



CORDED WARE COASTAL COMMUNITIES

USING CERAMIC ANALYSIS TO
RECONSTRUCT THIRD MILLENNIUM BC
SOCIETIES IN THE NETHERLANDS

SANDRA MARIËT BECKERMAN

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To my parents

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How can we reconstruct Corded Ware Culture chronology and society?

1.1 Introduction

“... a wandering race of hunters and pastoralist. They appear as pre-eminently martial folk: yet, whether by plunder or trade, they were able to secure products of distant lands. ... These conquering battle-axe wielders exerted a profound influence wherever they went.” (Childe, 1929: p.158)

“[A] revolutionary culture linked with a new way of life [cattle breeding], settlement patterns, burial practices and material culture that replaced the ‘traditional’ Neolithic culture forms ...” (Holmqvist-Saukkonen *et al.*, 2013, p.63)

The first quote, by Vere Gordon Childe, dates to 1929, when he published his grand narrative on the prehistory of Europe, titled *The Dawn of European Civilization*. For Childe, the beaker cultures were crucial to understanding the development from egalitarian to more complex and stratified societies (Childe, 1929). The work of Childe has had an enormous and lasting influence on subsequent researchers' ideas about beaker cultures. The second quote, by Holmqvist-Saukkonen, Larsson and Pesonen (who studied corded ware ceramics from Sweden, Finland and Estonia) indicates that almost a century later the Corded Ware Culture, in line with Childe's ideas, is still seen as revolutionary in nature.

Childe was not the first to underline the revolutionary character of the Corded Ware Culture; indeed, the first such descriptions date to the end of the nineteenth century. Müller (1898: p.277) described the builders of the single graves in Jutland as *“a new group migrating from the south: the Single Grave folk.”*

At the end of the nineteenth and the start of the twentieth century a new type of barrow was frequently encountered in many countries. Typically, these barrows contained a single individual buried in a crouched position with a set of grave goods (often including a beaker and, in the male graves, weapons, such as battle axes).¹ The second half of the twentieth century and the start of the twenty-first

1 For example, Åberg, 1916, 1918 (the Netherlands and Norway), Äyräpää, 1933 (Russia), Bursch 1933 (the Netherlands), Childe, 1929 (whole region), Götze, 1900 (Thüringen, Germany), Ischer, 1919 (Switzerland), Klopffleisch, 1883 (Sachsen, Germany), Kossina, 1910/1911 (whole region), Sprockhof, 1919-1920 (Brandenburg, Germany) 1925 (the Baltic), Van Giffen, 1930 (the Netherlands), and Götze, 1891 (the Baltic).

century saw many more publications focussing mainly on the chronology and the nature of Corded Ware society.²

The Corded Ware Culture covered a large area, from Russia to the Netherlands and from Scandinavia to Switzerland. The Corded Ware Culture covers the period 2900–2300 BC, albeit with slightly different start and end dates in different regions (Drenth and Lanting, 1991, Lanting and Van der Plicht, 1999-2000, Furholt, 2003a, Włodarczak, 2009).

Depending on the focus of research, the study region and the concept of culture involved, the culture was either called Single Grave Culture after the graves, Corded Ware Culture after a dominant technique of decoration, Protruding Foot Beaker Culture after the shape of the ceramic vessels and Battle-Axe Culture or Boat Axe Culture after the tradition of accompanying the male burials with an axe in some regions (Larsson, 2009: p.59). In recent years several scholars have abandoned the label ‘culture’ and interpret the similarities as a ‘complex’ (Larsson, 2009: p.59) or a ‘phenomenon’ (Furholt, 2013). The term Corded Ware Culture is used most widely and will therefore be used in this study as a shorthand.

Although the quote by Childe is now almost a century old, many authors still agree with Childe that this was a period that saw radical changes in material culture, economy and social organisation (e.g. Fokkens, 1998, Larsson, 2009, Holmqvist-Saukkonen *et al.*, 2013). This period is also still perceived as marking the rise of elites (Vandkilde, 2004, Westermann, 2007, Müller *et al.*, 2009, Pelisiak, 2013) and martiality (Fokkens, 1999, Vandkilde, 2006), while the eponymous beakers are often interpreted as drinking cups for alcoholic beverages (Childe, 1925, Klassen, 2005a-b, Sherratt, 1997a-b, Westermann, 2007). The strong focus on funerary contexts has also persisted.

One of the most debated aspects of the Corded Ware Culture concerns its origin and spread, through migration (e.g. Childe, 1929, Glob, 1969, Kristiansen, 1989, Brodie, 2001), diffusion (e.g. Lanting and Van der Waals, 1976, Hübner, 2005, Ebbesen, 2006, Włodarczak, 2009) or a combination of both (e.g. Kosko, 1997 and Larsson, 2009). Many causes have been proposed as the motor behind the spread of the Corded Ware Culture, including climate change, social changes, economic changes, changes in material culture, or a combination or ‘package’ (e.g. Glob, 1969, Kristiansen, 1989, Fokkens, 1998).

Much is still unknown about Corded Ware settlements and their social organisation, ideology, subsistence, and use of material culture. New dating methods have improved the chronology (Glob, 1969, Lanting and Van der Waals, 1976, Drenth and Lanting, 1991, Furholt, 2003a, Włodarczak, 2009), but there are still problems with establishing a high-resolution chronology due to the lack of dendrochronological dates, problems with the ¹⁴C dates (including broad wiggles in the calibration curve and uncertainty of association), and a lack of (studied) stratified contexts (Furholt, 2003a, Włodarczak, 2009).

This study aims to increase our knowledge on the debates outlined above and to fill in specific knowledge gaps, including the specifics of Corded Ware chronology and society. Aspects of society that require further study are the subsistence, technology and economy (i.e. what was eaten, what means were present to acquire (these) goods, and what were the nature and organisation of technology and subsistence), as well as social organisation and ideology. Ceramics from Corded

2 Amongst others, Buchvaldek, 1967 (Bohemia, now Czech Republic), Drenth and Lanting, 1991 (the Netherlands), Fischer, 1956 (Saale, Germany), Furholt, 2003a (whole region), Glob, 1945 (Jutland, Denmark), Hausler, 1955 (Russia), Hübner, 2005 (Jutland, Denmark), Lanting and Van der Waals, 1976 (the Netherlands), Sangmeister, 1951, Sangmeister and Gerhardt, 1965 (southern Germany), Strahm, 1971 (Switzerland), Struve, 1955 (Schleswig-Holstein, Germany), Van der Waals and Glasbergen, 1955 (the Netherlands), and Włodarczak, 2009 (whole region).

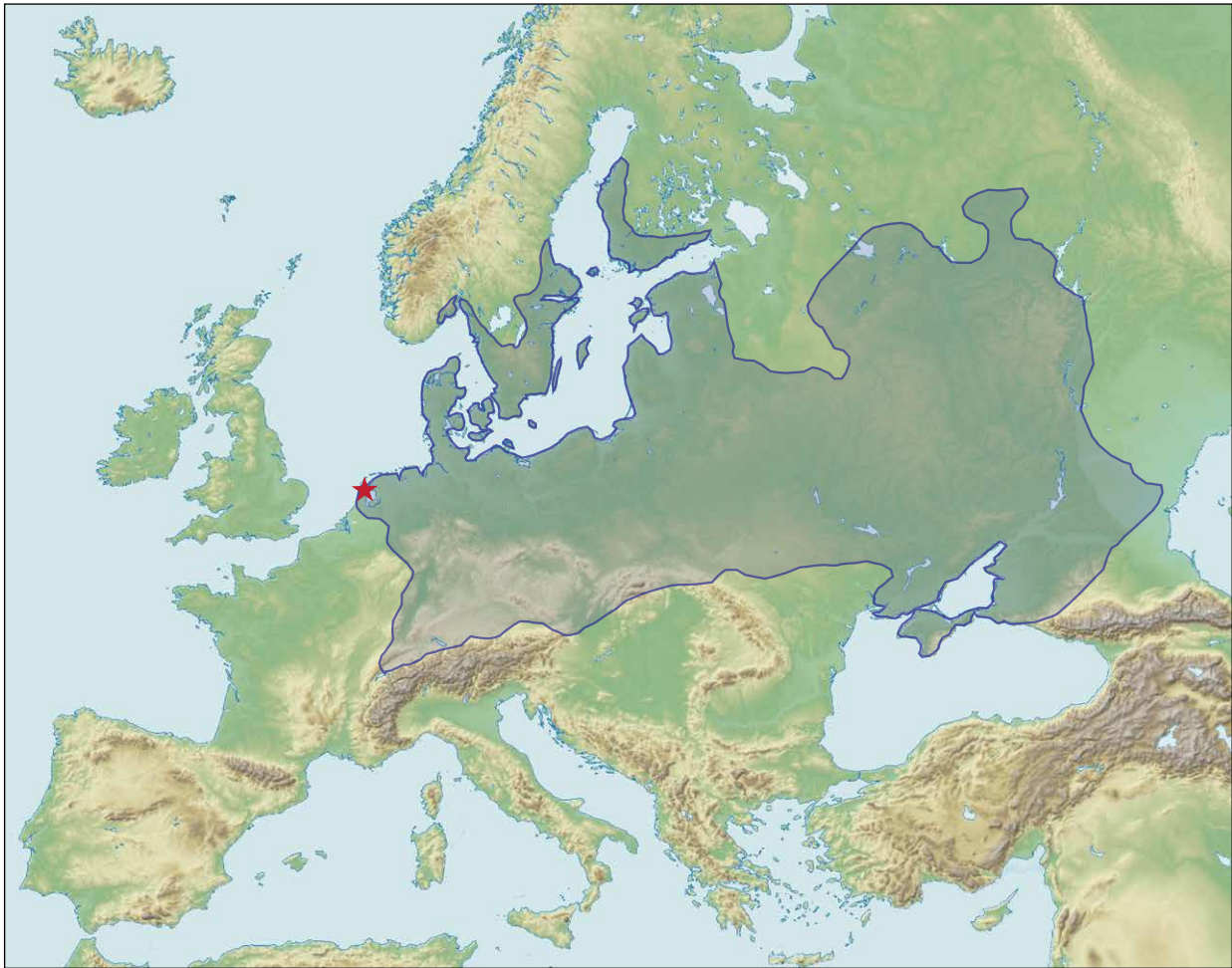


Figure 1.1 Map showing the distribution of supra-regional Corded Ware elements. The dot marks the location of the studied settlements (after: Milisauskas and Kruk, 2002).

Ware settlement sites from a tidal area in Noord-Holland, the Netherlands, will be studied to answer these research questions.

1.2 Previous research questions and debates

1.2.1 Introduction

During more than a century of study, two main themes have always prevailed: (1) chronology and change and (2) the reconstruction of society (tables 1.1 and 1.2). A short topical outline of the Corded Ware Culture will be presented below. In this outline the main debates will be described. This discussion also serves to outline the lacunas in our knowledge.

1.2.2 Corded Ware Culture Chronology

1.2.2.1 Migration, diffusion or a combination

The nature of the spread of Corded Ware Culture is strongly debated. There are three main viewpoints: (1) it spread through migration (e.g. Childe, 1929, Glob, 1969, Kristiansen, 1989, Brodie, 2001), (2) it spread through diffusion (e.g. Lanting and Van der Waals, 1976, Hübner, 2005, Ebbesen, 2006, Włodarczak, 2009) and (3) it spread through a combination of both of the above (Kosko, 1997 and Larsson, 2009).

Topic	Debate or question	Argument(s)	Problem(s)	Section	
Chronology and change	Origin	Migration: Skull morphometrics, short period of spread, radical changes in material culture and economy. Process of spread via communication network.	Ongoing debate, dating problems, starting period hardly studied at settlements.	1.2.1.1	
		Diffusion: Common traits with previous cultures, continuity.			
		Combination: Biological necessities, isotope evidence for mobility.			
	A-horizon	Does the Corded Ware start with a unity phase?	Unity phase: A-axe, A-beaker, Strichbündel amphora found all over Corded Ware area.	Dating problems.	1.2.1.2
			No unity phase: The objects of the A-horizon rarely occur together and are not necessarily the oldest.		
	Previous cultures	Is there a clear dichotomy or is there continuity of characteristics for previous cultures?	Dichotomy: New graves, material culture and economy.	Research often focused on one culture, strong focus on graves, settlements less-well known.	1.2.1.3
			Continuity: Battle-axes, single graves, amphora and cattle present in preceding cultures.		
Spread	What was the motor behind the spread?	Changes in the climate, social changes, economic changes, changes in material culture, or a combination or package.	Many options listed, difficult to test.	1.2.1.4	
Dating	Can we date the start, end and (sub)phases of the Corded Ware Culture?	Yes: typochronology, 14C dates, dendrochronological dates.	High-resolution chronology impossible, stratified (settlement) contexts are lacking or have not been studied (in sufficient detail).	1.2.1.5	
		Problematic: 14C dates problematic, few dendrochronological dates, lack of stratified contexts.			
End of Corded Ware Culture	Is there a clear dichotomy at the transition to the Bell Beaker Culture?	Continuous process: intermediate forms, types of both cultures found together.	Sites datable to transition period hardly studied.	1.2.1.6	
		Clear dichotomy: differences in material culture, novelties, different distribution areas.			

Table 1.1 Current main topics of debate on Corded Ware Culture chronology and change.

A migrationist view was adopted by most scholars in the early years of Corded Ware Culture research. Evidence for migration during the Corded Ware period was found in new skull types and in economic and cultural traits that were said not to resemble those of their predecessors and that were perceived to have spread in a short period of time (Äyräpää, 1915, Buchvaldek, 1967, Glob, 1969, Girininkas, 1988, Gimbutas, 1979).

Under the influence of the New Archaeology in the nineteen-sixties and seventies, more and more scholars explained the spread of the Corded Ware Culture in terms of diffusion (Malmer, 1962, Neustupný, 1969, Lanting and Van der Waals, 1976, Hübner, 2005, Ebbesen, 2006, Włordarczak, 2009). These studies focussed on the supra-regional elements that are found in the whole or in large parts of the Corded Ware area. This traditional focus on shared characteristics of the Corded Ware Culture has, however, led to a neglect of differences in local manifestations and thus a failure to notice locally continuing processes (Sørensen, 1997: p.228). Instead of large-scale migrations, it is now thought that large-scale communication networks were responsible for the spread (Furholt, 2003b: p.26). Social novelties and new styles of materials spread as macro-regional fashion movements and saw a differentiated reception regionally and locally (Vandkilde, 2006: p.412). Local practices and foreign novelties mixed, transforming societies in the process (Vandkilde, 2006: p.412).

A third option, a combination of migration and diffusion, has also found support in recent years (Kosko, 1997 and Larsson, 2009). The influence of Lévi-Strauss's structuralism (Lévi-Strauss, 1963), which considered marital necessities as the prime cause for migration, and the recent evidence from isotope studies (e.g. Müller, 2013), have resulted in renewed support for migration and mobility as part of the explanation for the spread of this culture. According to Müller (2013), this increase in mobility led to the emergence of a network of communities with an exogamic marriage system that may have been the motor behind both social and material culture change. Isotope studies, sometimes combined with DNA analysis, have provided evidence for this model, as these studies have shown that during the Corded Ware period movements of individuals or small groups were common (e.g. Haak *et al.*, 2008: p.18229, Chenery and Evans, 2011a: p.32, 2011b: p.87).

Topic	Debate or question	Argument(s)	Problem(s)	Section	
Society and social organisation	Economy and subsistence	Is the Corded Ware characterised by a revolutionary new economy?	Yes: cattle-isation, hardly any settlements showcase a nomadic lifestyle, symbolic use of bulls.	Too little ecological and zoological research.	1.2.2.1 and 1.2.2.2
		No: regional differences, also agriculture, cereal and cereal imprints in ceramics, adaption to regional ecological circumstances, cattle already present in previous period.			
	Settlements	Did settlements become less substantial?	Yes: settlements not found in large parts of Corded Ware region, nomadic lifestyle based on cattle-herding.	Too little settlement research done.	1.2.2.3
			No: regional differences.		
	Gender	Are there gender-based differences in status?	Inequality: Men become more important, grave goods reflect role head of family and martiality.	Only based on graves.	1.2.2.6
			Equality: different roles, but both are equal, equal number of male and female graves.		
	Individualisation and the rise of elites	Did the individual become more important and does this period mark the start of the rise of elites?	Yes: from communal to single graves, smaller settlements and a new social structure led to the rise of private property (cattle).	Only based on graves.	1.2.2.7
			No: accumulation of wealth not possible, uniformity of grave goods all over Corded Ware area; consequently these cannot reflect wealth.		
	Martiality	Did the Corded Ware Culture period see the rise of martiality and warfare?	Yes: Need to protect livestock, grave-goods including battle axes, example: arrow in sternum in Gjerrild.	Mainly based on theoretical views, rare evidence of violence, difficult to test.	1.2.2.8
			No: sparse examples of use of violence.		
Alcohol	Were the beakers used for drinking alcohol?	Yes: alcohol as source of influence, beakers in male graves, shape of the beakers, Refshøjgård non-carbonised grain in beaker.	No residue analysis, almost exclusively based on graves.	1.2.2.9	
		No: very limited evidence, beakers were (also) used for other purposes like cooking.			
Religion and ideology	Did the Corded Ware Culture have a new ideology and religion?	New: Reflection of new social and economy reality, based on opportunity, mobility, new funerary rites, bulls as symbol; lack of settlements is indication of rules against digging.	Much information on funerary and some on special deposits, far too little information on daily life ideology and religion	1.2.2.10	
		Continued: votive depots, single deposits.			
Unity	Is the Corded Ware Culture characterised by uniformity or diversity?	Uniformity: same graves and grave-goods all over Corded Ware area.	Long tradition of focus on uniformity, regions and differences received far less attention	1.2.3	
		Diversity: regional differences in subsistence and artefacts, local ongoing older traditions, statistical analysis: local tight-knit network and large loose-knit network.			

Table 1.2 Current main topics of debate on Corded Ware Culture society and social organisation.

The rapid spread of items belonging to this culture, and the assumption that it is impossible for individuals to learn a new technique from a finished object alone, are arguments that have been used to reintroduce the migrationist approach (Kristiansen, 1989: p.213, Brodie, 2001: p.488).

1.2.2.2 Origin

Strongly related to the question of the spread of the Corded Ware Culture is the question of its origin. This topic has also been disputed for a long time. Proposed areas of origin are Denmark (Kossina, 1910/1911), Thuringia (Childe, 1929), southern Russia (Childe, 1929, Glob, 1945), Kurgan/Pontic steppe (Gimbutas, 1979), Central Europe (Sherratt, 1981) and Poland (Furholt, 2003a). Some scholars have suggested that the first phase is a uniformity phase, dubbed the A-horizon (Glob, 1945, Struve, 1955, Buchvaldek, 1997). During this initial phase, three kinds of artefacts were allegedly present in all regions: the A-axe, the A-beaker with cord decoration, and Strichbündel amphora (Glob, 1945, Struve, 1955). This idea of an A-horizon was, however, rejected by Malmer (1962), Neustupný (1969), Behrens (1997) and Ebbesen (2006), who all stated that the artefacts that form this horizon rarely occur in association across the whole region. Furholt (2003b: p.22) proposed a non-ceramic starting phase for the Corded Ware Culture. A list of supra-regionally shared items was compiled by Furholt (2014a) (see figure 1.2). These items comprise not just the items of the A-horizon, but also others, such as the C-beaker with herringbone decoration and short wave

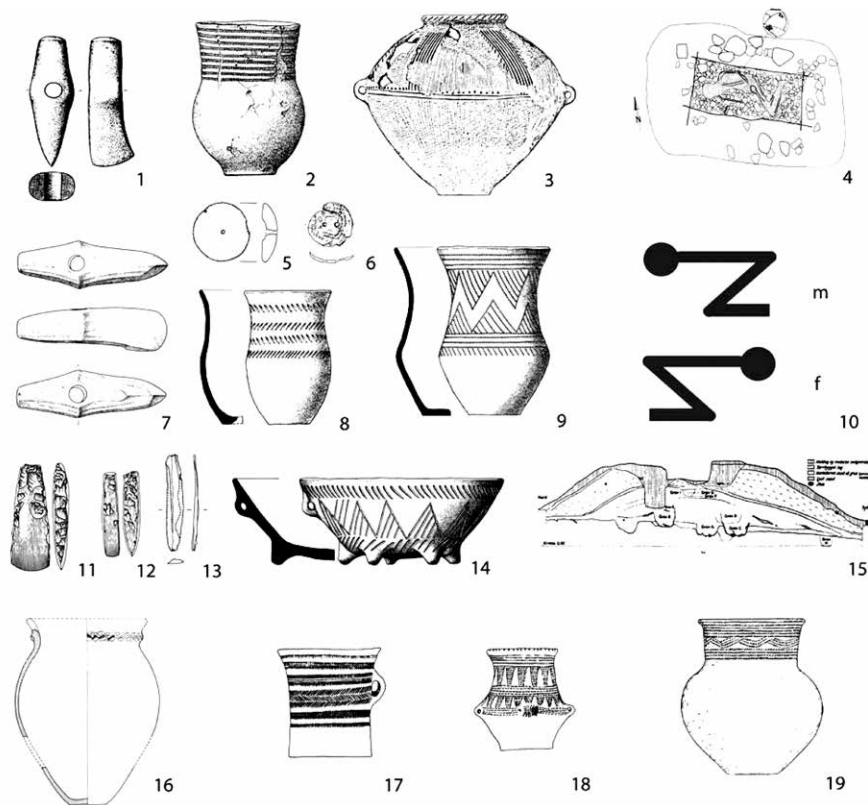


Figure 1.2 Corded Ware Culture elements with a supra-regional distribution (after: Furholt, 2014a: fig.2).
 1. Battle axe (Type A), 2. Cord-decorated beaker (Type A), 3. Strichbündel amphora, 4. Single burial, 5. Disc-shaped amber ornament, 6. Disc-shaped bone ornament, 7. Faceted battle axe, 8. Herringbone-ornamented beaker, 9. Triangle-ornamented beaker, 10. Gender-specific deposition rules, 11. (Flint) axe, 12. (Flint) chisel, 13. Flint blade, 14. Bowl, 15. Burial mound, 16. Short wave moulded vessel, 17. Straight-walled vessel, 18. Amphora.

moulded vessels (figure 1.2). According to Furholt (2003a: p.118-121, 2014a: p.9), these items do not reflect a typological horizon, but rather a set of items that were imbedded into a regionally more diverse set of material culture.

1.2.2.3 Preceding cultures

An analysis of the differences between the Corded Ware Culture and preceding cultures has led some authors to postulate a discontinuity (e.g. Vander Linden, 2001a). Others have stressed instead that several elements show continuity (Sørensen, 1997, Furholt, 2003a, Hübner, 2005, Larsson, 2009). For example, Vander Linden (2001a) has pointed to the differences between the Funnel Beaker Culture and the Corded Ware Culture, but Sørensen (1997: p.228) and Hübner (2005: p.753-754) state that important elements of the Corded Ware Culture, such as battle axes and single graves, were already present during the Funnel Beaker period. The amphorae of the preceding Globular Amphora Culture are seen as direct precursors to the amphorae of the Corded Ware Culture in the same region (Larsson, 2009: p.61). Particularly the Strichbündel amphorae have been interpreted as a development of the Złota-group out of the preceding Kugel amphorae (Furholt, 2003b: p.19).

1.2.2.4 Motor behind the spread

Both social change and climate change have been proposed as causes for the spread of the Corded Ware Culture, and these may have driven the spread of innovations and changes in the economy and subsistence (e.g. Glob, 1969, Kristiansen, 1989, Fokkens, 1998). Fokkens (1998: p.487) has suggested that the beakers were a symbol accompanying the plough; when the use of the ard was adopted by new communities, so were the accompanying symbols. These economic changes, in turn, had social implications, such as a shift from collective to individual burial (Fokkens, 1998: p.487). According to Furholt (2014: p.1), the Corded Ware

Culture is not a social totality but, rather, a set of symbols and practices. An increase in mobility is nevertheless seen by Furholt (2014a: p.16) as the motor behind the spread of Corded Ware Culture, but only indirectly – with mobility being made possible by the long-term effects of technological innovations that, in turn, led to economic and social change.

Glob (1969: p.83) proposed climate change as the motor behind the spread of the Corded Ware Culture. He thought that during the fourth and third millennia BC, the climate became warmer on the steppes east of the river Wolga, with pasture areas decreasing in size (Glob, 1969: p.83). In this scenario, the nomadic Corded Ware people could no longer find enough pasture on the steppes and they spread in all directions to find new pasture (Glob, 1969: p.83). Climate change is also seen by Kristiansen (1989: p.217) as a factor that contributed to the development of the Corded Ware Culture. According to Kristiansen (1989: p.217), the Corded Ware Culture was a response to a cooler and wetter climate around 3000 BC. Adapting to this climate led to new social and economic practices (Kristiansen, 1989: p.217).

1.2.2.5 Typochronology and absolute dates

Not only the origin, start, spread and antecedents of the Corded Ware Culture, but also the changes that happened during the Corded Ware Culture have been studied and debated. In the decennia after World War II many typochronologies, mainly of axes and beakers, were compiled for the different areas and countries.² The Corded Ware Culture has in different regions been split up into several different phases, based on developments in axes, beakers or a combination of these and other artefacts (e.g. Glob, 1945, Hübner, 2005, Lanting and Van der Waals, 1976, Sangmeister, 1951). Ebbesen (2006: p.245), however, suggested that few changes occurred during the course of the period. Another much debated topic is the presence or absence of the above-mentioned A-horizon (e.g. Glob, 1945, Struve, 1955, Malmer, 1962, Neustupný, 1969, Behrens, 1997, Ebbesen, 2006).

In the second half of the previous century, ¹⁴C dates and, especially in Switzerland, dendrochronological dates became available for the Corded Ware Culture. These dating methods have been used to test the typochronological subdivisions of the Corded Ware Culture. Furthermore, these dating methods have been used in the debates on migration vs. diffusion and on the origin, spread and end of the Corded Ware Culture. However, detailed chronological phasing has proved to be difficult because the ¹⁴C dates suffer from numerous problems, such as broad plateaus in the calibration curve, uncertainty of association, problems with the sample treatment, an own age of the dated material, and limited stratigraphic evidence (Sørensen, 1997, Furholt, 2003a, Włodarczak, 2009). These problems hamper the establishment of high-resolution chronologies and have thus far failed to settle the debates on migration vs. diffusion and on the origin, spread and end of the Corded Ware Culture.

1.2.2.6 End of the Corded Ware Culture and transition to the Bell Beaker Culture

The end of the Corded Ware Culture and the transition to the Bell Beaker Culture is also a much studied topic. In their influential 1976 paper, Lanting and Van der Waals postulated that the development from Corded Ware to Bell Beaker must have been continuous and that All Over Ornamented Beakers can be seen as the link (Lanting and Van der Waals, 1976: p.4). Bell Beakers were thus seen as a local development in the middle and lower Rhine regions, with roots in the Corded Ware Culture, rather than having a foreign, Iberian, origin (Lanting and Van der

Waals, 1976: p.4). Brodie (2001, p.487) postulated the same area of origin for the Bell Beaker pots, but also stated that copper working was an important new technique that spread through Europe in a south-east to north-west direction. Brodie suggested that beakers may have tagged along.

Besse (2004) compared Bell Beaker pottery with the ceramics from preceding cultures for 80 sites in 11 countries. She concluded that in the southern part of the Bell Beaker distribution area there is a clear dichotomy in the types present on earlier Late Neolithic sites and on Bell Beaker sites (Besse, 2004: p.140-142). In the northern and the eastern parts of the Bell Beaker distribution area, however, many Bell Beaker types show a strong resemblance to older Corded Ware types (Besse, 2004: p.137-140). Besse (2004: p.142) therefore concluded that in the northern and eastern parts of the Bell Beaker distribution area, the Corded Ware Culture played a major part in the origin of the Bell Beaker Culture, but that in the southern part of the Bell Beaker distribution area the transition was more radical. It should be noted that the Bell Beaker Culture was not fully adopted or developed in all regions of the Corded Ware Culture; in Denmark, for example, only few Bell Beaker characteristics are visible (Hübner, 2005: p.750).

1.2.3 Corded Ware Culture Society

1.2.3.1 Introduction

In addition to the debate pertaining to chronology and change, in which especially the questions of origin and spread have sparked much debate, there is a second, related debate about how society was organised. Many scholars agree that the third millennium BC was an era of substantial economic and social changes (e.g. Fokkens, 1998, Larsson, 2009, Holmqvist-Saukkonen *et al.*, 2013). In explaining Corded Ware society, different scholars have taken different viewpoints and different starting points. Changes in technology, economy and subsistence have been taken as a starting point by many (e.g. Childe, 1929, De Laet and Glasbergen, 1959, Sørensen, 1997, Turek, 1997, Hübner, 2005, Klassen, 2005a-b, Ebbesen, 2006, Müller *et al.*, 2009, Rasmussen, 2013). Evidence from Corded Ware Culture settlements has been used to reconstruct the technology, economy and subsistence (e.g. Klassen, 2005a-b, Ebbesen, 2006: p.226, Rasmussen, 2013). Most often, it is funerary contexts, rather than settlement contexts, that have been used to compile social models. In these models, factors such as individualisation and the rise of elites (e.g. Vandkilde, 2004, Westermann, 2007, Müller *et al.*, 2009, Pelisiak, 2013), martiality (e.g. Fokkens, 1999, Vandkilde, 2006) and the use of alcohol (Childe, 1925, Sherratt, 1997a, Klassen, 2005a-b) are often important. The ideology and religion of the Corded Ware people have also been discussed by several scholars (Sherratt, 1997b, Ebbesen, 2006, Müller *et al.*, 2009, Turek, 2012).

1.2.3.2 Technology and economy

Childe took a Marxist historical materialist approach to studying the Corded Ware economy and stressed the importance of technological changes as a starting point for explaining Corded Ware society. It is therefore not surprising that Childe (1929: p.158) mentioned the economy and subsistence in his first sentence of his description of the Corded Ware Culture:

“... a wandering race of hunters and pastoralist [...] by plunder or trade, they were able to secure products of distant lands ...”

For Childe, pastoralism and hunting thus dictate other aspects of society. Plunder and trade were used to obtain amber, salt and tin (Childe, 1929: p.158). Sherratt's (1981) model of the 'secondary products revolution' supported and refined Childe's view. This revolution concerns the introduction, in different stages, of the ard, the wheel, wool and the horse, which led to fundamental changes in third millennium BC social organisation, gender roles and settlement patterns (Sherratt, 1997a: p.385). In both Childe's and Sherratt's lines of explanation, technology and subsistence play a large role in explaining how society was organised.

In the Netherlands, reconstructing the nature of the Corded Ware Culture means of production has led to some debate. Van der Waals (1984) suggested that the innovations of the ard, wheeled transport, milk and wool must have played an essential role in the transition from the Funnel Beaker Culture to the Corded Ware Culture. Fokkens (1998: p.487) has also interpreted the spread of the ard, together with carts, draught animals and certain cultural traits, as important economic changes in the Netherlands. For Fokkens, socio-economic changes in the Funnel Beaker Culture led to the Corded Ware Culture. Drenth and Lanting (1997) questioned the importance of the ard and the wheeled vehicle to the discussed cultural transformations. They argued that the current state of research in the Netherlands does not allow for these far-reaching conclusions and that the plough may already have been common in the Funnel Beaker period (Drenth and Lanting, 1997; p.62). Furthermore, Drenth and Lanting (1997: p.62) propose that there is evidence that wheeled transport also pre-dates the Corded Ware Culture. Technology and the organisation of this technology thus play an important part in reconstructions of the Corded Ware Culture, as does subsistence (that is, what was eaten).

1.2.3.3 Subsistence

Cattle breeding is often seen as an important part of the Corded Ware Culture subsistence base. Some researchers even considered it to be the motor behind the spread of the Corded Ware Culture (Childe, 1929, De Laet and Glasbergen, 1959, Sherratt, 1997a, Heyd, 2013). Heyd (2013) suggested that this subsistence base involved 'cattle-isation', meaning a huge increase in the importance of cattle. Reconstructions of Corded Ware subsistence have, however, been hampered by a lack of evidence. In large parts of the Corded Ware distribution area, settlements are scarce or even non-existent (Larsson, 2009: p.63-64). The lack of settlement evidence led scholars to presume that Corded Ware people were nomadic and pastoral (Childe, 1929: p.145, De Laet and Glasbergen, 1959: p.86, 88). Sherratt (1997a: p.422) postulated that this cattle-based, pastoral economy required less substantial settlements. Heyd (2013) argued that the cattle revolution started on the steppes and that the increasing numbers of cows led to a more pastoral economy with more mobility among people and, consequently, more contacts. This, in turn, led to the geographical expansion of the Corded Ware Culture over large areas of Europe. In a more mobile way of life, wheeled transport may have gained in importance. Vencl (1994) even theorised that wagons may have substituted for permanent dwellings.

According to Pelisiak (2013), the increasing importance of pastoral husbandry – in combination with a more sedentary way of life – led to the need to protect livestock, as shepherds could come into conflict. This, in turn, led to the emergence of a shepherd/warrior elite (Pelisiak, 2013, p.73). In this way, a changed economic system led to social differentiation and new social relations (*loc. cit.*). Cattle

husbandry has also been linked to more freedom for the individual and the first emergence of private ownership (Hübner, 2005: p.753).

However, not all scholars assume such a revolutionary increase in the importance of cattle. Sørensen (1997: p.228), for example, argues that the increased importance of cattle was a slow development rather than a revolution. Cattle husbandry was not new to the Corded Ware period; it simply increased in importance (Hübner, 2005: p.752).

Still other researchers have argued that crop agriculture must have played an important part (e.g. Ebbesen, 2006, Larsson, 2009). In the areas where settlements are rare, pollen, carbonised plant macroremains and cereal impressions on ceramics are seen as evidence for crop cultivation (Larsson, 2009: p.63-64). Regional differences in subsistence – reflecting the different opportunities afforded by the different landscapes that the Corded Ware communities inhabited – have also been postulated (Ebbesen, 2006: p.228). Similarly, Turek (1997) opposed the idea of a universal nomadic economy. In his view Central Europe was not suitable to this way of life; the absence of settlements is not caused by a nomadic lifestyle, but may instead reflect ideological rules against digging into the ground (Turek, 1997). Evidently, the subsistence system to a large degree influenced the nature of Corded Ware settlements, as well as their use, location and size.

1.2.3.4 Settlements

Although the Corded Ware area extends from Russia to the Netherlands and from Scandinavia to Switzerland, settlement sites with good preservation conditions for organic remains are very rare and have only been found in parts of Finland, the Netherlands, Germany, Switzerland and Denmark. The absence of such settlements in other areas has led to the interpretation that the social organisation came to be based on smaller social groups, with a decrease in settlement size (Hübner, 2005: p.752). Many authors propose that the Corded Ware settlements represent a new way of life (e.g. Hecht, 2007, Müller *et al.*, 2009, Holmqvist-Saukkonen *et al.*, 2013). From a comparison of different settlements in Central Europe and southern Scandinavia, it was concluded that the larger village communities of the earlier phases were replaced by smaller Corded Ware nuclear families, dotting the landscape with dispersed small hamlets or single homesteads (Hecht, 2007, Müller *et al.*, 2009: p.140). Local production was organised within such hamlets (Müller *et al.*, 2009: p.140). These hamlets were part of a tight-knit exchange network with neighbouring communities and a more loose-knit exchange network of communities at greater distances (Müller *et al.*, 2009: p.140).

The settlement finds reflect a subsistence system that was well suited to the regional circumstances and possibilities (Klassen, 2005b, Ebbesen, 2006: p.226, Rasmussen, 2013). For example, the inhabitants of Gaasemosen, a coastal site in Jutland, combined long-distance herding with seasonal hunting and fishing (Rasmussen, 2013). In contrast, on the more fertile soils of eastern Jutland, the cultivation of emmer wheat formed an important part of the subsistence system (Klassen, 2005b: p.17-22). Settlement sites in a tidal area in the Netherlands show a broad spectrum economy combining the cultivation of crops and the keeping of livestock with hunting, fowling, fishing and gathering (Hogestijn, 2001: p.155-156, Drenth *et al.*, 2008: p.175). In Switzerland, Corded Ware Culture settlements are found on the margins of lakes, where the people once again tailored their subsistence base to the local circumstances. For the Swiss sites, there are few differences with previous cultures and the economy can be characterised as mixed farming (Strahm, 1971: p.172-173). As a fifth example, the settlement of Wattendorf-Motzenstein, located on a rocky dolomite outcrop in Franconia

(Germany), was inhabited by an agrarian Corded Ware community (Müller *et al.*, 2009: p.125-126). Their subsistence base consisted of stock breeding, the cultivation of cereals and pulses, and hunting (Müller *et al.*, 2009: p.137).

Whereas settlements are rare in many parts of the Corded Ware distribution area, funerary contexts have been found in almost all Corded Ware regions. These funerary contexts have been more intensively used to reconstruct Corded Ware society.

1.2.3.5 Graves

The Corded Ware funerary record has often been used to reconstruct the social organisation of Corded Ware societies. Hübner (2005: p.738) has called the Corded Ware tumuli ‘monument of the radical changes’ of the period. This quote is indicative of the importance many scholars attach to the graves, the position of the body within the grave and the associated grave goods, which are seen as very distinctive for this culture (Hübner, 2005). In several regions, the culture is even named after the practice of burying just one person in each grave, being variously referred to as Single Grave Culture, Einzelgrabkultur (Germany) or Enkelgrafcultuur (the Netherlands) (Hübner, 2005, Lanting and Van der Waals, 1976). The position of both the grave, the deceased and the grave goods are said to have been regulated by strict rules (Turek, 2012: p.196). Men were buried on their right side in a crouched position, with the head oriented to the west, while women were buried on their left side in a crouched position, with the head oriented to the east (Hübner, 2005: p.743). The graves are often covered by a small barrow, and they are sometimes surrounded by a ring ditch and/or a circular ring of posts (Hübner, 2005: p.739). The frequently linear arrangement of barrows has led one researcher to propose that the monuments were placed along roads (Ebbesen, 2006: p.236). According to Bourgeois (2013: p.194), the alignment of the barrows was part of a cultural concept of the structuring of space, linked with roads and (thus) the movement of people.

Not just the graves and their location and alignment but also the grave goods have been used to reconstruct Corded Ware societies. The extent to which burials are considered to reflect the patterns of daily life and social structures varies between scholars. Some authors have translated graves and grave goods rather directly into societal organisation (e.g. Fitzpatrick, 2011). In opposing views, the grave artefacts are seen as also reflecting the mourners, rather than solely the deceased themselves (Turek and Černý, 2001: p.606). Consequently, it has been stressed that the graves do not necessarily mirror living society, but that they reflect ‘imagined identities’ – an idealised situation or idealised world (Kolar, 2013). Yet potentially, grave sets may be indicative of such social aspects as gender roles.

1.2.3.6 Gender roles

Various grave goods in Corded Ware graves are seen as gendered artefacts. Necklaces of animal teeth or circular shell discs, copper (solar) discs and hair ornaments, and such ceramics as ovoid pots and amphorae are seen as gifts for females (Turek and Černý, 2001: p.605). Male grave goods often include a battle axe, but other axes, blades, blade knives and pairs of amber discs are also common (Ebbesen, 2006: p.234). The items incorporated in male graves frequently reflect access to long-distance connections (Kolar, 2013). Copper tools also occur in male graves (Turek and Černý, 2001: p.605). Craft work may have been held in high esteem, as the graves of both males, females and children contain items for craft production (Kolar, 2013). Ceramics are found in both male and female graves (Hübner, 2005: p.744). The item that gave this culture its name, the cord-

decorated beaker, is often found in graves of both sexes. The shapes and to a lesser degree decorative patterns on these beakers vary, from the slim, long-necked beakers of the Netherlands and parts of Germany to the more globular, wide-mouthed beakers of Sweden and Finland (Larsson, 2009: p 60). Beakers are more often found in male graves, but they also occur in female graves (Turek, 2012: p.196). Because these beakers are found in graves with many and in graves with few grave goods, it has been postulated that these beakers unite the different ranks and represent an aspect of identity that is shared by the whole community (Vandkilde, 2006: p.415).

Although most authors agree that various grave goods are gendered artefacts, their interpretations differ. Some interpret the differences between male and female graves as symbolic reflections of the division of labour within the family and the different statuses of men, women and children (Turek, 2012: p.197). Others, conversely, conclude that men and woman were 'strikingly equal' (Ebbesen, 2006: p.240). Still others see strong differences between the sexes (Hübner, 2005: p.745, 747). Drenth (2005: p.360) suggested that the gendered grave goods reflect differences in daily life, and he argued that the highest social positions were occupied by men (Drenth, 2005: p.360). This higher status of men is often seen as being derived from men's role as warrior, as head of the family or both (e.g. Hübner, 2005: p.753). The proposed expressions of individuality – such as burials in individual graves – are interpreted as reflecting either a social category or social diversification (Turek, 2012: p.197). Both the expression of gender role and the rise of individualisation and elites have been associated with the Corded Ware period.

1.2.3.7 Individualisation and elites

Many authors see the Corded Ware period as a time in which society changed from being group-oriented and egalitarian towards being more individual and stratified (e.g. Westermann, 2007, Pelisiak, 2013, Vandkilde, 2004, Müller *et al.*, 2009). Evidence for individualisation and the rise of elites is seen to be reflected in both settlements and burials. Settlements are said to have become smaller, and this new settlement pattern, in turn, led to changes in the social structure. In this changing society, private property could have played an essential role (Hübner, 2005: p.752, Müller *et al.*, 2009: p.140).

The change from communal megalithic graves to the single graves of the Corded Ware Culture is interpreted as reflecting individualisation (Westermann, 2007: p.22). The construction of high mounds is, from a social-evolutionist perspective, taken as evidence that society comprised an elite with a higher status (Kristiansen, 1989). Graves with high-status grave goods, such as weapons for men and whetstones and jewellery for women, are taken as evidence for the emergence of a segmented society (Hofmann, 2013). Clusters of larger graves with more grave goods are interpreted as the burial places of the chief's kin (Hofmann, 2013). The presence of different types of axes and beakers in graves is taken by Czebreszuk and Szmyt (2013) to indicate competition within the elite group. The elites and the superior role of men, according to Czebreszuk and Szmyt (2013: p.67-68), helped to stabilise society, but at the same time also led to permanent competition among group members.

This model of the rise of individualisation and elites, as indicated by the presence of high-status grave goods, has also been criticised. Some researchers have stated that Corded Ware communities were without significant social differences (Ebbesen, 2006: p.240, Hübner, 2005: p.746). According to Ebbesen (2006: p.245), Corded Ware social structure even prevented the accumulation of

individual wealth and thus the formation of an elite. Vandkilde (2006: p.414-417) questioned whether the elite was solely male. He proposed that the comparable numbers of men and women belonged to this elite and that this points towards gendered divisions of labour rather than male dominance (Vandkilde, 2006: p.414-417). Fokkens states that all over Europe there is strong uniformity in the graves and grave goods of the Corded Ware period. Weapons, ceramics, tools and ornaments in graves are usually found in single digits, and this pattern existed for a millennium (Fokkens, 2005: p.10). This indicates, according to Fokkens, that the graves and grave goods do not indicate wealth (Fokkens, 2005: p.10). His alternative interpretation is based on the idea that the funerary ritual transforms the deceased person into a stereotypical ancestor (Fokkens, 2005: p.11). These ancestors were seen as very important for Beaker society (Fokkens, 2005: p.11). The grave goods, including weapons, are seen as symbolic tokens for the morals and values of society, and they acquired this value through exchange (Fokkens, 2005: p.11). Besides being interpreted as a tentative reflection of societal values, weapons from graves have also been more explicitly linked to values such as martiality.

1.2.3.8 Martiality

Ever since Childe, martiality has been seen as an important aspect of Corded Ware Culture society. Whereas researchers seem to agree on the existence of martiality, they differ in their interpretation of how martiality was expressed (e.g. Fokkens, 1999, Ebbesen, 2006, Vandkilde, 2006). Warrior equipment in male graves may carry symbolic meaning (Vandkilde, 2006: p.410-417). Martiality has been linked by Childe (1929) to the emergence of elites and the need to defend private property. Others have proposed that martiality reflects society and its ideology as a whole and does not simply reflect elites. Fokkens (1999: p.37) has proposed that endemic warfare became an important element in society when the large communities of the Middle Neolithic dissolved into smaller social units during the Late Neolithic. Expressions of martiality in graves are interpreted in terms of the 'constitution' of the people; the right to carry weapons is thus seen as a rite of passage of becoming a man (Fokkens, 1999: p.39). Fokkens proposed that older men would give up their weapons and deposit them for the gods in rivers or marshes (Fokkens, 1999: p.39). Deceased buried with weapons are thus said to represent a specific age group rather than an elite (Fokkens, 1999: p.39). Kolar (2103) relates warfare to teenagers rather than to adults.

Kristiansen (1989: p.214) sees a Corded Ware ideology of warfare, hierarchy and domination as an important argument for his migration hypothesis. He argues that if this culture spread peacefully, warfare would not have been necessary (Kristiansen, 1989: p.214). Examples of the use of violence are, however, rare. In a burial in Gjerrild (Denmark), an arrowhead embedded in the breast bone was argued to be the cause of death (Ebbesen, 2006: p.241). Indications for violence were also found in the four closely related Corded Ware multiple burials from Eulau (Germany) (Haak *et al.*, 2008: p.18227).

Direct evidence for martiality thus exists in the presence of weapons in the (few) burials where there are indications for the use of violence. Indirect evidence is sought in the proposed need to defend property. Beakers found in funerary contexts have been linked to alcohol consumption; this alcohol consumption has in turn been linked with martiality and the rise of elites.

1.2.3.9 The alcohol problem

“Indeed the inevitable drinking-cup which gives a name to its users may be more than a readily recognised diagnostic symptom: it symbolizes beer as one source of their influence as a vodka flask or a gin bottle would disclose an instrument of European domination in Siberia and Africa respectively.” (Childe, 1925: p.223)

Childe was the first to suggest that the beaker folk used the eponymous beaker for drinking alcohol. Alcohol provided the distributors of it with a source of influence or even domination (Childe, 1925: p.223). Sherratt (1997a: p.392) also postulated that alcohol can be seen as a social lubricant used in the process of forming a new social fabric, a lubricant that was needed as the Corded Ware Culture witnessed a period of social, cultural and economic change. Sherratt's (1997a-b) main arguments involve the shapes and decorations of the beakers, their presence over large areas and the presence of beakers in male graves. The widespread cord decoration on these beakers may have been an advertisement of the beaker's contents: the cord may have been made from hemp (Sherratt, 1997a: p.397). Sherratt argued that alcohol was rare and that access to it was the privilege of a special status category (Sherratt, 1997b: p.422). For example, Sherratt (1997b: p.422) linked drinking to older men with family authority.

For the Bell Beaker period, the use of beakers for alcohol has been much debated and tested. Recently, new techniques have become available that enlarge the possibilities for analysing the contents of a vessel. By analysing the absorbed or carbonised residues, a reconstruction of the former contents can be made. For the Bell Beaker period, this method has allowed more beakers containing alcohol, especially from Spain, to be recognised (Rojo-Guerra *et al.*, 2006, Guerra Doce 2006a-b). Negative evidence, that is, beakers without contents, has, in turn, been used to dispute the alcohol theory (Vander Linden, 2001b: p.47, Brodie, 1997, Case, 1995). However, others have argued that empty beakers may have acted as a symbol of a vessel for alcohol (Vander Linden, 2001b: p.47). In France, residues are also found on Bell Beakers, but these beakers are interpreted as cooking vessels (Pétrequin and Pétrequin, 1988: p.251-255). Other possible uses of beakers include reduction pots for smelting copper ore, funerary urns and, in the case of large beakers, storage vessels (Guerra Doce, 2006a: p.248-256). Guerra Doce concludes that all these activities have a symbolic connection and that all the activities linked to beakers imply some kind of transformation (Guerra Doce, 2006a: p.247).

In contrast to the Bell Beaker period, evidence for alcohol consumption remains very scant for the Corded Ware period. At Refshøjgård in eastern Jutland, non-carbonised barley grains were found in a corded beaker of the oldest phase of the Single Grave Culture (Westermann, 2007: p.28, Klassen, 2005a). The increased number of beakers used as grave goods in the later phases of the Single Grave Culture in Jutland have been interpreted as evidence for an important role for beer and cereals in the funerary rituals and possibly also in daily life (Klassen, 2005a: p.19-22). To summarize, although the consumption of alcohol has often been assumed for the Corded Ware period, the actual evidence remains scant and needs further testing.

1.2.3.10 Religion and ideology

Although religion and ideology are seen as important elements of Corded Ware society, they are not often the main research topic. However, several elements have been discussed by different authors. Many authors interpret changes in ideology as resulting from changes in the social and economic spheres (Sherratt, 1997b:

p.424, Turek, 2012: p.197, Müller *et al.*, 2009: p.140). According to Sherratt (1997b: p.424), the ideology and religion of the Funnel Beaker Culture centred around sacred places and events and included enclosures, astronomical alignments, esoteric paraphernalia and sacrificial offerings. During the Corded Ware period, this ideology was replaced with one based on opportunity and mobility (Sherratt, 1997b: p.424). Sherratt (1997b: p.424) proposed that Corded Ware burial mounds and (possibly) the patterns of exchange represent particular events. This is in contrast with Funnel Beaker ideology, which, he argued, was based on a predetermined cycle. For the first time, personal possessions were stressed in rituals (Sherratt, 1997b: p.422). New farming technologies were also reflected in rituals involving bull and solar symbolism (Turek, 2012: p.197). Representations of bulls in such schemes, as horns on vessels, are found in male graves, whereas solar symbols, such as circles on discs, are found in female graves (Turek, 2012: p.197).

The funerary practices indicate social diversification and different statuses for men, women and children (Turek, 2012: p.197). In death, people emphasised communication with the ancestors, representations of social hierarchy, and the wealth of individuals and their families (Turek, 2012: p.200). A continuation of religious and ideological practices stemming from the preceding cultures has also been suggested for the Corded Ware Culture period (Ebbesen, 2006: p.231). In Denmark, for example, hoards as well as single deposits of battle axes, pottery, tools and jewellery have been found (Ebbesen, 2006: p.231-232).

In summary, Corded Ware Culture religion and ideology can be seen as comprising elements of older traditions as well as elements reflecting the importance of the new social and economic relations. Regional diversity in Corded Ware Culture religion and ideology is to be expected.

1.2.4 Uniformity or diversity: Scale and regionality

“The epithet ‘Battle-axe’ is applied to a number of distinct cultures and peoples.”
(Childe, 1958: p.140)

Research during most of the first 100 years of Corded Ware research focused on the perceived high cultural uniformity. In fact, uniformity in material culture – mainly battle axes and (cord-decorated) beakers – and similarities in burial rituals formed the basis for identifying archaeological remains found over a large area as being the hallmarks of people belonging to this one culture. Despite many debates on the chronology, dispersal mode (i.e. migration or diffusion) and nature of this society, this notion of cultural uniformity has remained resilient.

In recent years, however, research has become more focused on regional variability rather than global uniformity (Hübner, 2005, Ebbesen, 2006, Furholt, 2013, 2014). Corded Ware is viewed less as one culture or even an ethnicity and more in terms of a number of connecting elements of material and social novelty (Furholt, 2003b: p.22, 2014: p.1-16, Vandkilde, 2006: p.412). An interpretation of Corded Ware Culture as a mosaic consisting of elements that were used over large areas and of more local and regional elements has for some scholars replaced the idea of a monolithic culture that was to a large extent seen to be similar across large areas (Furholt, 2014a: p.5). The extent, speed and way of adoption of such novel items and customs, however, differs strongly per region (Vandkilde, 2006: p.412).

In different regions the different items connected to the Corded Ware network were used together with regional artefacts (Furholt, 2003b: p.22). In Denmark, there are clear differences in material culture and subsistence strategy between Corded Ware groups living in different geographical regions or ecological zones (Hübner, 2005, Ebbesen, 2006). These differences are said to derive from different contacts; people on western Jutland had more contacts with other parts

of Denmark, whilst people on eastern Jutland had more contacts with the Baltic (Hübner, 2005: p.247).

Furholt (2013) compared the finds from different regions in the Corded Ware area using network analysis and concluded that, on a regional scale, there are tight-knit networks. On a larger spatial scale, the network was more loose-knit, with fewer similarities (Furholt, 2013: p.68). Moreover, comparable items do not necessarily have comparable meanings. Meaning is created in social practice and transformed within regional contexts (Furholt, 2013: p.68). Furholt (2013: p.68) ultimately sees the Corded Ware Culture not as one phenomenon, but as several smaller phenomena with overlapping traits.

Ebbesen (2006: p.228, 244) postulated that the strong regional differences reflect differences in subsistence and pottery. He proposed that pottery has its own regional character and that the trading area of potters was about 10 km (Ebbesen, 2006: p.237). However, there was also exchange of amber, battle axes, wrist guards, flint and ceramics over longer distances (for which longboats and ox-drawn wagons were presumably used) (Ebbesen, 2006: p.236-238).

Evidently, all of the different Corded Ware regions show both common traits and specific regional/local traits. A detailed study of the Corded Ware Culture in one region can therefore contribute to the knowledge of both that region and of Corded Ware Culture as a whole.

From the outline of the research and debates surrounding Corded Ware Culture presented above, it becomes clear that after more than a century of study, various aspects of this culture are still unknown. New research is needed in order to enhance and increase our understanding of Corded Ware chronology and society. To this end, a series of research questions have been compiled that try to tackle the above issues.

1.3 Current research questions

The main research questions of this study aim to fill gaps in our knowledge on the Corded Ware Culture and to contribute to the various debates concerning this culture discussed above, such as Corded Ware chronology and Corded Ware society. To refine chronological frameworks, it is necessary to gain a better insight into (1) the relationship of the Corded Ware Culture to previous cultures, (2) the start of the Corded Ware Culture, (3) the spread of the Corded Ware Culture, (4) the changes that took place during the Corded Ware period, (5) the end of the Corded Ware period and (6) the degree of regional variability within the Corded Ware Culture. Similarly, more detailed knowledge on Corded Ware societal aspects can be derived from a new study of (1) technology, (2) subsistence strategies, (3) social organisation, (4) religion and ideology and (5) the degree of regional variability in these aspects. The above aims can be rephrased into more specific research questions addressing Corded Ware chronology and society, respectively.

Chronology

The research questions concerning Corded Ware Culture chronology are

- How does the Corded Ware Culture relate to previous cultures? Does the transition to the Corded Ware Culture represent cultural continuity or discontinuity or a combination of both?
- How did the Corded Ware Culture spread? Is it the result of migration, diffusion or both?
- Where did the Corded Ware Culture start?

- Why did the Corded Ware Culture spread? Why did large areas of Europe become part of the Corded Ware Culture? What was the role of innovation, economic change, social change, climate change or other factors?
- What changes occurred during the Corded Ware period? Is it possible to construct new typochronologies and absolute chronologies?
- How did the Corded Ware Culture end and what is the relation to the Bell Beaker Culture? Were these developments continuous or are discontinuities discernable?
- Is the Corded Ware Culture one homogeneous culture or are there regional differences? Are there regional differences in the chronological developments?

Society

The research questions regarding Corded Ware Culture society are

- How can the Corded Ware period be characterised technologically, and was technological change the (only) motor behind other changes? Did such changes pertaining to a (secondary products) revolution or were they more gradual?
- What was the subsistence strategy of the Corded Ware Culture? Was there an increase in the importance of cattle ('cattle-isation')? Can the subsistence strategy be characterised as mixed farming? Was the subsistence strategy regionally specific?
- How was Corded Ware society organised, and was this organisation guided by economic, technological, subsistence and/or climate changes or the other way around? Is there evidence for the proposed gender division? Are patterns indicative of the emergence of martiality and elites visible? Is there evidence for the use of alcohol, often linked to these social changes?
- How can the cosmology and ideology of Corded Ware communities be characterised?
- Is the Corded Ware Culture one homogeneous block or are there regional differences? Is the Corded Ware Culture one culture or even ethnicity, or is it a mosaic or network of regional groups? Is there one type of society or are there regional differences in social organisation?

Having formulated various relevant research questions above, it is necessary to choose a particular study area and dataset that will enable me to answer these questions.

1.4 Choosing the dataset

1.4.1 Introduction

Although the above research questions seek to enhance our understanding of the Corded Ware Culture at large, they result in too broad a topic to feasibly study. Therefore, choices need to be made. Moreover, in order to be able to answer the research questions formulated above, a dataset needs to be chosen that meets the criteria needed to enhance our understanding of the Corded Ware chronology and society. These criteria are outlined below.

1.4.2 Choosing settlements

In this study, settlements are chosen as the main dataset to address the research problem. The reconstructions of the Corded Ware Culture have previously been mainly based on funerary contexts. These funerary contexts most often only

represent a single event and contain a limited number of grave goods. Associations of different types of ceramics, axes or other artefacts are rare. Also, the majority of these funerary contexts do not show any stratigraphy. This complicates the use of funerary data to answer the research questions listed above. On settlements, however, both a greater number and different types of artefacts are found in association. Settlements are often multi-phased, with a sequence of layers comprising remains from different periods. This presence of (1) different types in association and (2) time depth and stratigraphy can greatly increase our understanding of both Corded Ware chronology and Corded Ware society. The Corded Ware artefacts that are commonly found in funerary contexts, including ceramics, stone axes and flint artefacts and amber beads, are found on settlement sites as well. Funerary and settlement contexts need to be compared to reveal similarities and differences in the object types present and in their use and meaning. Settlements, however, tend to yield finds that are not present or rare in funerary contexts, such as pollen, seeds, animal bones, different types of artefacts, as well as indications for the use of these artefacts, such as charred food residues and features (including house plans and ard marks). These data can be used to reconstruct the daily lives of the Corded Ware folk. Evidently, the study of well-preserved Corded Ware Culture settlements and a comparison with other Corded Ware sites, including funerary sites and other settlement contexts, will significantly enhance our understanding.

1.4.3 Choosing settlements in the Netherlands

Within the wider northwestern European dataset on Corded Ware settlements, a choice is made to focus on Dutch coastal settlements. Three main reasons underlie this decision. First, the Dutch coastal zone offers fantastic preservation conditions, leading to high-resolution observations. Second, within the Dutch coastal zone, several settlements dating to the late fourth and third millennia BC are known, allowing for inter-regional and diachronic comparisons. Third, these sites are situated in landscapes characterized by ongoing Holocene sedimentation, meaning that remains may potentially be preserved in discrete stratigraphic layers. Fourth, because the Pleistocene upland areas have also yielded ample (funerary) Corded Ware sites (Drenth *et al.*, 2008: p.175), intra-regional comparisons may be made. This complementary dataset includes more than 100 intensively studied funerary sites from all over the sandy upland soils in the northeastern part of the Netherlands (figure 1.3). Because the Corded Ware Culture graves in the Netherlands are similar to those in other Corded Ware regions (Drenth, 2005: p.357-359), supra-regional integration and comparisons are possible as well.

Corded Ware communities in the area now known as the Netherlands exploited a wide variety of food sources (Drenth *et al.*, 2008: p.175). Settlement sites are mainly found in the wetland area in the western part of the country (figure 1.3 and 1.4). In the Dutch province of Noord-Holland, a group of more than 25 Neolithic settlements were located in a tidal area (Van Heeringen and Theunissen, 2001). These settlements have not been studied integrally before, and they are of exceptional quality due to their excellent preservation of organic materials. These wetland settlements will be therefore taken as the main object of study, and the well-documented upland funerary contexts will be used for comparisons.

On the different settlement sites in this region different types of artefacts are found in association. Two Corded Ware Culture settlement sites in Noord-Holland contained stratified sequences (Van Heeringen and Theunissen, 2001). The settlement sites in the Noord-Holland cluster date exclusively to the Corded Ware Culture period (Hogestijn, 2001: p.147), with the following exceptions: Slootdorp-Bouwlust and Kreukelhof date to the older Funnel Beaker Culture

(TRB) (Van Heeringen and Theunissen, 2001: p.257-274); Zandwerven yielded a mixture of remains from the preceding Vlaardingen Culture and the Corded Ware Culture in the lowest spits (Van Heeringen and Theunissen, 2001: p.227-236); and Sijbekarspel-De Veken yielded material dating to the transitional period from the Corded Ware Culture to the Bell Beaker Culture (Van Heeringen and Theunissen, 2001: p.79-87).

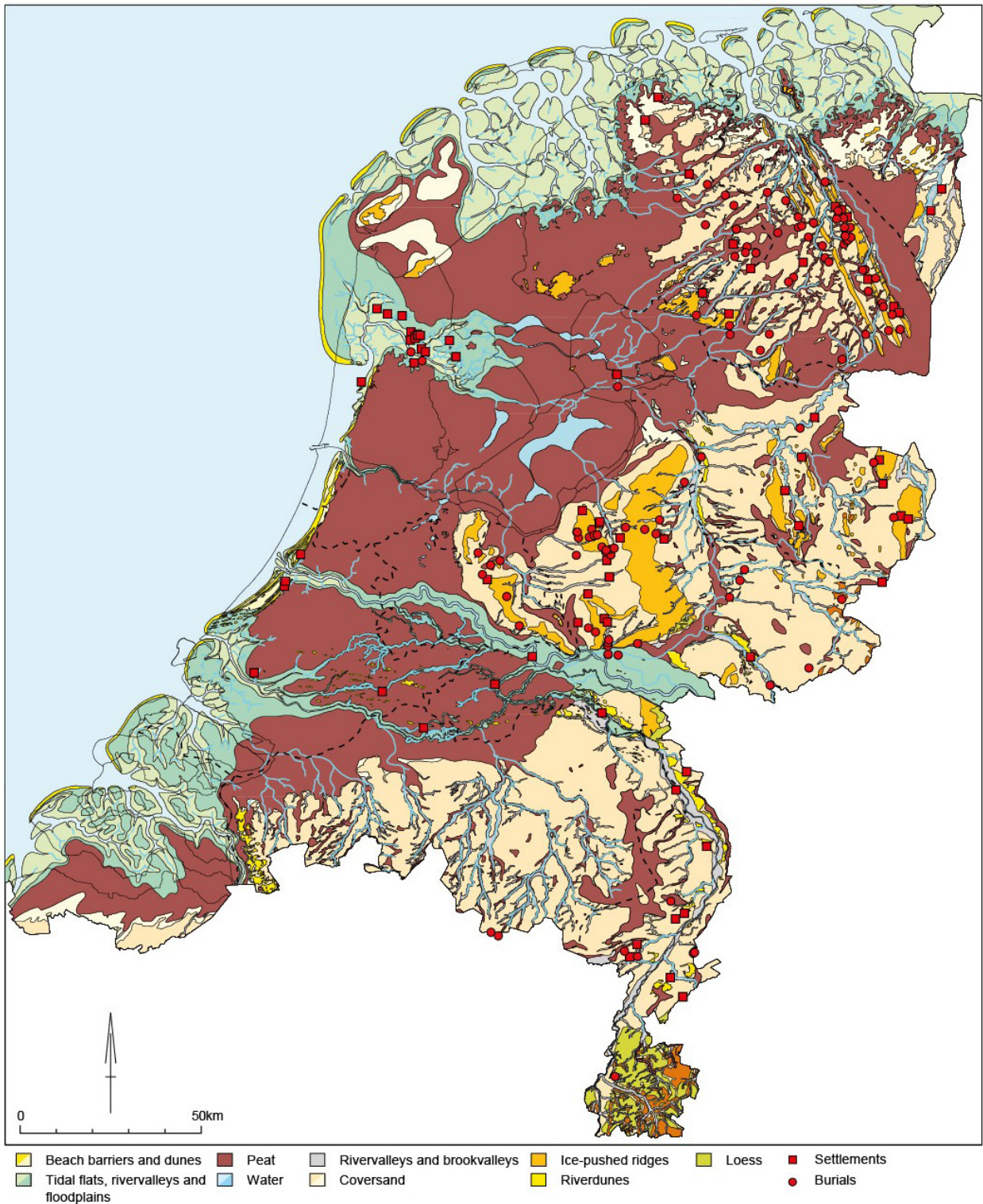
The analysis of stratified sites and a number of sites that together represent sufficient time depth allows for the testing of current chronological models. Furthermore, this dataset allows for the formulation of new ideas on the chronology of the Corded Ware Culture in this region, including the start of the Corded Ware Culture, the chronological developments within the Corded Ware Culture and the end of the Corded Ware period and the transition to the Bell Beaker Culture.

The nature of Corded Ware society is a less-studied aspect in the Netherlands. The well-preserved settlements in Noord-Holland, however, provide a treasure chest of information for reconstructing this society. Information on Corded Ware society can be obtained from the study of pottery types, their technological characteristics, associations and use on sites. Furthermore, the study of ecological data – including zoological and ecological remains – spatial analysis, the study of patterns within and between sites, and a comparison with funerary contexts will enhance our understanding of Corded Ware societies. Together, this series of sites will allow for the formulation of ideas on Corded Ware economy, subsistence, social organisation, gender roles, individualisation and elites, martiality and religion and ideology – and the scale of these aspects. A large team of specialist brought together in a research project funded by NWO (Nederlandse Organisatie voor Wetenschappelijk Onderzoek/Netherlands Organisation for Scientific Research) as part of the Odyssee research programme titled “Unlocking Noord-Holland’s Late Neolithic Treasure Chest: Single Grave Culture behavioural variability in a tidal environment” has already integrally studied the artefacts and features found on the settlements of Keinsmerbrug, Zeewijk and Mienakker.

1.4.4 Ceramics from settlements in the Netherlands

Within the various datasets and artefact types available from the Dutch coastal settlements, ceramics are chosen here as the primary means to study the Corded Ware Culture. Ceramics have long played a major role in reconstructions of the Corded Ware Culture, as they are almost always preserved in all different contexts and possess characteristics that yield information on chronology and society. In the Dutch research tradition, Corded Ware ceramics have been used to establish key chronological models (e.g. Van der Waals and Glasbergen, 1955, Lanting, 1973, Drenth and Lanting, 1991, Drenth and Hogestijn, 1999, Lanting and Van der Plicht, 1999-2000, and Lanting, 2007-08). Unfortunately, ceramic analyses have focused almost exclusively on the decoration and shape of funerary ceramics. The technological characteristics and use of funerary vessels and all aspects of the ceramics from settlements have received far less attention. The study of changes and differences in technology, morphology and decoration of the ceramics in different (stratigraphic) locations on individual sites and across different sites will help answer questions on Corded Ware chronology and society.

In short, the ceramics from the Corded Ware settlement sites in Noord-Holland are chosen for analysis because (1) different types are found in association, (2) there are stratified sites and sites that date to the transitional start and end phases of the Corded Ware Culture and (3) the ceramic analysis from three sites, Keinsmerbrug, Mienakker and Zeewijk, has already been undertaken as part of the Odyssee project. The datasets are supplemented by detailed study of the ceramics from the



sites of Slootdorp-Bouwlust, Zandwerven, Aartswoud and Sijbekarspel-De Veken, as these sites either (1) hold key data regarding the Corded Ware transitional phases, (2) have yielded stratified contexts, or (3) represent settlement sites of differing sizes. Through a study of the different steps in the lifecycle of ceramics (including production, use and function, secondary use, and discard) on different settlement sites, new insights into the technology, subsistence, economy, social organisation, religion and ideology of the Corded Ware Culture are obtained. The

Figure 1.3 Map Corded Ware Culture settlements and funerary sites in the Netherlands (after: Theunissen, 2014 and Vos and De Vries, 2013).

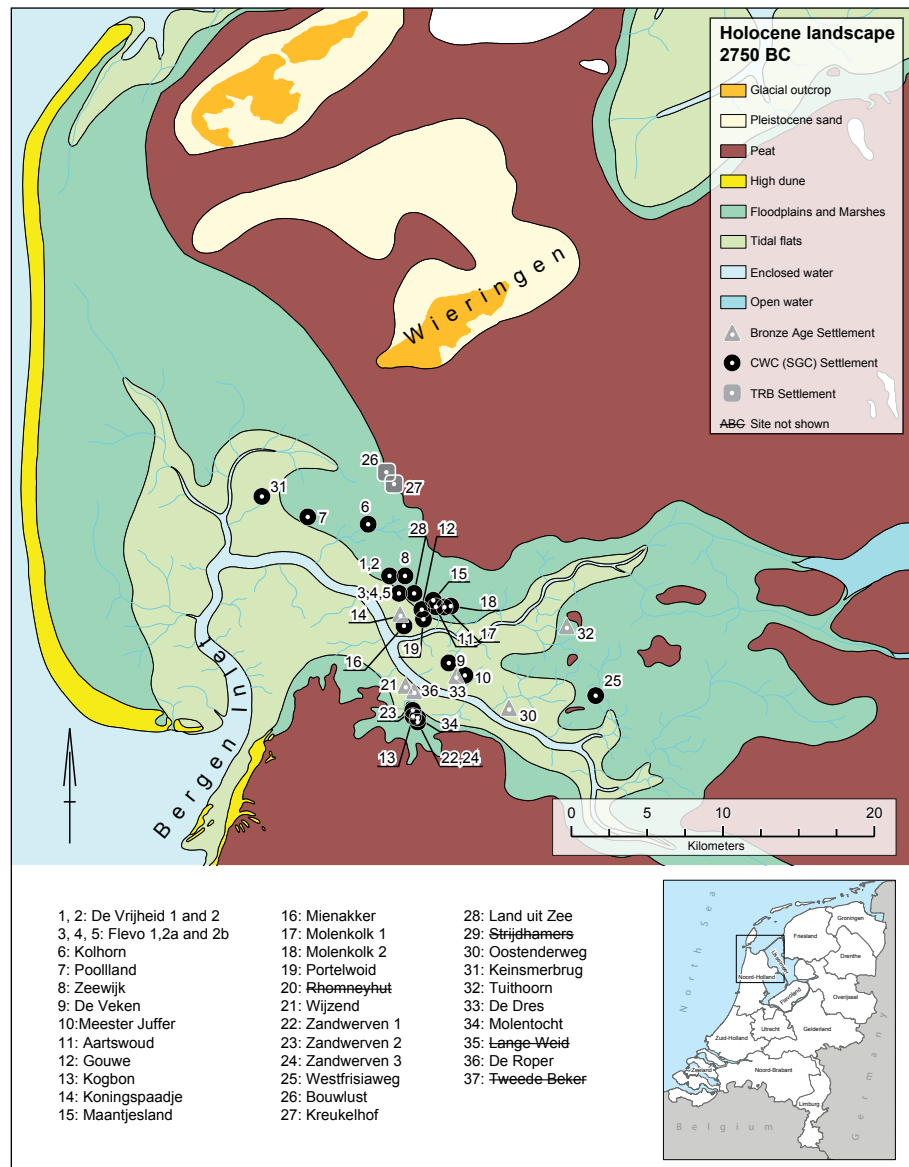


Figure 1.4 Corded Ware Culture settlements in Noord-Holland with studied sites (after: Nobles in prep and Vos and De Vries, 2013).

various steps necessary and their position in the present study are introduced in the outline below.

1.5 Outline

1.5.1 Chapter 1: Introduction

The present chapter has explained why Corded Ware settlement ceramics from the Netherlands were chosen as the dataset used to answer the various research question posed on Corded Ware chronology and society. Tables 1.3 and 1.4 indicate which analyses are needed to answer the individual research questions.

1.5.2 Chapters 2 and 3: The ceramics from Corded Ware settlement sites and a supra-regional comparison

The methodology involved in studying the Corded Ware Culture settlement ceramics is discussed in chapter 2. In that chapter, the general characteristics of the ceramics from the seven studied settlement sites are also presented. Chapter 3 involves a comparison of ceramics from different contexts, comprising (1) ceramics from different contexts (settlement and funerary), (2) ceramics from different regions, and (3) ceramics from different periods (Funnel Beaker Culture, Vlaardingeng Culture, Corded Ware Culture and Bell Beaker Culture). Combined, the data presented in chapters 2 and 3 already help to answer some of the research questions concerning Corded Ware Culture chronology and society.

1.5.3 Chapter 4: Corded Ware Culture chronology

New ideas on Corded Ware Culture chronology are presented in chapter 4. Currently, there are two mutually exclusive chronological models for the Corded Ware period in the Netherlands (e.g. Lanting and Van der Waals, 1976, Lanting and Van der Plicht, 1999-2000, Drenth and Hogestijn, 1999). Both models are mainly based on funerary contexts without stratification and with problematic ¹⁴C dates (uncertainty of association, old-wood effect and broad wiggles in the calibration curve). In Chapter 4, the evidence underlying both models is evaluated, as is their suitability. The new analysis of the Corded Ware ceramics from seven different settlement sites can play a key part in validating one of the two chronological models or in replacing them with a new model. Different ceramic types co-occur

Table 1.3 Analysis executed to answer research questions on Corded Ware chronology.

Research question	Level of analysis		
	Local (Noord-Holland)	Regional (coastal zone of the Netherlands)	Supra-regional (the Netherlands and the whole Corded Ware area)
How does the Corded Ware Culture relate to previous cultures? Does the transition to the Corded Ware Culture represent cultural continuity or discontinuity or a combination of both?	Analysis of the ceramics from sites dating to the preceding cultures: Slootdorp-Bouwlust (Funnel Beaker Culture) and Zandwerven (bottom layer only, Vlaardingeng Culture). The analysis will also encompass a comparison of the technically malleable characteristics of the older and younger ceramics.	Comparison of the assemblages from Noord-Holland with the Vlaardingeng Culture sites in the southern part of the coastal zone on which Corded Ware Culture beaker sherds are often found.	Comparison of the finds from the oldest sites with those from other sites with the same date in the Netherlands and in other parts of the Corded Ware Culture area. Re-analysis of 14C dates and testing of the chronological models of Lanting and Van der Waals (1976) and Drenth and Hogestijn (1999).
How did the Corded Ware Culture spread? Is it the result of migration, diffusion or both?	Comparison of the technological and morphological characteristics and decoration, especially the technically malleable steps, of the ceramics from Slootdorp-Bouwlust, Zandwerven and the Corded Ware Culture sites.		
Where did the Corded Ware Culture start?	Comparison of the oldest Corded Ware Culture finds from Noord-Holland with other early Corded Ware Culture contexts in the Netherlands and other parts of the Corded Ware Culture region.		
Why did the Corded Ware Culture spread? Why did large areas of Europe become part of the Corded Ware Culture? What was the role of innovation, economic change, social change, climate change or other factors?	Analysis of the presence and use of ceramic assemblages and ceramic artefacts.	Comparison with other regions through a literature review.	
What changes occurred during the Corded Ware period? Is it possible to construct new typochronologies and absolute chronologies?	Analysis of the stratified sites of Zandwerven and Aartswoud. Comparison of the results from all sites studied. New 14C dates.	Comparison of the assemblages from Noord-Holland with the Vlaardingeng Culture sites in the southern part of the coastal zone on which Corded Ware Culture beaker sherds are found.	Re-analysis of 14C dates and testing of the chronological models of Lanting and Van der Waals (1976) and Drenth and Hogestijn (1999). Comparison with Corded Ware Culture regions outside the Netherlands.
How did the Corded Ware Culture end and what is the relation to the Bell Beaker Culture? Were these developments continuous or are discontinuities discernable?	Analysis of the ceramics from Sijbekarspel-De Veken (early Bell Beaker Culture). Comparison of the technically malleable characteristics of the Sijbekarspel-De Veken ceramics with the characteristics of ceramics from the Corded Ware Culture sites studied. Comparison of the characteristics and spatial patterns of All Over Ornamented Beakers and Protuding Foot Beakers. Analysis of the presence of characteristics viewed as precursors of Bell Beaker characteristics (e.g. the Veluwe shape and zoned decoration).	Comparing the assemblages from Noord-Holland sites in the southern part of the coastal zone on which early Bell Beaker sherds are found.	Comparison of the finds from the youngest sites with other sites with the same date in the Netherlands and in other parts of the Corded Ware Culture area. Re-analysis of 14C dates and testing of the chronological models by Lanting and Van der Waals (1976) and Drenth and Hogestijn (1999).
Is the Corded Ware Culture one homogeneous culture or are there regional differences? Are there regional differences in the chronological developments?	Comparison of the results from the analysis of ceramics from Corded Ware Culture settlements in Noord-Holland with the results from other regions in the Netherlands and beyond.		

on the different settlements, and two of the studied settlements are stratified. Additionally, the chosen dataset contains sufficient time depth and incorporates sites dating to the periods preceding and following the Corded Ware Culture. Studies of Corded Ware ceramics are often based solely on the decoration and morphology of the vessels. In this study, different aspects of ceramics, including the technology of the vessels, will be analysed (table 1.3).

By studying the characteristics of the ceramics and their associations and contexts, this ceramic analysis will enhance our understanding of the chronological developments that happened before, during and after the Corded Ware period and determine the accuracy of the existing chronological models. Furthermore, this study will refine our knowledge on the provenance of Corded Ware vessels and will contribute in important ways to the debate on the spread of the Corded Ware Culture (i.e. whether it was the result of migration, diffusion or a combination of both) (table 1.3). A comparison of Corded Ware ceramics from different contexts, settlements and regions will help to establish the absence or presence of regional differences.

1.5.4 Chapter 5: Corded Ware Culture society

In chapter 5, ceramic analysis is used to provide new insights into the nature and dynamics of Corded Ware societies. The evidence on which reconstructions of Corded Ware society have traditionally been based is often limited. The analysis of ceramics from well-preserved Corded Ware settlements can thus greatly enhance our understanding of these Corded Ware societies. The reconstruction of Corded Ware societies includes a reconstruction of technology, subsistence and economy; social organisation and individualisation; gender differentiation and the rise of elites; as well as ideology and religion.

The reconstruction of the technology, subsistence and economy of the Corded Ware communities in the coastal zone undertaken by the Odyssee project included a reconstruction of the use of vessels and ceramic artefacts, such as spindle whorls (table 1.4). In chapter 5, the subsistence strategy of Corded Ware communities in different regions will be compared in order to study regional variability.

Table 1.4 Analysis executed to answer research questions on Corded Ware society.

Research question	Level of analysis		
	Local (Noord-Holland)	Regional (coastal zone of the Netherlands)	Supra-regional (the Netherlands and the whole Corded Ware area)
How can the Corded Ware period be characterised technologically, and was technological change the (only) motor behind other changes? Did such changes pertaining to a (secondary products) revolution or were they more gradual?	Analysis and comparison of ceramic assemblages and ceramic artefacts and their use and spatial patterns within sites. Part of and supplemented by the results of the Odyssee project.	Comparison of the assemblages from Noord-Holland with the Vlaardingen Culture assemblages in the southern part of the coastal zone on which Corded Ware Culture beaker sherds are often found.	Comparison of Corded Ware Culture settlements in Noord-Holland with other Corded Ware Culture sites, both settlement and funerary contexts.
What was the subsistence strategy of the Corded Ware Culture? Was there an increase in the importance of cattle ('cattle-isation')? Can the subsistence strategy be characterised as mixed farming? Was the subsistence strategy regionally specific?	Analysis of the types and use of ceramics and ceramic artefacts. Part of and supplemented by the results of the Odyssee project.		Comparison of the evidence from Corded Ware Culture settlement sites from different parts of the Corded Ware Culture area.
How was Corded Ware society organised, and was this organisation guided by economic, technological, subsistence and/or climate changes or the other way around? Is there evidence for the proposed gender division? Are patterns indicative of the emergence of martiality and elites visible? Is there evidence for the use of alcohol, often linked to these social changes?	Comparison of the sizes of settlements and the spatial patterns of different types of ceramics and their inter- and intra-site use on settlement sites.		Testing of the alcohol hypothesis by comparing the use of Corded Ware Culture ceramics from settlements and funerary contexts from different parts of the Corded Ware Culture area.
How can the cosmology and ideology of Corded Ware communities be characterised?	Analysis of the use and discard patterns of ceramics.		Comparison of Corded Ware Culture settlement and funerary contexts; analysis of similarities and differences in the presence of ceramic types and their use.
Is the Corded Ware Culture one homogeneous block or are there regional differences? Is the Corded Ware Culture one culture or even ethnicity, or is it a mosaic or network of regional groups? Is there one type of society or are there regional differences in social organisation?	Comparison of the results from the analysis of ceramics from Corded Ware Culture settlements in Noord-Holland with the results from other regions in the Netherlands and beyond.		

Social organisation and individualisation, gender differentiation and the rise of elites will be reconstructed using the composition of ceramic assemblages and discard patterns of ceramics, as these may reflect social differences (table 1.4). The use of alcohol has been linked to the emergence of elites and martiality (e.g. Childe, 1925, Sherratt, 1997a-b). Therefore, in chapter 5 the evidence for alcohol consumption and other uses of Corded Ware vessels in different Corded Ware regions is presented to test this alcohol hypothesis. The ideology and religion of the Corded Ware Culture can be reconstructed by studying the symbolic connotations of beakers in funerary and settlement contexts (table 1.4).

To sum up, in chapter 5, reconstructions of Corded Ware societies in the Dutch coastal zone and the supra-regional comparison are used to formulate ideas on the scale and importance of the regional and supra-regional connections among different Corded Ware regions.

1.5.5 Chapter 6: Gordon Childe and the new approaches to Dutch Corded Ware communities

In Chapter 6, we return to the Childe quote that formed the starting point of the present chapter.

In this chapter, both the theoretical background, the Marxist concept of history used by Gordon Childe, as well as his grand narrative of the Corded Ware Culture are discussed. Using the results of the previous chapters, Chapter 6 will evaluate which aspect or aspects of both the theoretical model and the grand narrative have retained their value for current – and future – reconstructions of the Corded Ware Culture. In this way, the results of the current study can be more easily and validly integrated into narratives of Corded Ware chronology and society at scales above that of the present study areas.

Neolithic ceramics from Noord-Holland, the Netherlands

2.1 The dataset

2.1.1 Introduction

In this chapter the studied settlements will be introduced, the methods of analysis will be outlined and the ceramic assemblages found on the different sites will be presented. Knowledge of this dataset will help to reconstruct both Corded Ware chronology and society.

The site of Zandwerven in Noord-Holland was the first Neolithic wetland site to be discovered in the Netherlands; it was found in 1928 by Butter and excavated in 1929 by Van Giffen (Van Giffen, 1930). In the second half of the twentieth century several other sites with comparable cultural remains were discovered and investigated in this region (Van Heeringen and Theunissen, 2001: p.36-45). The total number of known sites in Noord-Holland now stands surpasses 25, and many of them have been subjected to small- or large-scale excavations (Van Heeringen and Theunissen, 2001: p.36-45). The majority of these sites are dated to the Corded Ware period (c. 2900–2500 cal. BC). Because few settlements of the Corded Ware Culture are known across Europe (section 1.2.3.4) and the sites concerned exhibit extremely good preservation of both organic and inorganic materials and of spatial patterns, the west-Frysian sites are of international importance (Van Heeringen and Theunissen, 2001: p.36-45).

2.1.2 Selection of sites for ceramic analysis

Seven sites were chosen for ceramic analysis: Slootdorp-Bouwlust, Zandwerven, Keinsmerbrug, Mienakker, Zeewijk, Aartswoud and Sijbekarspel-De Veken. These sites were selected because they represent different phases and settlement sizes and can thus contribute to our knowledge of Corded Ware society and chronology. The ceramics from the sites of Keinsmerbrug, Mienakker and a selection of the material from the different parts of Zeewijk were studied as part of the Odyssey research project titled Unlocking Noord-Holland's Late Neolithic treasure chest: Single Grave Culture behavioural variability in a tidal environment, in which the various remains from the sites were studied integrally by a broad team of specialists. Keinsmerbrug and Zeewijk are viewed by Hogestijn (2001: p.147) as larger, sedentary, sites, while Mienakker is interpreted as a smaller, temporary site. These three sites were the first to be analysed in this study. Zandwerven and Aartswoud were chosen because their stratigraphical sequences may enhance our understanding of the chronological developments of the Corded Ware Culture in this region. Zandwerven was also chosen for the fact that material from the lowest layers is said to be comparable to ceramics from the Vlaardingengroup (Van Heeringen and Theunissen, 2001: p.227-236). This may help us understand

the transition from Vlaardingen Culture to Cord Ware Culture in the study area. The site of Sijbekarspel-De Veken was chosen because it yielded sherds that date to the Bell Beaker period, representing possibly the youngest Neolithic site in the area (Van Heeringen and Theunissen, 2001: p.79-87). Slootdorp-Bouwlust was included because this is probably the oldest site, with finds dating to the Funnel Beaker (or Trichter(-rand-)becherkultur [TRB]) period, allowing a comparison with the younger Neolithic phases (Van Heeringen and Theunissen, 2001: p.257-274). Several other known Corded Ware settlement sites were not included, either because no ceramics were found at these locations or because ceramics were present in very low numbers.³ The ceramics from three additional sites were suitable for analysis, yet were not included for various reasons. The site of Oostwoud-Tuithoorn consists of a large field as well as tumuli, dating to the Bell Beaker period and the Bronze Age. Albeit very interesting, this site does not fit the primary scope of this study. The site of Kolhorn has yielded a large number of ceramics that have been partly been studied already (Roorda, 2001, Ufkes, 1995). However, because spatial data is missing for this site, it has been excluded from the analysis.

The ceramics from the sites chosen for analysis have all, to some extent, been analysed before. However, none of these sites have been published in full, and their ceramic assemblages have not been compared before. A first impression of the Zandwerven excavation of 1929 and its finds was presented by Van Giffen in 1930. Van Regteren Altena and Bakker (1966) published an overview of the ceramics found during the 1929 and the 1957 and 1958 campaigns. Van der Waals and Glasbergen (1956) published the Protruding Foot Beaker sherds found on the site. A full report on the ceramics from Aartswoud was never presented, despite the fact that several authors have published about this material. Van Iterson Scholten and De Vries-Metz (1981) published their views on the ceramics found during the trial excavation in 1972, and three students analysed a selection of the ceramics: Floore (1991) studied the short wave moulded vessels, Luijten (1988) the ceramics from trench 8 and Manssen (unknown year) the undecorated sherds from the southern part of trench 5. Diatoms of ten sherds have been studied by Jansma (1982), who concluded that one was not made locally; the other nine sherds were made using marine clay of presumably local origin. The ceramics from the settlements of Keinsmerbrug and Mienakker have been analysed by Hogestijn, yet few details have been published (Hogestijn, 1997, Van Ginkel and Hogestijn, 1997). The same goes for the ceramics from Sijbekarspel-De Veken. These finds have been studied by Hogestijn, but the published information is very limited (Hogestijn and Woltering, 1990). Hogestijn and Drenth (2001: p.45) and Van Heeringen and Theunissen (2001: p.257-264) present some preliminary information on the ceramics from Slootdorp-Bouwlust. These ceramics are said to be comparable to Funnel Beaker ceramics and include the characteristic funnel beaker, baking plate and bowl, and bucket shapes (Hogestijn and Drenth, 2001: p.45). Sier (2001: p.358) has analysed a selection of 15 kg of ceramics from Zeewijk-West and more than 4 kg from Zeewijk-Oost.

3 No ceramics were found at the following sites: Gouwe, Kogbon, Oostenderweg, De Dres, Molentocht and Lange Weid. Low numbers of ceramics are found at: De Vrijheid 1 and 2, Flevo 1, 2a and 2b, Poolland, Meester Juffer, Koningspaadje, Portelwoid, Wijzend, De Roeper and Kreukelhof, Westfrisiaweg, Molenkolk 1, Maantjesland and Wieringermeer (Van Heeringen and Theunissen, 2001).

2.1.3 Location, environment, landscape and subsistence

At the start of the Holocene period, the western part of what is now the Netherlands started to inundate as a result of a relative sea level rise, and the landscape changed into a collection of tidal basins, of which the Bergen inlet is one (Kleijne and Weerts, 2013: p.19). From 4000 cal. BC onwards the coast started to prograde, causing tidal inlets to close and beach barriers with small dunes to form (Kleijne and Weerts, 2013: p.19). The Bergen tidal basin was the last to close. Around 3200 cal. BC it still existed as a salt marsh dissected by tidal creeks (Kleijne and Weerts, 2013: p.19). Levees formed along these tidal creeks, while to the northwest and southwest beach barriers were to be found. Further to the north two Pleistocene outcrops still existed: Texel and Wieringen (Kleijne and Weerts, 2013: p.19). The higher parts of this landscape would flood only occasionally (Kleijne and Weerts, 2013: p.19). Different zones of salt, brackish and fresh water were present (Kleijne and Weerts, 2013: p.19, Kleijne *et al.*, in prep.). Due to the closing of the beach barriers during and after the Neolithic, peat growth increased (Kleijne and Weerts, 2013: p.20). The landscape was diverse and dynamic, with open water transport routes between the coast and the hinterland (Kleijne and Weerts, 2013: p.19). The settlements were located on the levees that existed along the branches of the main creeks (figure 1.4, Drenth *et al.*, 2008: p.158). Zandwerven is the single exception to this pattern, as this site is located on a beach barrier (Drenth *et al.*, 2008: p.158).

The vegetation was mosaic-like (Kleijne *et al.*, in prep.). Pollen analysis of samples from Keinsmerbrug and Mienakker proved that in these locations the landscape was very open, treeless and dominated by grassland and pioneer species (Van Haaster, 2012: p.105). The inhabitants used this diverse landscape to grow crops, keep cattle, hunt mammals, fowl, catch fish and gather wild plants and shellfish (Drenth *et al.*, 2008: p.158). Cattle, pigs, sheep and possibly goat and dog were raised and eaten (Drenth *et al.*, 2008: p.163). The hunted species include seals, beaver, elk, roe deer, brown bear, aurochs and possibly red deer (Drenth *et al.*, 2008: p.163). Birds were also part of the diet, and at Keinsmerbrug fowling for ducks was probably one of the main activities, as indicated by very high numbers of duck bones (Drenth *et al.*, 2008: p.163, Zeiler and Brinkhuizen, 2012: p.147). Mienakker yielded high numbers of duck bones as well (Zeiler and Brinkhuizen, 2013: p.173). Both fresh- and saltwater fish were caught, but the species caught differ among the sites (Drenth *et al.*, 2008: p.163). At Mienakker flatfish and haddock dominate (Zeiler and Brinkhuizen, 2013: p.173). The numbers of haddock at Mienakker are the highest of any Neolithic site (Kleijne *et al.*, in prep.). This marine fish can only be found at great depths in open sea or in large tidal inlets (Kleijne *et al.*, in prep.). At Mienakker, the remains of what was possibly a (seal) skin-lined canoe have been found. This craft could have been used for this type of fishing, but also for obtaining other resources and keeping in contact with people over longer distances (Nobles, 2013b: p.247).

The crops grown include mainly naked barley and to a lesser extent emmer wheat (Drenth *et al.*, 2008: p.165). These cereals were grown at several sites. Both at Mienakker and Zeewijk, plough marks have been found (Kleijne *et al.*, in prep.). Wild plants were also gathered (Drenth *et al.*, 2008: p.168). These include orache seeds, crab apples, hazelnuts and acorns (Kubiak-Martens, 2012: p.99 and 2013: p.116).

There are significant differences among the sites in terms of subsistence. Hogestijn (1997) postulates that there were two types of settlements: small settlements (less than 500 m²) that were used as temporary camps for such activities as herding, hunting and fishing, and large settlements (over 3000 m²) that were

residential or base camps. On the small sites, 80% of the archaeozoological remains derive from wild animals, whereas on large settlements this proportion is between 10 and 30% (Hogestijn, 1998: fig.1). However, Drenth *et al.* (2008: p.165 and table 5) argue that these numbers are not in concordance with the materials found; they conclude that at the two small settlements (Keinsmerbrug and Mienakker) the numbers of wild animals are low.

New research has enhanced the insights into the settlement system and indicates that the Hogestijn model should be refined (Kleijne *et al.*, in prep.). At Keinsmerbrug very large numbers of ducks were caught during the summer season and seasonal indicators for winter exploitation of animals absent (Zeiler and Brinkhuizen, 2012: p.147). Hunting, and also grazing of cattle, took place near the site as well (Kleijne *et al.*, in prep.). This site is therefore interpreted as a non-permanently occupied extraction camp used for gatherings of people from different communities (Kleijne *et al.*, in prep.). Mienakker is also small in size. It did provide evidence for year-round activities and was probably inhabited by a single extended family (Kleijne *et al.*, in prep.). Zeewijk shows yet another picture: this settlement is larger and was either used by one household for a more prolonged period or by several households for a few generations (Kleijne *et al.*, in prep.). The rich and varied landscape was thus inhabited by people who were well adapted to it and who perfectly exploited the available resources and possibilities (Theunissen *et al.*, 2014).

2.2 Methodology

2.2.1 Introduction

As is reflected in the name Corded Ware Culture itself, ceramics have always been important in reconstructions of this period. The presence of a type of ceramics is taken by many scholars to be indicative of the presence of a certain group of people with the same material culture. While previous research has given great importance to ceramics, the number of characteristics studied and the questions addressed remained rather limited. Decoration and shape have long been the most important characteristics to be studied. In this study the shape and decoration of vessels will be studied as well, but it will also incorporate other aspects of the lifecycle of the ceramics, including their technology, use, re-use and discard. The different methods of ceramic analysis used will be outlined below; these include the first-ever Dutch Beaker ware type division, published by Van der Waals and Glasbergen (1955) (section 2.2.2), as well as new theories and methods, including those of Salanova (2001), Besse (2004), Larsson (2008) and Furholt (2008) (section 2.2.3). Following this, the methodology adopted in this study will be outlined (section 2.2.4).

2.2.2 Van der Waals and Glasbergen (1955) type division

In 1955 Van der Waals and Glasbergen presented a type division for Dutch Beaker types, dividing them into Protruding Foot Beaker, Bell Beaker and All Over Ornamented Beaker.

The Protruding Foot Beaker ceramics were interpreted as belonging to the Corded Ware Culture and were subdivided into seven sub-types (types 1a–1f and the zigzag type) (Van der Waals and Glasbergen, 1955: p.7-12). Sub-type 1a is decorated with cord impressions applied in horizontal lines (Van der Waals and Glasbergen, 1955: p.8). Sub-types 1b–1e and the zigzag type are decorated with spatula impressions in different motifs consisting of oblique impressions,

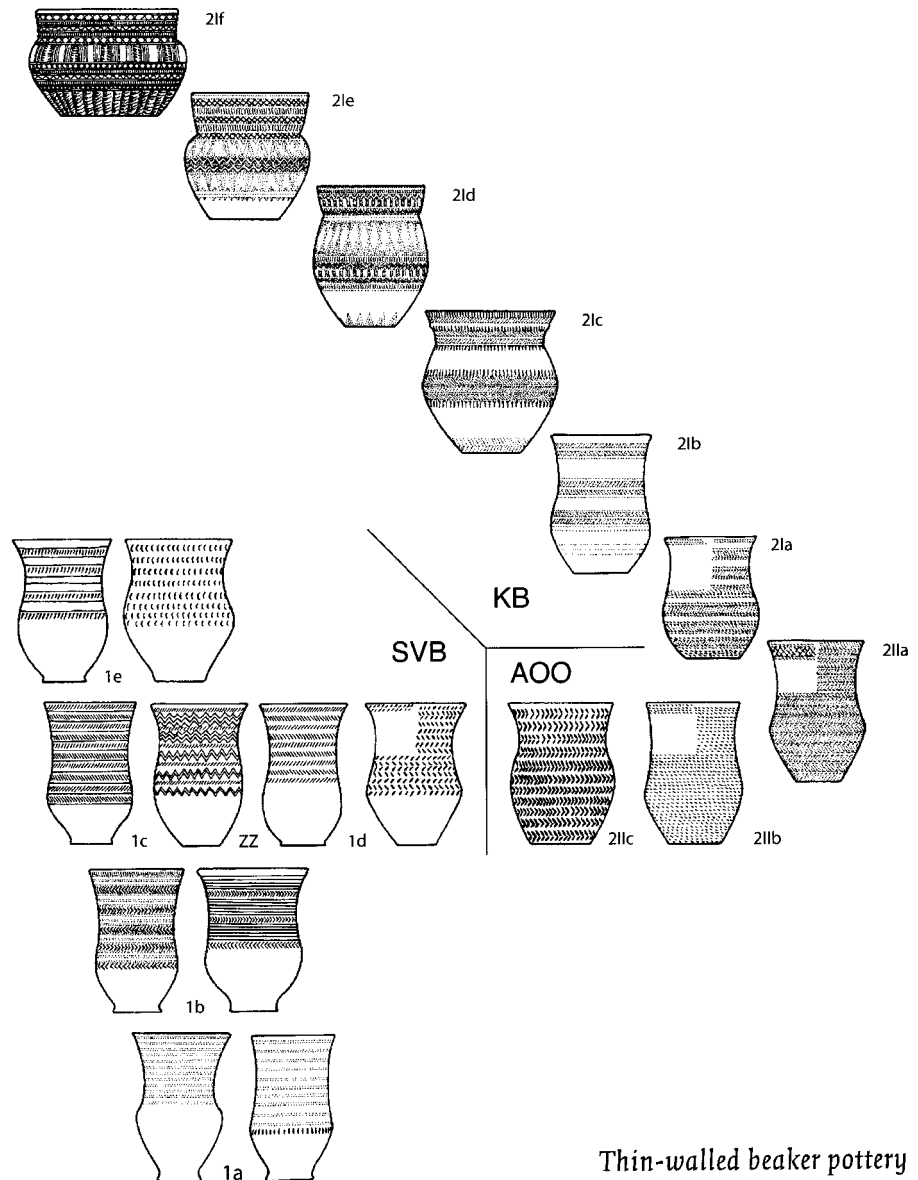


Figure 2.1 Type division of Van der Waals and Glasbergen (1955), as modified by Lanting and Van der Waals (1976).

Thin-walled beaker pottery

horizontal rows and zigzags and crosses (figure 2.1). Sub-type 1f is undecorated, but a plastic band or a cordon may occur below the rim (Van der Waals and Glasbergen, 1955: p.12).

Bell Beakers were grouped into five sub-types (2Ia–2If) on the basis of their shape and decoration (see chapter 4). Just one of the Bell Beaker types, 2Ia, occurs on one of the Noord-Holland sites (Sijbekarspel-De Veken). This type is decorated with zones with oblique dentated spatula impressions bordered by double dentated spatula lines (Van der Waals and Glasbergen, 1955: p.19, figure 2.1).

The All Over Ornamented vessels are interpreted by Van der Waals and Glasbergen (1955: p.27) as a hybrid group of beakers, combining characteristics of the Protruding Foot Beaker and the Bell Beaker. On the basis of their decoration, three different All Over Ornamented sub-types were distinguished: type 2IIb is decorated all over with cord impressions, type 2IIc is decorated with spatula motifs and type 2IIa combines spatula motifs and cord impressions (Van der Waals and Glasbergen, 1955: 27–33) (figure 2.1).

This 1955 type division, with some adjustments and the addition of some new types, is still in use today. Type 2IId was added by Lanting, Mook and Van der Waals (1973) and consists of vessels decorated all over with cord and plain spatula

impressions. Type 2IIe was added to describe vessels that are comparable to vessels of type 1e, but with ornamentation over the entire surface (Sier, 2001: p.397). Sier (2001: p.397) also introduced type 2IIIf, for vessels on which rows of oblique impressions made with a (plain) spatula are bordered by a grooved line.

Van der Waals and Glasbergen (1955: p.33-36, fig. 14) stated that the alphabetical type ordering represented their chronological order, albeit with considerable overlap of different types. Other authors have placed the types in a slightly different chronological order (Lanting, 1973, Lanting and Van der Waals, 1976, Drenth and Lanting, 199, Lanting and Van der Plicht, 1999/2000, Lanting, 2007/2008). For a detailed discussion of the types and the various chronological claims, see chapter 4. A major change made by Lanting and Van der Waals (1976: 3, 5, 13–15) concerns the chronological position of the All Over Ornamented beakers; they are placed before and partly overlapping with the Bell Beakers. Several authors have stressed that although beakers are present on settlement sites, it is difficult to compare the sherds to one of the types due to fragmentation (Sier, 2001: p.386, Van Heeringen and Theunissen, 2001: p.146). Despite these difficulties, the type-division, alongside other methods, is still used in the present study. Since almost all other Dutch sites have been studied using this scheme, its application ensures comparability between datasets.

2.2.3 *New theories and methods*

2.2.3.1 Introduction

In recent Corded Ware and Bell Beaker studies, ceramics were used to reconstruct not only the chronology, but also society as a whole (for example, Salanova, 2001, Besse, 2004, Larsson, 2008). The focus has thus shifted from the shapes and decoration to the whole lifecycle of the ceramics, including their technology, use and symbolic roles. This is the result of the application of new theories and new techniques.

Ethnography offered the concept of *chaîne opératoire* (Gosselain, 2000), based on a theory first proposed by Leroi-Gourhan. The *chaîne opératoire* (Dobres, 1999 and 2000) and ‘cultural biography’ (Kopytoff, 1986) concepts are often used to study different parts of the lifecycle of ceramics and the social aspects and symbolism attached to these steps. Gosselain (1999: p.5) describes the notion on which the *chaîne opératoire* theory is based as follows: “*technical processes are in fact a metaphor for explaining aspects of the human experience and serve to structure rituals*”. Larsson (2009) used this idea to study the similarities and differences between the technology of the ceramics of two different pottery traditions in the Middle Neolithic in southern Sweden. Larsson and Graner (2010) used the *chaîne opératoire* to study the hybridization of two different pottery traditions in the late Middle Neolithic in eastern Sweden.

From sociology, the theory of ‘diffusion of innovations’ by Rogers (2003, first published in 1962) is borrowed. This theory explains how, why and how fast new technologies and ideas spread. It distinguishes different phases in the adaptation, and hence different groups of adapters: innovators, early adopters, early majority, late majority and laggards (Rogers, 2003). Fokkens (2012), for example, uses this theory to explain the transition to Bell Beaker ceramics in the Netherlands.

A third influential theory in archaeological ceramic studies is ‘agency theory’, derived from philosophy and sociology. Marx (2009: p.9, first published 1852) used social agency to explain that

“Man makes his own history, but he does not make it out of the whole cloth, he does not make it out of conditions chosen by himself, but out of such he finds close at hand. The tradition of all past generations weighs like an alp upon the brain of the living.”

In recent models, Bourdieu's concept of agency has been applied to archaeology to investigate the ability that individuals had to act in societies structured by institutions and beliefs (Dobres and Robb, 2010: p.5). Van der Noort (2012) studied Bell Beaker agency, taking the individuals who were navigators of ships as a starting point for looking at the spread of these crafts. Louwe Kooijmans (2009) adopted the agency concept as a tool to reanalyse and characterise regionalisation trends in the neolithisation of the Netherlands.

In addition to new theories, also new techniques have become available. Analysis of diatoms (Batterbee, 1988) and thin-sections (Larsson, 2008) render it possible to determine the origin of clay and/or its temper and thus answer questions on the origins of vessels and allow comparisons of the raw materials used to make different vessels. Analysis of residues, either as absorbed lipids or as charred crusts, has made it possible to determine the contents and use of a vessel (Evershed, 2008). Furthermore, statistical analysis and spatial analysis are being used more often to study patterns in, and between, sites and regions (Furholt, 2003b).

Four recent studies on ceramics have had a particularly strong influence on the current study; a short summary of the theories and methods used and the results obtained in these key approaches is presented below.

2.2.3.2 Salanova (2001): Bell Beaker decoration techniques

Salanova (2001) used ceramics as a means to reconstruct the Bell Beaker society. The high uniformity in decoration technology of the beakers over vast areas of Europe has led Salanova to postulate that this can only be explained in terms of movements of people (Salanova, 2001: p.91). Since only small numbers of beakers circulated, contacts between potters better explain the observed standardisation (Salanova, 2001: p.96). In settlements, the Bell Beaker ceramics decorated with either 'maritime' or 'linear' decoration occur together with many different local forms (Salanova, 2001: p.91). She therefore argues that Bell Beaker ceramics do not represent a distinct horizon, but that potters continued to make their usual forms while also borrowing decorative themes from the Bell Beaker repertoire (Salanova, 2001: p.97). A comparison of domestic and funerary ceramics led her to the conclusion that, while the decoration on funerary pots is standardised, the decoration in settlements is more diverse (Salanova, 2001: p.99). She suggests that there is a relationship between the circulation of Bell Beaker ceramics and the network of metal artefacts (Salanova, 2001: p.99). In her conclusion Salanova uses Bell Beaker ceramics and other artefacts to try to answer the question whether the Bell Beaker phenomenon represents a technological, ideological or economic union (Salanova, 2001: p.100). She argues that a technological union seems unlikely because not all pottery technology is affected. An ideological union is also unlikely because artefacts have a different function in different regions. Although a lack of data makes it hard to prove, an economical union is seen as the most suitable explanation (Salanova, 2001: p.100). Bell Beaker ceramics could have been the ideological instrument to consolidate the economic alliances brought about by copper working and subsequent exchange (Salanova, 2001: p.100-101).

Salanova's analysis of the techniques used for decoration, as well as her analysis of settlement material and the modelling based thereon are very useful for the present analysis of Corded Ware settlement ceramics.

2.2.3.3 Besse (2004): Bell Beaker common ware

Besse (2004) studied Bell Beaker common wares from 800 sites, both funerary sites and settlement sites, from 11 countries. On these sites, 83 different vessel types were present (Besse, 2004: p.128). On the basis of frequency analysis, 26 main types could be identified (Besse, 2004: p.135). The degree of inter-association of these types was studied by means of multi-dimensional scaling and cluster analysis (Besse, 2004: p.135). This analysis showed that there are three regions in which comparable vessel types are present: an eastern, southern and northern Bell Beaker region (Besse, 2004: p.135-136). For each site the ceramics are compared with the ceramics from preceding cultures (Besse, 2004: p.128). According to Besse (2004: p.137), Bell Beaker common wares reflect the complex relationships that exist between supra-regional cultural groups and the regional substrate. Earlier ceramics, however, showed a different pattern for the three geographical areas. In the east and the north, Bell Beaker common wares are very comparable to the preceding Corded Ware ceramics (Besse, 2004: p.137-140). In the south, however, far fewer types originated from various Late Neolithic groups, and the transition to the Bell Beaker Culture appears to be more radical (Besse, 2004: p.140). Furthermore, in the south the sites with decorated Bell Beaker pottery are much more numerous and the Bell Beaker sites do not occupy the same locations as the pre-Bell Beaker sites (Besse, 2004: p.142). Besse therefore concludes that in the north and east Corded Ware traditions play an important role in the emergence of Bell Beaker Culture, whereas in the south the Bell Beaker Culture emerged under the influence of outside events (Besse, 2004: p.142).

Besse's focus on common wares instead of on beakers is worthwhile as it provides new options for gaining insights into past societies, their developments and networks. The analysis of common wares will also be an important part of the present study.

2.2.3.4 Larsson (2008): Battle Axe Culture and Pitted Ware Culture in southern Sweden

During the Middle Neolithic in southern Sweden, Larsson (2008: p.81) argues, there is a dichotomy between coastal and inland material culture. Sites from the hunter-gatherer Pitted Ware communities are located in the coastal zone, whereas sites of the small-scale farming and animal husbandry Battle Axe Culture (the northern branch of the Corded Ware Culture) are found inland (Larsson, 2008: p.81).

Larsson's (2008: p.81) main research question was whether this pattern relates to a single society with differences in ritual and social stratification expressed through the material culture or, instead, to two distinct societies that co-existing for centuries. To answer this question, she studied the ceramics from the different sites and used ethnographic parallels to understand the observed patterns, working from the hypothesis (Larsson 2008: p.84) that craft traditions are a reflection of the formation of social identity. Important aspects of society and its ideology can be identified through the study of the organization and teaching of crafts (Larsson, 2008: p.84).

The *chaîne opératoire* stage of clay selection is the main topic of Larsson's study, but the choice of temper, shaping, surface treatment and firing techniques are analysed as well (Larsson, 2008: p.84). The results of this analysis show that there are differences in clay and temper selection and other characteristics for the Pitted Ware Culture vessels, on the one hand, and the Battle Axe Culture vessels, on the other hand (Larsson, 2008: p.85). Such innovations as the use of grog as temper, shaping the vessels through pinching, and firing in a reduced atmosphere with partial oxidation are only used by the Battle Axe Culture potters (Larsson, 2008:

p.87). Battle Axe Culture ceramics are very homogenous, and the craft seems to be very explicit and fixed, whereas Pitted Ware ceramics show more regional differences (Larsson, 2008: p.85-86).

Larsson, inspired by ethnographical accounts, states that potters tend to be fairly inflexible in the basic technological choices of clay temper and firing (Larsson, 2008: p.87). Potters are themselves part of a tradition, and their craft is often thought of as being instigated by the ancestors, which underpins and defines a potter's identity (Larsson, 2008: p.87).

The observed differences in the *chaîne opératoire* of the Pitted Ware Culture vessels versus the Battle Axe Culture vessels are thus interpreted by Larsson as evidence of autonomous groups (Larsson, 2008: p.88). The standardisation of the technology and visual appearance of the Battle Axe Culture pottery is regarded as a reflection of a clear and well-defined social position for potters and a restricted passing down of knowledge to a select few (Larsson, 2008: p.88). Her final conclusion (Larsson, 2008: p.88) is that "*the hand that made the pot was the hand that shaped cultural identity*". Larsson's research shows the possibilities for developing ideas on identity on the basis of ceramic analysis—ideas that are of the utmost relevance to the present study.

2.2.3.5 Furholt (2008): Baden ceramics

In his 2008 paper, Furholt criticizes existing views of the Baden Culture as showing a block-like coherence (Furholt, 2008: p.617). He offers an alternative to the culture-historical framework by applying a polythetic classification and relating material culture to different spheres of communication (Furholt, 2008: p.617).

Furholt initially analysed 120 ceramic assemblages from the regions of Moravia, Upper Silesia and Lesser Poland. Later, he expanded the scope to ceramics from surrounding areas (Furholt, 2008: p.619). A correspondence analysis of the decorative motifs for 389 settlement finds revealed a number of stylistic groups that show differences across time (Furholt, 2008: p.619). Furholt concludes that the phenomenon that is usually called the Baden Culture is better described as a number of distinct pottery styles that share a number of common features, but are still differentiable (Furholt, 2008: p.620). They are primarily differentiated by period and place of manufacture (Furholt, 2008: p.620).

Fabric analysis was carried out on 800 vessels stemming from Moravia, Upper Silesia and Lesser Poland, comprising analysis of the temper, surface treatment, wall thickness, colour and structure (Furholt, 2008: p.623). The aim was to understand the system of pottery distribution (Furholt, 2008: p.623). Correspondence analysis of the results of the fabric analysis revealed three clusters: two fine wares (TG1 and TG2) and one coarse ware (TG3) (Furholt, 2008: p.624). The study of the occurrence of these fine and coarse fabrics within the previously defined style groups shows that there were two spheres of interaction: in the coarse wares local traditions are dominant, but in the fine wares supra-regional styles seem to play a much greater role (Furholt, 2008: p.624).

Furholt argues that the idea of monothetic cultures should be replaced by a new model in which different materials belong to different sub-systems and play different roles in society (Furholt, 2008: p.626). The coarse wares refer to local networks of interaction and have a utilitarian role (Furholt, 2008: p.626). The fine wares, however, represent a supra-regional system in which the material is used more actively (Furholt, 2008: p.626). The earliest fine ware (Boleráz) is first used in Austria and then spreads to the north and west within a short time span. Furholt (2008: p.627) suggests that there is a correlation with the spread of the wheeled vehicle.

A comparison of the spread of different types of ware and the ideas behind the observed patterns can also be applied to Dutch Corded Ware ceramics. Therefore, in the current study, an analysis of coarse wares versus fine wares is also conducted.

2.2.4 Methodology of this study

2.2.4.1 Introduction

This study aims to increase our knowledge of the chronology, technology, subsistence, economy, social organisation and ideology of Corded Ware society (see chapter 1). To this end it is necessary to analyse (in an integrated way) the technological characteristics (2.2.3.1), the morphological characteristics (2.2.3.2) and the decoration (2.2.3.3) of the ceramics. Only those ceramic sherds with a weight of 3 g or more were included.

First, use, re-use and discard will be analysed (2.2.3.4). Second, in order to gain a better understanding of the settlements and their inhabitants, the ceramic assemblages and their distribution within individual sites (intra-site analysis) and between sites (inter-site analysis) will be compared (2.2.3.5). Third, the ceramics will be compared with local precursors and contemporaries, such as Funnel Beaker, Vlaardingen and Corded Ware ceramics from other regions, in order to better understand the chronology and the social organisation of Corded Ware communities (2.2.3.6). The different ceramological methods applied are discussed below.

2.2.4.2 Technology

Technological analysis plays a key role, because new research has shown that these characteristics can provide information on both the chronology and the society of the culture under study (Salanova, 2001, Besse, 2004, Larsson, 2008). Salanova (2001: p.91) considered technological analysis important because motifs are said to circulate rapidly and easily between groups. Techniques, on the other hand, are more stable and are entrenched in cultural norms (Salanova, 2001: p.91). Technological analysis is also important because many morphological characteristics are no longer available for study in the excavated ceramics due to fragmentation and weathering processes.

Different steps of the technological process of making a vessel can provide different types of information on Corded Ware society. Some characteristics of ceramics are more likely to change than others (Gosselain, 2000: p.191). Techniques that leave visible evidence on the finished product (such as tempering and secondary forming) and the steps of clay selection, extraction, processing and firing are easily changeable since they are easy to learn by skilled potters and therefore have a tendency to fluctuate (Gosselain, 2000: p.191-192). The steps of fashioning, primary forming and roughing-out of vessels leave fewer apparent traces on the end product. Because these techniques are connected to the primary learning of potting, they are far less likely to change and will reflect more deeply rooted and enduring aspects of social identity (Gosselain, 2000: p.192). These latter techniques are claimed to be impossible to learn from finished objects (Brodie, 2001: p.488). The appearance of new techniques thus indicates either the import of vessels, the import of knowledge of specific techniques or the migration of potters.

My analysis therefore includes (1) tempering agents (types, sizes and combinations), (2) wall thickness, (3) firing method, (4) construction method, and (5) surface treatment (appendix 2.1). For the tempering, the added materials will be described. These include stone grit (hornblende, quartz, granite, red

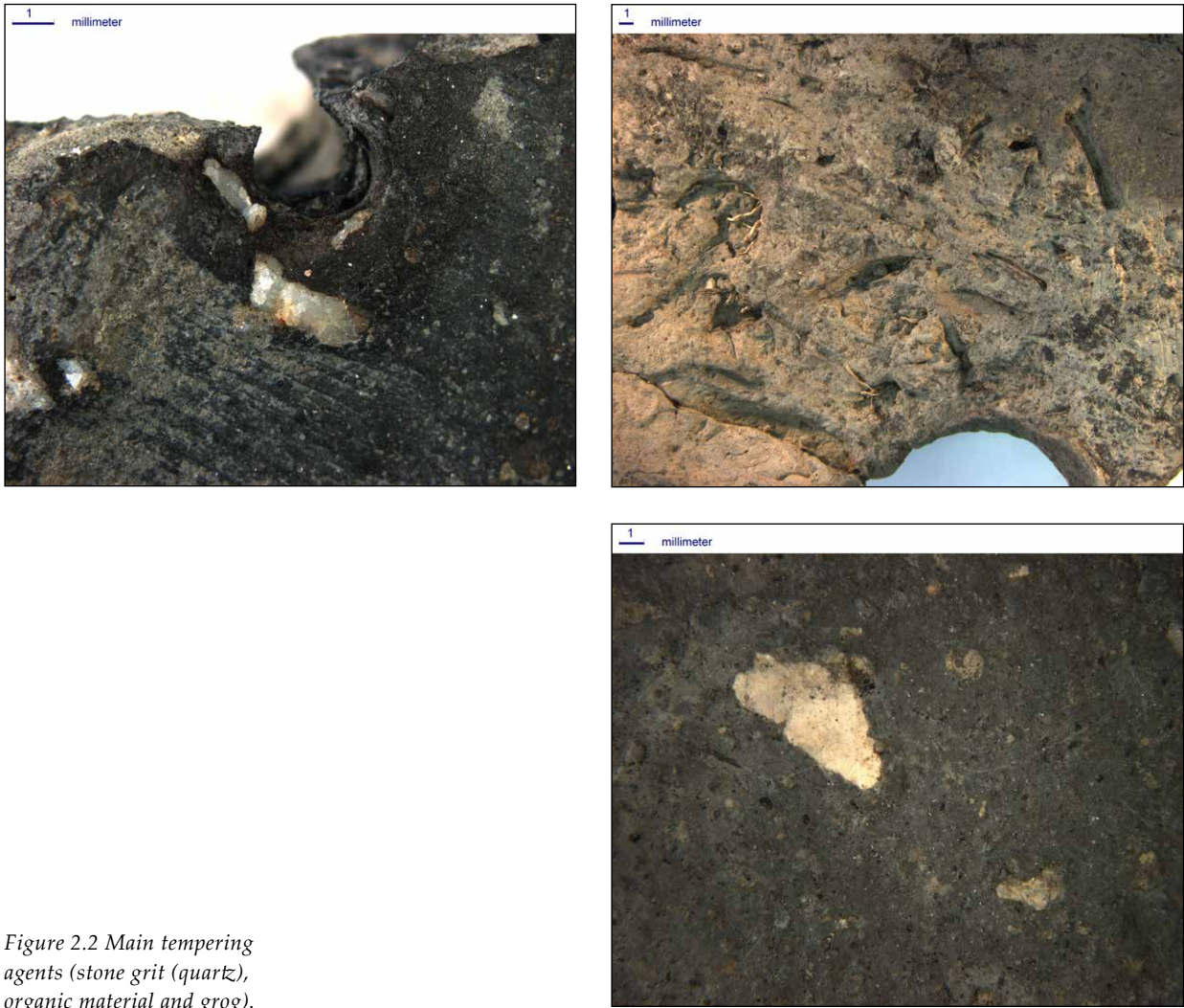


Figure 2.2 Main tempering agents (stone grit (quartz), organic material and grog).

granite, mica and flint), grog, sand, organic material (including cereals), bone and shell.⁴ Furthermore, the combinations in which tempering agents are added and the quantity and size of the particles will be studied. The thickness of the wall will be measured. In cases where different parts of the same vessel are present, several measurements will be taken. Three thickness classes have been created: thin-walled ware (5–7.5 mm), medium-thick-walled ware (8–8.5 mm) and thick-walled ware (9–10.5 mm). These classes comprise the majority of the sherds; only a small proportion is either thinner or thicker. The firing environment is reflected by the colours of the cross-sections. During firing the vessel can acquire a dark colour in an oxygen-reduced firing atmosphere, or a light colour in an oxygen-rich firing atmosphere. Changing the oxygen levels during firing and cooling can lead to differences between the colour of the core and that of the inside and outside of the vessel.

It has been argued that Corded Ware vessels were constructed using both coils and using wraps (Van der Leeuw, 1976: p.85). During this study, coils were described using the definitions of Stilborg and Bergenstrahle (2000: p.31). Both

4 The categories of 'quartz' and 'granite' are used to describe the temper present in the sherds. Wares containing quartz but without visible mica and feldspar particles are categorized as quartz-tempered. Those containing both quartz, feldspar and mica particles are categorized as granite-tempered. The category of organic-tempered is used to describe sherds that show cavities and imprints of what is presumed to be plant material.

coils that were placed directly on top of each other (the H-technique) and coils that were placed at an angle (the Hb-technique) were observed.⁵

The treatment of the outer and inner surfaces will be studied as well. Rough, lightly smoothed, smoothed and polished surfaces were observed on both the inside and the outside of sherds. Smitting only occurs on the outside of sherds. The correlations between the different technological characteristics will also be studied.

The technological characteristics of all seven studied sites will be presented and discussed in section 2.3. A comparison of the technological characteristics for the ceramics from the seven sites in Noord-Holland to that of the ceramics from Funnel Beaker sites, Vlaardingens sites and Corded Ware (funerary) sites from elsewhere in the Netherlands will be presented in chapter 3.

2.2.4.3 Morphology

Differences in the size and shape of ceramics can indicate differences in chronology, function and role of these ceramics. Because the morphological characteristics of many vessels from Corded Ware sites have been studied and published, the morphological analysis of the vessels from the sites currently under study can also serve to compare different assemblages.

The analysis is executed in three steps. In the first step, morphological characteristics are studied at the level of the individual sherd. This step concerns the partitioning of the pot and the shape of the rim, base and handles (appendix 2.1). In the second step, all rim and base sherds and sherds that either capable of being refitted or, on the basis of their characteristics, likely belonged to the same vessel, were studied again as 'pot individuals'. The rim diameter, widest belly circumference and base diameter were measured, and a description of the shape was made (appendix 2.1).

The third step concerns a metrical analysis based on a method developed by Koch (1998) for Neolithic bog pots found in Zealand, Møn, Lolland and Falster in Denmark. Koch measured different points of the vessel in order to establish a curve in a coordinate system (Koch, 1998: p.68). This system renders it possible to compare the curves of different vessels and to establish shape groups. Koch distinguishes between 25 groups. She tested the validity of these groups by using a statistical principal component analysis (Koch, 1998: p.71-75). Graner (2003) conducted a metrical analysis on Funnel Beaker ceramics from east-central Sweden. Since these vessels were less complete, he adjusted Koch's method to use the diameter of the rim, rather than the height, as a basis.

Beckerman and Raemaekers (2009) applied a metrical analysis to Vlaardingens Culture ceramics from sites in the Dutch southern coastal zone and rivers area. A metrical analysis was also conducted on the vessels found on the currently studied sites in order to establish shape groups. For vessels that are complete from the rim down to at least the greatest belly circumference, the rim and shoulder angle, the rim height (from rim down to smallest circumference) shoulder height (from smallest down to largest circumference) and the rim and belly diameter were measured (figure 2.3). Of the vessels that are complete down to at least the smallest circumference, the rim diameter and the rim height and angle are measured. The vessels can, on the basis of their size and profile, be sub-divided into four main types: (1) vessels with a high upright or inward-sloping neck, (2) medium to large vessels with an pronounced S-shape, (3) medium to large vessels

5 The H-technique coils of Stilborg and Bergenstrahle (2000: p.31) are comparable to the H-joins of Louwe Kooijmans (1980: fig. 10); the Hb-technique coils of Stilborg and Bergenstrahle (2000: p.31) are comparable to the N-joins and Z-joins of Louwe Kooijmans (1980: fig. 10).

with an enlarged beaker shape and (4) beakers. The sizes of the rim diameter, the rim and shoulder height and the rim and shoulder angle on which this type division is based are presented in table 2.1.

The characteristics of 84 vessels that are complete down to at least the greatest belly circumference, from other, mainly funerary, Corded Ware contexts are also studied (Table 3.2). These include nineteen vessels associated with a ¹⁴C date. The metrical characteristics of the vessels from the Corded Ware Culture sites in Noord-Holland can be compared with each other and with the characteristics of Vlaardingen Culture and other Corded Ware Culture sites. This makes it possible to postulate ideas on the chronology of shapes and the relationships among different sites.

2.2.4.4 Decoration

Decorative motifs are said to circulate rapidly and easily between groups and may have a symbolic value (Salanova, 2001: p.91). Cereal impressions may be an example of such a symbolic value. These impressions in ceramics are found on Corded Ware ceramics from different regions. Larsson (2009: p.63-64) discusses cereal impressions from southern Sweden. In Denmark barley is the

Table 2.1 Characteristics of the different vessel shapes.

Nr in text			Thickness (in mm)	Rim diameter	Rim Δ	Rim height	Shoulder Δ	Shoulder height
4	Beaker	Complete down to the greatest belly circumference	3.5-7.5	8-14.5	0.2-1.2	1.9-8.4	0.7-2.1	1.9-8.4
		Complete down to the smallest circumference					x	x
3	Enlarged beaker	Complete down to the greatest belly circumference	5-10	15-22	0.6-1.0	3.5-5.8	1.3-2.0	7.4-8.4
		Complete down to the smallest circumference					x	x
2	Pronounced S-shape	Complete down to the greatest belly circumference	9.5-10	15-22	0.5-1.0	1.2-3.3	1	3.8
		Complete down to the smallest circumference					x	x
1	High upright or inward-sloping neck	Complete down to the greatest belly circumference	6.5-8	17-28	-0.2-0.6	4-5.4	0.6-1.0	3.2-6.1
		Complete down to the smallest circumference					x	x

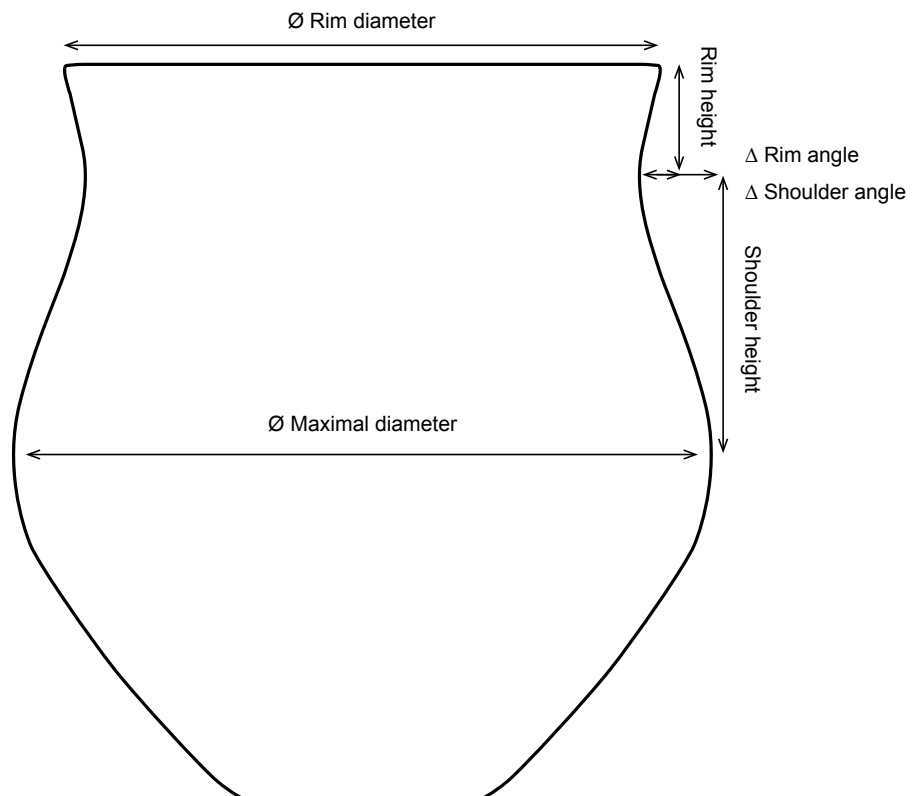


Figure 2.3 Metrical characteristics of the different vessel shapes.

most frequently found impression, but examples of emmer, wheat and apple core impressions are also found (Ebbesen, 2006: p.225). At the site of Wattendorf-Motzenstein (Germany), ceramics impressed with einkorn were discovered (Müller *et al.*, 2009: p.135). Vertical decorative zones consisting of several inverted-V shapes found on ceramics from Jutland are interpreted by Klassen (2005b: p.16-17) as representations of spikes. Klassen (2005b: p.19) concludes that especially in the late phase of the Single Grave Culture, cereal (specifically, emmer) was gaining in importance and also had great symbolic value. This important social and symbolic role of cereals is underlined by the presence of grinding stones in graves, ploughmarks under graves and indications of beer drinking (Klassen, 2005b: p19-22). Larsson (2009: p.63-64) interprets the grain impressions found on ceramics from Sweden as an indication of the symbolic importance of agriculture.

For the decorated sherds analyzed in the current study, the decoration techniques as well as the motifs are analysed. The decorative motifs are compared with the Van der Waals and Glasbergen types (2.2.1). The techniques with which the decoration was applied have been used by other researchers (Salanova, 2001) to help reconstruct societies. The techniques of decoration will therefore also be analysed. Here four main techniques were used: spatulas were used to make impressed lines, round imprints, or perforations; cords were used to make cord impressions; fingertips were used to make fingertip impressions; and nails were used to make nail impressions.

The decorative motifs and techniques present on the different sites are presented in section 2.3. A comparison of the techniques and motifs found on the different sites and on pre-Drouwen sites, Vlaardingen sites and Corded Ware (funerary) sites from elsewhere in the Netherlands is the subject of chapter 3.

2.2.4.5 Use

Several authors have suggested that Corded Ware beakers were used as alcohol drinking vessels (Childe, 1925, Sheratt, 1997a-b, Klassen, 2005a-b, Rojo-Guerra *et al.*, 2006, Guerra Doce 2006a-b, Westermann, 2007, Vander Linden, 2012). The majority of these authors base their theory (ultimately) on the ceramics from funerary contexts. The present study of settlement ceramics presents an opportunity to test those ideas and postulate new ideas on the role and function of different Corded Ware ceramics.

The use of vessels cannot always be inferred from their shape. As Larsson (2009: p.157) argues, the relationship between ware, form and function is not simply a derivative of its technological characteristics and shape. It is therefore vital to look for traces of use—in the form of residues on the ceramics themselves, or use wear, or discard patterns and contextual relationships to other artefacts and features. Charred residues have been found on vessels from all of the sites studied here, but other use wear was rarely found. The proportions of residues and the characteristics and find contexts for the ceramics on which they occurred have been studied. Furthermore, the residues of 57 vessels have been chemically and botanically analysed as part of the NWO project (Oudemans and Kubiak-Martens, 2012, 2013, 2014.). Kubiak-Martens and Oudemans performed residue analysis using a combination of archaeobotanical analysis, chemical analysis by means of scanning electron microscopy (SEM), and chemical analysis by means of direct temperature-resolved mass spectrometry DTMS. The residues of 16 vessels from Keinsmerbrug, 16 vessels from Mienakker and 25 vessels from Zeewijk were analysed (Oudemans and Kubiak-Martens, 2012, 2013, 2014.). Both the establishment of the presence of residues and the residue analysis itself can provide information on the use and functions of different types of vessels and

highlight similarities and differences within and between sites and regions. This can contribute to the debate on whether beakers were drinking vessels used for alcohol.

The presence of different types of ceramic artefacts, such as spindle whorls and baking plates will be noted. The re-use of ceramics and their characteristics and find locations will be analysed as well. Nobles (2012, 2013a, 2014) analysed the discard patterns of ceramics in relation to those of other artefacts and features on the sites of Keinsmerbrug, Mienakker and Zeewijk. For the vessels without encrusted residues, spatial analysis may contribute to ideas on function and use. The spatial analysis of all ceramics can contribute to answering my questions on the social organisation and activities of the people who inhabited the sites.

Another ceramic feature of which the function needs to be studied is perforations. Several kinds of perforations were observed: perforations as decoration, perforations as part of repairs and perforations of which the function is unclear. The first kind often consists of a row of perforations under the rim; some of these perforations are drilled through the vessel wall, some are simply shallow indentations on the outside surface. Repair holes are drilled close to the margins of both sides of a fracture in order to reconnect, presumably with a piece of string, the two parts. For the majority of the perforations their original function is unclear, as these are often single perforations visible on small sherds. It is clear that the majority of these were drilled secondarily (post-initial firing) to repair the vessel. The various indications for use will be discussed by site in section 2.3. A comparison of patterns of use is the topic of section 3.3.4.

2.2.4.6 Inter- and intra-site analysis and regional comparison

The ceramic assemblages of different parts of sites will be compared (inter-site analysis), and the sites will be compared with each other and with sites from other regions and periods (intra-site analysis). Both the technological characteristics, the morphological characteristics, the decoration, the indications for use, the size of the assemblage and the patterns in which sherds have been found will be compared. The intra-site analysis can contribute to our knowledge of the site and of differences in period of use, activity areas and/or social aspects among the inhabitants of the sites.

Differences in assemblage composition in different parts of the site can be caused by temporal or spatial differences. The use of different types of vessels side by side is seen by Ebbesen (2006: p.237) as an indication that society had exogamous marriage rules. Homogeneity in large areas is seen by Salanova (2001: p.91) as an indication of movements of people. A very homogeneous assemblage can also indicate one period of use by a homogeneous group of people and/or a specific function of the site. The size of the assemblage can reflect the length of occupation and the function of the site (Hogestijn, 1997: p.28-29). In this analysis, the degree of homogeneity will be used to formulate ideas on the inhabitants of the site, their mobility and the nature and duration of habitation of the sites following the ideas of Salanova (2001) and Ebbesen (2006).

Comparing the ceramic assemblages from different sites can enhance our understanding of the chronological differentiation of the settlements and the economic and social system in which the inhabitants of the settlements operated (Van der Waals and Glasbergen, 1955, Lanting and Van der Waals, 1976 Hogestijn, 1997). A comparison with contemporaneous and both younger and older sites from different regions can also enhance ideas on the chronology and societal developments. A comparison will be made with the Funnel Beaker ceramics from various sites, especially those found on the site P14, located in the basin of the

river Vecht (Ten Anscher, 2012), located some 65 km in a straight line from my study area. In the southern part of the coastal zone and the rivers area in the central Netherlands (c. 45 km from the site Westbroek Vindplaats 3 and c. 110 km from the site of Vlaardingen itself) the sites of the Vlaardingen group are found (Glasbergen *et al.*, 1967, Louwe Kooijmans, 1974, 1976, Lanting and Van der Plicht, 1999/2000, Beckerman and Raemaekers, 2009). Some of these sites are older and some are partly contemporaneous with the Corded Ware Culture sites. The Corded Ware Culture and the Vlaardingen Culture have always been treated as distinct cultures. It is thought there was a period of 'peaceful coexistence' with incidental contacts, followed by an 'assimilation phase' (Louwe Kooijmans, 1976: p.289). Such ideas can be tested by comparing the ceramic assemblages of the Vlaardingen and Corded Ware sites.

The Corded Ware dataset in the Netherlands consists of the wetland settlement sites studied here, as well as some upland sites, most of which consist of burial mounds (Lanting and Van der Waals, 1976, Drenth, 2005, Drenth *et al.*, 2008). The ceramics from the funerary sites will be compared with the ceramics from the analysed settlements (Lanting and Van der Waals, 1976: p.71, Floore, 1991: p.55). Various researchers have suggested differences between settlement and funerary ceramics (Van Heeringen and Theunissen, 2001: p.146, Drenth *et al.*, 2008: p.153). The presence of different regional groups within the Corded Ware Culture has also been postulated (Drenth *et al.*, 2008). These ideas will be tested in chapter 3 by comparing the ceramics. The chronological and societal implications of the observed patterns will be discussed in chapters 4 and 5.

2.3 Ceramics from the different settlements

2.3.1 Slootdorp-Bouwlust

2.3.1.1 Introduction

The excavations at this site were carried out in 1990 and 1991 by the Dutch state service for archaeology (then Rijksdienst voor het Oudheidkundig Bodemonderzoek, now Rijksdienst voor het Cultureel Erfgoed, Van Heeringen and Theunissen, 2001: p.257-264). A coring campaign consisting of 77 corings indicated that the cultural layer had been almost completely incorporated into the topsoil; however, at locations under drainage pipes the cultural layer was not affected by ploughing. The topsoil was investigated using corings and by repetitively ploughing and subsequently surveying the ploughed plot (by walking and sometimes crawling over an area of 44 × 26 m), and by taking and sieving 50 1-litre samples of soil. The excavation consisted of three small test trenches (1990) and an excavation trench of 42 × 23 m (1991).

Features uncovered included 14 large pits and 541 postholes. Hogestijn and Drenth (2000: p.130-131) reconstructed a two-aisled house plan measuring 11 × 3.8 m. The house was thought to have been repaired or rebuilt several times (Hogestijn and Drenth, 2000: p.130-131). The finds include a total of 650 sherds, 10 140 flint artefacts (amongst which only 117 tools, representing c. 1%), as well as stone tools, including hammerstones, quern stones and a complete axe (Van Heeringen and Theunissen, 2001: p.260-261, Hogestijn and Drenth, 2000: p.129). Animal bones show a dominance of wild animals, mainly big birds and mammals (Van Heeringen and Theunissen, 2001: p.261). Shells were found in large numbers, comprising mainly common mussel (Van Heeringen and Theunissen, 2001: p.261). A botanical sample yielded emmer wheat (Van

Heeringen and Theunissen, 2001: p.261). Hogestijn and Drenth (2001: p.42) concluded that the site must have been used repeatedly during the winter months.

Limited information is published on the ceramics. Bakker analysed a selection of the sherds (Hogestijn and Drenth, 2001: p.45).⁶ According to Bakker, shapes mainly consist of funnel-shaped beakers and, to a lesser extent, bowls, buckets and baking plates. The decoration suggests an attribution to the Funnel Beaker Culture, either Brindley (1986) horizon 4/5 or Bakker (1979) transition from the late Drouwen to the early Havelte phase, around 3000 BC (Hogestijn and Drenth, 2001: p.45).

The pottery of Slootdorp-Bouwlust was re-examined by me in 2012, and during this analysis a total of 1685 sherds were analysed. Just 20% of these sherds, or 335, had been found during the excavation. The remainder were found during water sieving (table 2.8). There are huge differences between the average weight and size of the sherds found in relation to the respective collection method: the average weight of the sherds found during the excavation is 14.63 g, whereas the weight of the sherds found by sieving the 50 1-litre samples from the topsoil is 5.28 g.

2.3.1.2 Technological characteristics

The vast majority of the sherds were tempered with stone grit. Hornblende was used most often.⁷ Granite also occurs frequently, and quartz was added to the clay of a few sherds (table 2.2). Several sherds show that very special types of temper, in the form of shell, flint, and bone, were also used (table 2.2, figure 2.2, 2.5-2.8). Another remarkable find is the imprints of grains found on five sherds (figure 2.9). These imprints were previously analysed by De Cock-Buurman (1993). She concluded that it concerned impressions of naked barley (*Hordeum vulgare Nudum*) and emmer wheat (*Triticum dicoccum*) (De Cock-Buurman, 1993). Several authors have discussed cereal imprints found on other Neolithic sites. They have suggested that these imprints entail a symbolic representation of the importance of grain (Raemaekers, 2015) or a product made from cereals, namely, beer (Klassen, 2005a-b). This aspect will be discussed further in sections 5.2 and 5.3.

The majority of the sherds are thin-walled (52%), but both medium-thick-walled (26%) and thick-walled (18%) sherds occur as well. Grog, stone grit and organic temper are present in sherds of all thickness classes. Sherds fired in a completely reduced atmosphere, resulting in ceramics with both a dark inside, outside and core, are most common (52%). Firing in a (partially) oxidising atmosphere occurred as well. About a third of the sherds have a light outside colour (table 2.2). A correlation between firing method, thickness and/or tempering was not found. The majority of the sherds have a lightly smoothed or smoothed outside (55%, table 2.2). These lightly smoothed or smoothed sherds are thin-walled a little more often than the average sherd. The insides of the sherds are most often left rough (53%, table 2.2).

Several sherds are broken at the point where two coils join. Hb coils were observed on 107 sherds. The direction of the coils sometimes changes at the point of the largest belly circumference, a pattern that was also observed by Ten Anscher (2012: p.65) on vessels from P14 and which is seen as typical for ceramics dating to the period after 4000 cal. BC.

6 From the notes made by J.A. Bakker, I deduce that by the time of the current reanalysis several sherds must have gone missing.

7 Macroscopic identification S. Arnoldussen: hornblende, p-XRF and XRD analysis by B. Van Os: amphibole group.

	Sijbekarspel-De Veken		Mienakker		Zeewijk-West southern part		Zeewijk all		Keinsmerbrug		Aartswoud		Zeewijk-Oost		Zeewijk-West northern part		Zandwerven 1929 III		Zandwerven 1958 high		Zandwerven 1929 II		Zandwerven 1958 low		Zandwerven all		Slootdorp-Bouwlust not from features		Slootdorp-Bouwlust features		Slootdorp-Bouwlust all				
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%			
Number of sherds	1685	100%	66	100%	1772	100%	3329	100%	512	100%	531	100%	629	100%	852	100%	27	100%	241	100%	18	100%	91	100%	759	100%	1366	100%	319	100%	1685	100%			
Analysed	1676	99%	65	11%	1761	99%	3308	99%	291	57%	526	99%	622	99%	849	100%	27	100%	240	100%	18	100%	91	100%	752	99%	1358	99%	318	100%	1676	99%			
Grit	x	x	x	x	x	x	x	x	204	40%	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x				
Indelible/younger	13	1%	7	0%	11	1%	21	0%	17	3%	5	1%	7	1%	3	0%	x	x	1	0%	x	x	x	x	7	1%	12	1%	1	0%	13	1%			
Tempering																																			
Quartz	x	x	x	x	x	x	1	0%	1	1%	x	x	x	x	1	0%	x	x	2	1%	x	x	x	x	5	1%	x	x	x	x	x	x			
Quartz and grog	x	x	x	x	x	x	3	0%	11	7%	1	0%	x	x	3	0%	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
Quartz and sand	6	0%	x	x	x	x	5	0%	x	x	11	2%	x	x	5	1%	2	7%	39	16%	x	x	8	9%	104	14%	6	0%	x	x	x	x			
Quartz, grog and sand	x	x	x	x	x	x	3	0%	x	x	23	4%	x	x	2	7%	69	8%	8	3%	x	x	5	5%	28	4%	x	x	x	x	x	x			
Quartz, sand and organic	2	0%	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	2	0%	x	x	x	x	x			
Quartz, grog, sand and organic	x	x	x	x	x	x	1	0%	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	2	0%	x	x	x	x	x	x			
Quartz, homblende and sand	1	0%	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	1	0%	x	x	x	x	x			
Quartz, homblende, grog and sand	1	0%	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	1	0%	x	x	x	x	x			
Granite	x	x	x	x	x	x	x	x	x	x	3	1%	x	x	10	1%	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
Granite and grog	x	x	x	x	x	x	2	0%	3	2%	2	0%	x	x	2	0%	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
Granite and sand	634	38%	70	22%	564	42%	302	40%	88	37%	25	5%	40	7%	63	7%	8	30%	15	6%	5	28%	61	67%	50	7%	28	2%	28	2%	28	2%	564	42%	
Granite, grog and sand	38	2%	x	x	52	3%	155	5%	1	1%	44	8%	40	6%	43	5%	x	x	15	6%	x	x	2	2%	4	1%	5	0%	x	x	x	x	38	2%	
Granite, grog, sand and organic	5	0%	x	x	x	x	1	0%	x	x	15	3%	1	0%	x	x	x	x	x	x	x	x	x	x	x	4	0%	48	4%	x	x	x	x	5	0%
Granite, sand and organic	48	3%	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	1	0%	48	4%	x	x	x	x	48	3%	
Granite, grog and shell	x	x	x	x	x	x	1	0%	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
Granite, sand and bone	x	x	x	x	x	x	x	x	x	x	1	0%	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Granite, red granite and sand	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	1	0%	x	x	x	x	x	x	x	
Granite, homblende and sand	27	2%	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	27	2%	x	x	x	x	x	27	2%	
Granite, homblende, grog and sand	4	0%	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	3	0%	x	x	x	x	x	4	0%	
Granite, homblende, sand and organic	2	0%	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	2	0%	x	x	x	x	x	2	0%	
Granite, homblende, grog, sand and organic	1	0%	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	1	0%	x	x	x	x	x	1	0%	
Granite, sand and shell	5	0%	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	5	0%	x	x	x	x	x	5	0%	

	Slootdorp-Bouwlust all	Slootdorp-Bouwlust features	Slootdorp-Bouwlust not from features	Zandwerven all	Zandwerven 1958 low	Zandwerven 1929 II	Zandwerven 1958 high	Zandwerven 1929 III	Zeewijk-West northern part	Zeewijk-Oost	Aartswoud	Keinsmerbrug	Zeewijk all	Zeewijk-West southern part	Mienakker	Sijbekarspel-De Veken
Granite, homblende, sand and shell	1	0%	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Granite, sand, organic and shell	3	0%	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Granite, sand, organic and bone	1	0%	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Red granite	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Red granite and grog	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Red granite and sand	19	1%	1	0%	18	1%	7	1%	15	2%	6	10	26	38	1	2%
Red granite, grog and sand	9	1%	3	1%	6	0%	x	x	3	0%	1	1	45	2%	x	4
Red granite, sand and organic	1	0%	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Red granite, grog, sand and organic	1	0%	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Red granite, homblende and sand	3	0%	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Red granite, homblende, sand and organic	2	0%	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Red granite, homblende, grog sand and organic	1	0%	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Homblende and sand	619	37%	126	39%	493	36%	1	0%	x	x	x	x	x	x	x	x
Homblende, grog and sand	101	6%	70	22%	31	2%	x	x	x	x	x	x	x	x	x	x
Homblende, grog, sand and organic	29	2%	20	6%	9	1%	x	x	x	x	x	x	x	x	x	x
Homblende, sand and organic	20	1%	x	x	x	1%	x	x	x	x	x	x	x	x	x	x
Homblende, sand, organic and shell	5	0%	x	x	x	0%	x	x	x	x	x	x	x	x	x	x
Homblende, sand and flint	1	0%	x	x	x	0%	x	x	x	x	x	x	x	x	x	x
Grog	x	x	x	x	x	x	x	x	x	x	3	23	3	3	x	x
Grog and sand	18	1%	10	3%	8	1%	159	21%	600	71%	307	96	2724	1544	595	49
Grog and organic	x	x	x	x	x	x	x	x	x	x	x	2	x	x	x	x
Grog, sand and organic	1	0%	x	x	x	0%	51	7%	28	3%	37	3	44	15	37	6
Grog, sand and mica	x	x	x	x	x	x	x	x	x	x	x	x	x	x	1	0%
Grog, sand and shell	x	x	x	x	x	x	x	x	1	0%	x	x	1	x	x	x
Grog and shell	x	x	x	x	x	x	x	x	x	x	x	x	x	x	1	0%
Grog and mica	x	x	x	x	x	x	x	x	x	x	x	x	1	0%	x	x

Table 2.2 Characteristics of the ceramics from the different sites.

	Slootdorp-Bouwlust all	Slootdorp-Bouwlust features	Slootdorp-Bouwlust not from features	Zandwerven all	Zandwerven 1958 low	Zandwerven 1929 II	Zandwerven 1958 high	Zandwerven 1929 III	Zandwerven West northern part	Zandwerven Oost	Aartswoud	Keinsmerbrug	Zandwerven all	Zandwerven West southern part	Mienakker	Sjibekarspel-De Veken					
Sand	64	4%	30	4%	2	2%	13	5%	x	x	36	4	56	2%	46	3%	14	2%	x	x	
Sand and mica	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Sand and organic	5	0%	5	0%	x	x	x	x	x	x	9	x	x	x	x	x	4	1%	x	x	x
Sand, organic and shell	1	0%	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Organic and shell	x	x	x	x	x	x	x	x	x	x	x	1	x	x	x	x	x	x	x	x	x
Organic	x	x	x	x	x	x	x	x	x	x	1	x	x	x	x	x	x	x	x	x	x
Thickness (mm)																					
lies>2.5	x	x	x	x	x	x	x	x	1	0%	x	x	x	x	x	x	x	x	0	0%	
3-3.5	x	x	x	x	x	x	x	x	1	0%	x	x	38	1%	18	1%	4	1%	2	4%	
4-4.5	x	x	3	0%	x	x	4	2%	23	3%	4%	x	202	7%	173	10%	30	6%	3	5%	
5-5.5	72	5%	21	7%	2	2%	8	4%	78	10%	12%	22	454	15%	315	19%	120	23%	8	14%	
6-6.5	247	16%	59	20%	8	9%	24	11%	140	18%	17%	59	599	20%	372	22%	166	31%	11	20%	
7-7.5	466	31%	90	31%	10	11%	41	19%	149	20%	24%	56	694	23%	424	25%	92	18%	16	29%	
8-8.5	392	26%	50	17%	25	28%	52	24%	161	21%	15%	41	454	15%	178	11%	30	6%	13	24%	
9-9.5	201	13%	31	11%	11	12%	42	20%	87	11%	11%	43	287	9%	117	7%	58	11%	2	4%	
10-10.5	80	5%	18	6%	25	27%	20	9%	81	11%	7%	20	174	6%	43	3%	16	3%	0	0%	
11-11.5	25	2%	10	4%	5	6%	12	6%	23	3%	5%	1	58	2%	16	1%	4	1%	0	0%	
12-12.5	18	1%	4	1%	4	4%	9	4%	5	1%	2%	x	29	1%	14	1%	x	x	0	0%	
13-more	18	1%	9	3%	1	1%	3	1%	16	2%	3%	x	24	1%	3	0%	x	x	0	0%	
Colour(I)																					
da-da-da	804	52%	234	77%	42	46%	96	43%	552	69%	42%	103	2004	65%	1073	63%	290	49%	16	28%	
da-da	x	x	x	x	x	x	x	x	x	x	x	x	16	1%	x	x	93	15%	x	x	
da-da-li	46	3%	5	2%	x	x	4	2%	25	3%	8%	12	208	7%	156	9%	38	6%	6	10%	
da-li-da	119	8%	16	5%	2	2%	3	1%	4	1%	5%	15	7	0%	2	0%	x	0%	1	2%	
da-li-li	37	3%	2	1%	x	x	1	1%	17	2%	3%	1	40	1%	17	1%	1	0%	2	3%	
li-da-da	240	16%	14	5%	29	32%	82	37%	75	9%	18%	17	334	11%	200	12%	15	2%	10	17%	
li-da-li	219	14%	25	8%	14	16%	24	11%	99	13%	21%	22	376	12%	216	13%	114	19%	22	38%	
li-li-da	34	2%	4	1%	2	2%	3	1%	6	1%	1%	4	12	1%	5	0%	1	0%	1	2%	
li-li-li	37	2%	4	1%	2	2%	8	4%	17	2%	2%	10	69	2%	33	2%	42	7%	x	x	
li-li	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	15	2%	x	x	

	Slootdorp-Bouwlust all	Slootdorp-Bouwlust features	Slootdorp-Bouwlust not from features	Zandwerven all	Zandwerven 1958 low	Zandwerven 1929 II	Zandwerven 1958 high	Zandwerven 1929 III	Zandwerven West northern part	Zandwerven Oost	Aartswoud	Keinsmerbrug	Zandwerven all	Zandwerven West southern part	Mienakker	Sijbekarspel-De Veken															
Surface treatment outside																															
Rough	696	169	55%	527	42%	569	87%	80	88%	8	47%	196	90%	27	100%	573	75%	384	73%	354	71%	209	86%	1956	69%	966	65%	310	69%	40	69%
Smooth	860	139	55%	721	58%	84	13%	11	12%	9	53%	22	10%	0	0%	189	25%	145	27%	145	29%	33	14%	872	31%	514	35%	138	31%	18	31%
Surface treatment inside																															
Rough	832	144	53%	688	54%	584	82%	59	65%	14	78%	187	83%	23	88%	660	83%	444	79%	422	83%	228	91%	2295	74%	1144	69%	452	76%	43	75%
Smooth	733	149	47%	584	46%	129	18%	32	35%	4	22%	39	17%	3	12%	141	17%	120	21%	86	17%	22	9%	799	26%	511	31%	141	24%	14	25%
Decoration																															
Undecorated rims	96	79%	27	53%	69	97%	42	69%	9	90%	4	100%	2	25%	x	58	54%	52	72%	13	81%	30	63%	146	47%	157	64%	50	56%	5	83%
Decorated rims	26	21%	24	47%	2	3%	19	31%	1	10%	0	x	6	75%	5	50	46%	20	28%	54	19%	18	38%	162	53%	90	36%	39	44%	1	17%
Undecorated walls	1474	97%	229	92%	1245	98%	664	94%	81	99%	14	100%	226	97%	19	669	84%	528	91%	401	82%	210	74%	2443	80%	1214	74%	459	75%	55	90%
Decorated walls	43	3%	19	8%	24	2%	40	6%	1	1%	0	0%	7	3%	8	129	16%	50	9%	90	18%	72	26%	619	20%	419	26%	153	25%	6	10%

[1] From left to right: outside, core, inside, da=dark, li=light.



Table 2.2 (continued) Characteristics of the ceramics from the different sites.

	Thickness			Average thickness (in mm)	Rough outside surface	Tempering			Decoration			Undecorated	Vessel types
	Thin 5-7.5 mm	Medium 8-8.5 mm	Thick 9-10.5 mm			Stone	Organic material	Grog	Cord	Spatula	Fingertip		
Sijbekarspel-De Veken	35, 63%	13, 24%	2, 4%	6.8	40, 69%	11, 17%	6, 9%	65, 98%	7, 70%	3, 30%	0, 0%	59, 89%	x
Mienakker	378, 72%	30, 6%	74, 14%	6.9	310, 69%	2, 0%	38, 6%	635, 97%	69, 58%	50, 42%	0, 0%	486, 74%	Beaker and enlarged beaker
Zeewijk-West southern part	1111, 66%	178, 11%	160, 10%	6.9	966, 65%	151, 8%	15, 1%	1660, 94%	250, 54%	203, 44%	12, 2%	1295, 74%	Beaker and enlarged beaker
Zeewijk-all	1747, 58%	454, 15%	461, 15%	7.4	1956, 69%	478, 14%	46, 1%	3075, 92%	340, 44%	336, 44%	90, 12%	2585, 78%	Beaker and enlarged beaker
Keinsmerbrug	137, 57%	41, 17%	63, 26%	7.5	209, 86%	34, 22%	32, 11%	150, 92%	1, 2%	35, 85%	5, 12%	219, 75%	Beaker and enlarged beaker
Aartswoud	267, 53%	74, 15%	93, 18%	7.8	354, 74%	131, 25%	76, 14%	436, 82%	7, 6%	71, 65%	32, 29%	526, 79%	Beaker and enlarged beaker
Zeewijk-Oost	246, 48%	106, 20%	130, 24%	7.9	384, 73%	116, 19%	3, 0%	564, 90%	7, 11%	38, 61%	17, 28%	559, 84%	Beaker and enlarged beaker
Zeewijk-West northern part	367, 48%	161, 21%	168, 22%	7.9	573, 75%	209, 23%	29, 3%	749, 88%	38, 25%	57, 37%	59, 38%	694, 82%	x
Zandwerven 1929 III	11, 41%	7, 26%	5, 19%	8.2	27, 100%	12, 44%	2, 7%	17, 63%	7, 88%	0, 0%	1, 13%	19, 70%	x
Zandwerven 1958 high	73, 30%	52, 22%	62, 26%	8.5	196, 81%	153, 63%	23, 10%	97, 40%	2, 20%	8, 80%	0, 0%	232, 96%	x
Zandwerven 1929 II	2, 11%	6, 33%	7, 39%	9.2	8, 44%	7, 39%	3, 17%	16, 89%	0, 0%	0, 0%	0, 0%	18, 100%	x
Zandwerven 1958 low	20, 22%	25, 27%	36, 40%	8.9	81, 89%	76, 84%	10, 11%	20, 22%	0, 0%	0, 0%	0, 0%	90, 99%	Pronounced S shape
Zandwerven all	171, 27%	154, 24%	231, 36%	8.8	569, 87%	505, 68%	64, 9%	296, 40%	10, 20%	17, 33%	24, 47%	702, 93%	Pronounced S shape, beaker, enlarged beaker
Slootdorp Bouwlust no feature	615, 50%	344, 28%	234, 19%	7.9	529, 48%	1291, 91%	105, 7%	101, 6%	0, 0%	26, 100%	0, 0%	1336, 98%	High upright or inward bending neck
Slootdorp Bouwlust features	168, 59%	48, 17%	49, 17%	7.8	162, 55%	296, 93%	20, 6%	100, 32%	0, 0%	30, 100%	0, 0%	285, 91%	
Slootdorp Bouwlust all	785, 52%	392, 26%	281, 18%	7.9	696, 45%	1590, 93%	128, 7%	201, 12%	0, 0%	56, 100%	0, 0%	1621, 97%	High upright or inward bending neck
Total	3520, 60%	1158, 20%	1204, 20%	7.9	4134	2751, 38%	390, 5%	4858, 67%	434, 38%	568, 49%	151, 13%	3868, 77%	

Types decorated with both spatula and cord impressions are found on Zandwerven, Zeewijk-west south and Sijbekarspel De Veken and are counted in both categories
 Perforations or round imprints (often just under the rim) are found on Slootdorp and the lowest layers of Zandwerven and are counted in the spatula category

Highest
Second highest
Third highest

Table 2.3 Main differences among the different sites.

Numers of sherds with residues, % of sherds with residues, % of total	Total number of sherds with residues	% of sherds with residues	Thickness			Average thickness (in mm)	Rough outside surface	Tempering			Decoration			Undecorated
			Thin 5-7.5 mm	Medium 8-8.5 mm	Thick 9-10.5 mm			Stone	Organic material	Grog	Cord	Spatula	Fingertip	
Sijbekarspel-De Veken	9 (of 66)	14%	5, 56%, 14%	2, 22%, 15%	2, 22%, 100%	7.1	3, 33%, 8%	3, 22%, 27%	0, 0%, 0%	9, 100%, 14%	1, 11%, 14%	1, 11%, 33%	0, 0%, 0%	8, 89%, 14%
Mienakker	88 (of 654)	13%	79, 90%, 21%	3, 3%, 10%	0, 0%, 0%	6.4	29, 33%, 9%	0, 0%, 0%	3, 3%, 8%	85, 97%, 13%	5, 6%, 7%	22, 25%, 44%	0, 0%, 0%	61, 69%, 13%
Zeewijk-West southern part	832 (of 1761)	47%	595, 72%, 54%	67, 8%, 38%	57, 7%, 36%	6.5	460, 55%, 48%	42, 5%, 28%	1, 1%, 7%	781, 94%, 47%	207, 25%, 83%	85, 10%, 42%	7, 1%, 58%	533, 64%, 41%
Zeewijk-all	1271 (of 3308)	38%	824, 65%, 47%	146, 11%, 32%	136, 11%, 30%	6.8	763, 60%, 39%	142, 11%, 30%	9, 1%, 20%	1178, 93%, 38%	232, 18%, 68%	123, 10%, 37%	39, 3%, 43%	893, 70%, 35%
Keinsmerbrug	51 (of 291)	18%	20, 39%, 15%	7, 14%, 17%	12, 24%, 19%	7.5	32, 63%, 15%	1, 1%, 3%	7, 14%, 22%	49, 96%, 33%	0, 0%, 0%	13, 25%, 37%	3, 6%, 60%	35, 69%, 16%
Aartswoud	110 (of 531)	21%	70, 64%, 26%	13, 12%, 18%	17, 15%, 18%	6.9	64, 58%, 18%	17, 15%, 13%	11, 10%, 14%	85, 77%, 19%	2, 2%, 29%	16, 15%, 23%	6, 5%, 19%	86, 78%, 16%
Zeewijk-Oost	138 (of 622)	22%	71, 51%, 29%	19, 14%, 18%	24, 17%, 18%	7.5	103, 75%, 27%	18, 13%, 16%	0, 0%, 0%	131, 95%, 23%	5, 4%, 71%	16, 12%, 42%	2, 1%, 12%	115, 83%, 21%
Zeewijk-West northern part	301 (of 849)	35%	158, 52%, 43%	60, 20%, 37%	55, 18%, 33%	7.5	200, 66%, 35%	82, 27%, 39%	8, 3%, 28%	266, 88%, 36%	20, 7%, 53%	22, 7%, 39%	30, 10%, 51%	229, 76%, 33%
Zandwerven 1929 III	1 (of 27)	4%	x	x	x	x	x	x	x	x	x	x	x	x
Zandwerven 1958 high	43 (of 241)	18%	23, 53%, 32%	7, 16%, 14%	12, 28%, 42%	7.6	39, 91%, 20%	2, 5%, 1%	7, 12%, 30%	22, 37%, 23%	1, 2%, 50%	4, 7%, 50%	0, 0%, 0%	38, 16%
Zandwerven 1929 II	0 (of 18)	0%	x	x	x	x	x	x	x	x	x	x	x	x
Zandwerven 1958 low	29 (of 91)	32%	1, 3%, 5%	7, 24%, 28%	21, 72%, 34%	8.9	25, 86%, 31%	28, 97%, 37%	0, 0%, 0%	1, 3%, 5%	0, 0%, 0%	0, 0%, 0%	0, 0%, 0%	29, 100%, 32%
Zandwerven all	111 (of 752)	15%	32, 29%, 19%	20, 18%, 13%	53, 48%, 23%	8.4	87, 78%, 15%	76, 68%, 15%	8, 7%, 13%	37, 33%, 13%	2, 2%, 20%	4, 4%, 24%	3, 3%, 13%	102, 92%, 15%
Slootdorp Bouwlust no feature	58 (of 1366)	4%	39, 67%, 6%	18, 31%, 5%	5, 9%, 2%	7.4	17, 29%, 3%	56, 97%, 4%	6, 10%, 6%	7, 12%, 7%	0, 0%, 0%	1, 2%, 4%	0, 0%, 0%	57, 98%, 4%
Slootdorp Bouwlust features	126 (of 319)	39%	67, 53%, 40%	25, 20%, 52%	13, 10%, 27%	7.8	69, 55%, 43%	125, 99%, 42%	6, 5%, 30%	44, 35%, 44%	0, 0%, 0%	21, 17%, 70%	0, 0%, 0%	105, 83%, 5%
Slootdorp Bouwlust all	184 (of 1685)	11%	106, 58%, 14%	43, 23%, 11%	18, 10%, 6%	7.6	86, 47%, 12%	181, 95%, 11%	12, 7%, 9%	51, 28%, 25%	0, 0%, 0%	22, 12%, 39%	0, 0%, 0%	162, 88%, 10%
Total (and % of all)	1824 (of 7287)	25%	1136, 62%, 32%	234, 13%, 9%	238, 13%, 20%	7.4	1064, 26%	419, 23%, 15%	50, 3%, 13%	1494, 82%, 31%	242, 13%, 56%	201, 11%, 35%	51, 3%, 34%	1347, 74%, 35%

Table 2.4 Characteristics of the ceramics with residues.

55% or more of all sherds
45-54% of all sherds
35-44% of all sherds

Vessel	Shape	Characteristics	Site	Temper	Thickness (in mm)	Rim diameter (in cm)	Greatest belly diameter (in cm)	Foot diameter (in cm)	Height (in cm)	Rim Δ (in cm)	Rim height (in cm)	Shoulder Δ (in cm)	Shoulder height (in cm)	Comparable to Vlaardingen group
12	Beaker shape	1e like	Zeewijk-West southern part	Grog and sand	5	13	6	14.5?	15.5?	0.2	1.9	0.7	5.4	c
15	Beaker shape	Zigzag	Zeewijk-West southern part	Grog and sand	6-6.5	14.5	15.5?	x	x	0.7	2.6	1.1	4.8	c
131	Beaker shape	2Ild	Zeewijk-West southern part	Grog and sand	4-7.5	13.5	16	8	x	1.1	3.3	1.9	7.2	none
124	Beaker shape	2Ilb	Zeewijk-West southern part	Grog and sand	3.5-4.5	8	8.5	4	11.5	0.9	2.2	0.9	4.1	c
31	Beaker shape	2Ilb	Mienakker	Grog and sand	5-7	11.5	11.5	6.5	16.5	0.9	2.5	1.0	5.4	c
29	Beaker shape	2Ilb	Mienakker	Grog and sand	4-7	12	11.5	6	13.5	1.2	3.4	1.0	3.6	none
29	Beaker shape	2Ilf	Zeewijk-West southern part	Grog and sand	4-7.5	12.5	12.5?	6	15.5?	0.9	4.2	2.1	4.5	none
24	Beaker shape	Plain vessel	Mienakker	Grog and sand	5.5-6.5	12	13.5?	x	x	0.5	2.5	1.2	4.0	c
123	Beaker shape, high shoulder	1a	Zeewijk-West southern part	Sand	4-5	14	17	x	x	0.6	2.1	2.1	10.4	none
7	Beaker shape, large rim angle and height	1d	Aartswoud	Grog, sand and organic material	5	14	13.5	x	x	2.0	5	1.3	5.7	f
30	Enlarged beaker shape	Plain vessel	Mienakker	Grog and sand	5-7	17	19	7	24.5	0.6	3.8	1.3	8.4	E
165	Enlarged beaker shape	Plain vessel	Zeewijk-West, probably southern part	Grog and sand	7.5-7	15.5	17.5?	x	x	0.6	4.5	1.7	7.4	E
28	Enlarged beaker shape	Plain vessel	Zeewijk-West southern part	Grog and sand	5-8	19	22.5	8	23.5?	0.6	3.8	2.0	8.4	E
1	Other form, very large	1d	Keinsmerbrug	Grog and sand	7.5-9	24	33	x	x	0.7	3.7	5.0	13.3	none
14	Other form, very small	Plain vessel	Zeewijk-West southern part	Grog and sand	4-7.5	7	8	4.5	7.5	0.0	2.2	0.4	1.1	C
30	Other form, long straight neck	Plain vessel	Zeewijk-West southern part	Grog and sand	4-7.5	12.5	14.5	5	12	0.1	5	1.0	1.8	none
46	Other form, plate	Cord or spatula decoration in blocks	Slootdorp-Bouwlust	Hornblende, grog and sand	10.5	22	x	x	x	x	x	x	x	none
44	Pronounced S-shape	Perforations under the rim	Zandwerven 1958 low	Granite and sand	10.5	19	20	x	x	0.5	1.2	1	3.8	C
45	High upright or inward-sloping neck	Perforations under the rim	Slootdorp-Bouwlust features	Hornblende, grog and sand	6.5-8	22.5	24.5	x	x	0.0	6.4	0.9	5.5	none
44	High upright or inward-sloping neck	Two perforations under the rim	Slootdorp-Bouwlust features	Hornblende and sand	6.5	28	28.5	x	x	0.6	5.4	0.6	3.2	none
43	High upright or inward-sloping neck	Plain vessel	Slootdorp-Bouwlust not from features	Hornblende and sand	7	27	28	x	x	0.4	4	0.7	6.1	none
47	High upright or inward-sloping neck	Strap handle	Slootdorp-Bouwlust features	Hornblende and sand	7.5	20	22.5	x	x	-0.2	4.5	0.7	4.9	none

Table 2.5 Vessels.

2.3.1.3 Morphological characteristics

Five vessels were complete from the rim down to at least the greatest circumference. Of these, four were found in features (table 2.5). Only vessel 43 was not found in a feature context (table 2.5).

Vessels 43, 44, 45 and 47 are all examples of a vessel type with a high upright or inward-sloping neck (figure 2.4). There is variation within this type: some vessels have a bi-conical profile (vessel 47), while on others the rim is more upright (vessel 44) or even slightly outward-sloping (vessel 43). The rim diameters vary between 20 and 28 cm, the total height from rim down to the greatest belly circumference varies between 8.6 and 11.9 cm. Vessel 45 is a very large example; the zone from the rim down to the greatest circumference measures 11.9 cm. The greatest circumference is accentuated with a little ridge that is at some locations very pronounced and at others more subtle (figure 2.4). Vessels 44 and 45 have perforations under the rim that were made after firing. On vessel 47, a strap handle was applied vertically just above and under the pronounced transition from neck to belly (figure 2.4). The vessels are all thin-walled (vessel 45 thin to medium-thick-walled) and are tempered with hornblende and sand (vessel 45 additionally shows grog). All these vessels have encrusted charred residues, indicating that they were used to prepare cooked meals. Several other, far less complete, specimens of this type of vessel have been found. These include the depicted vessels 42, 48, 74, 76, 84, C and G (figure 2.4). Vessels 48 and G show a more bi-conical shape, and above the transition point at the greatest circumference on both vessels vertical strap handles have been applied. The proportion of handles is remarkably high. At least some of the handles have been applied by means of a plug through the wall. Examples of these plugs have been found on vessels W, A1 and G1 (figure 2.4). Whether all handles were applied in this way is not clear. All handles

Vessel	Shape	Characteristics	Site	Temper	Thickness (in mm)	Rim diameter (in cm)	Greatest belly diameter (in cm)	Foot diameter (in cm)	Comparable to Vlaardingen group
3	Beaker-like	1d	Keinsmerbrug	Grog and sand	7	13	0.7	2.8	c-like?
13	Beaker-like	1d	Zeewijk-West southern part	Grog and sand	6-7	13	1.1	4.0	f-like?
27	Beaker-like	1d	Aartswoud	Grog and sand	4.5	12	1.5	7.7	none
O.5	Beaker-like	1d/1e	Zeewijk-Oost	Grog and sand	5.5	10	0.6	3.3	c-like?
4	Beaker-like	1e	Keinsmerbrug	Grog, sand and organic material	7	14	1.1	3.7	f-like
13	Beaker-like	ZigZag	Mienakker	Grog and sand	5.5	13	0.6	3.0	c-like?
O.62	Beaker-like	ZigZag	Zeewijk-Oost	Grog and sand	5.5	13	0.8	3.9	none
7	Beaker-like	1a/2Ilb	Mienakker	Grog and sand	5.5	8	0.7	1.6	c-like?
6	Beaker-like	1a/2Ilb	Keinsmerbrug	Grog, sand and organic material	5.5	10	0.3	1.7	c-like?
9	Beaker-like	1a/2Ilb	Mienakker	Sand	7	12	0.3	2.0	c-like?
31	Beaker-like	1a/2Ilb zoned cord	Aartswoud	Sand	4.5	15	1.3	7.5	none
10	Beaker-like	Plain vessel	Mienakker	Grog and sand	5.5	10	0.6	2.2	c-like?
O.41	Beaker-like	Plain vessel	Zeewijk-Oost	Grog and sand	5	14	0.7	2.2	c-like?
17	Beaker-like	Plain vessel	Zandwerven no layer	Quartz and sand	7.5	12	0.6	2.3	c-like?
26	Beaker-like	Plain vessel	Mienakker	Grog and sand	5.5-7.5	11	0.2	2.5	c-like?
28	Beaker-like	Plain vessel	Mienakker	Grog and sand	4-4.5	10	0.7	2.9	c-like?
1	Beaker-like	Plain vessel	Mienakker	Grog and sand	5	14	0.5	3.1	c-like?
2	Beaker-like, but with a small rim angle	Plain vessel	Mienakker	Grog and sand	6.5	9	0.1	1.6	none
2	Intermediate between beaker and enlarged beaker	1d	Keinsmerbrug	Grog and sand	8	16	1.1	3.8	none
156	Intermediate between beaker and enlarged beaker	1a/2Ilb	Zeewijk-West northern part	Grog and sand	4.5-6	16	0.9	3.5	none
9	Enlarged beaker-like	Plain vessel	Keinsmerbrug	Sand	5.5	17	0.7	3.8	E-like
18	Enlarged beaker-like	Plain vessel	Keinsmerbrug	Grog	10	19	0.7	4.7	E-like
12	Enlarged beaker-like	Plain vessel	Keinsmerbrug	Grog and sand	9-9.5	19	0.7	5.0	E-like
24	Enlarged beaker-like	Nailimprints on top of the rim	Aartswoud	Grog and sand	8.5	18	0.5	4.8	E-like
O.22	Enlarged beaker-like	Plain vessel	Zeewijk-Oost	Grog and sand	5.5	22	1.0	3.7	E-like
5	Enlarged beaker-like, but with a high rim and rim angle	Plain vessel	Zeewijk-West southern part	Grog and sand	6-8	21	1.4	6.5	none
1	Pronounced S-shape-like	Plain vessel	Zandwerven no layer	Quartz and sand	9	15	1.0	3.3	C-like
21	Pronounced S-shape-like	Plain vessel	Zandwerven no layer	Quartz, grog, sand and organic material	9	22	0.6	2.2	C-like
13	Other form, very large	Plain vessel	Keinsmerbrug	Grog and sand	7.5	27	2.1	5.8	none
25	Other form, very large	Fingertip impressions	Zeewijk-West northern part	Grog and sand	8.5-12	26	1.3	5.5	none
34	Other form, very large	Plain vessel	Aartswoud	Grog and sand	9	23	1.2	5.6	none
6	Other form	Plain vessel	Mienakker	Grog and sand	7.5	17	0.0	1.7	none

Table 2.6 Upper parts of vessels

are strap handles; other types, such as knobs, have not been found. Vessel 46 is a bowl decorated with blocks filled with lines consisting of round imprints (see section 2.3.1.4).

Fragments of 15 bases have been found. These show diameters ranging from 6 to 16 cm; the majority measure between 8 and 10 cm in diameter. All bases are flat, with a rounded or angular transition to the wall. Other base types, such as rounded bases, have not been recognised. The flat base belonging to vessel 48 is convex on the inside (figure 2.4).

Hogestijn and Drenth (2001: p.45) state that the shapes present at Slootdorp-Bouwlust include funnel-shaped beaker, bowl and bucket shapes. The Funnel Beaker shape has not been found in the current analysis, but the small number of high-quality, regular *tiefstich*-decorated sherds could stem from beakers. Vessel 46 is indeed a bowl. Bucket-shaped vessels were also not recognised during the current analysis. Furthermore, the vast majority of the vessels seem to have another shape than the shapes listed by Hogestijn and Drenth (2001). Parallels for the vessels with a high upright or inward-sloping neck and the bowl decorated with lines consisting of round imprints will be discussed in section 3.2.2.

		Slootdorp-Bouwlust features	Slootdorp-Bouwlust not from features	Zandwerven 1958 low	Zandwerven 1958 no layer	Zeewijk-Oost	Aartswood	Keinsmerbrug	Zeewijk-West, southern part	Mienakker
Beaker	Complete down to the greatest belly circumference	x	x	x	1	3	x	3	6	10
	Complete down to the smallest circumference	x	x	x	1	3	2	3	1	7
Enlarged beaker	Complete down to the greatest belly circumference	x	x	x	x	1	1	3	2	1
	Complete down to the smallest circumference	x	x	x	x	1	1	3	0	0
Pronounced S-shape	Complete down to the greatest belly circumference	x	x	1	2	x	x	x	x	x
	Complete down to the smallest circumference	x	x	x	2	x	x	x	x	x
High upright or inward-sloping neck	Complete down to the greatest belly circumference	3	1	x	x	x	x	x	x	x
	Complete down to the smallest circumference	x	x	x	x	x	x	x	x	x

There are no vessels that are this complete from Zandwerven 1929 high, and 1958 low or high or Sijbekarspel De Veken, of the Zeewijk-west north vessels none are of any of these four shapes

Table 2.7 Vessel shapes by site.

Collection method	Total number of sherds	Total weight of sherds*	Average sherd weight*
Coring 1	36	190,71	5,3
Coring 2	0	0	
Total coring	36	190,71	5,3

Survey 1	105	598,72	5,7
Survey 2	32	199,95	6,25
Survey 3	44	257,59	5,85
Survey 4	69	458,20	6,64
Survey 5	119	653,48	5,49
Survey 6	27	147,74	5,47
Total survey	396	2315,68	5,85

Wheelbarrow 1	383	1997,27	5,21
Wheelbarrow 2	260	1365,45	5,25
Wheelbarrow 3	262	1415,13	5,4
Total wheelbarrow	905	4777,85	5,28

Table 2.8 Slootdorp-Bouwlust frequency of sherds by collection method (data collected by J. Top).

Excavation from features	319	4388,31	13,76
Excavation not from features	16	514,13	32,13
Total excavation	335	4902,44	14,63

Corrections	13	106,11	8,16
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*Weights are in grams

2.3.1.4 Decoration

Just a very small number of sherds, making up 3% of the sherds, are decorated (table 2.2 and 2.3). The decorations can be subdivided into two groups: the majority of the decorated sherds from both the features and the topsoil show perforations and round imprints in the rim zone and irregular decoration, mainly applied with a spatula. A small group of sherds with a strong fabric, originating from the topsoil, deviates from this and shows more regular decoration.

Vessels Q2, R2, S2 and U2 are of the latter category (figure 2.4). On vessel R2, *tiefstich* decoration forms a ladder motif. Sherd Q2 shows very neat *tiefstich* lines, probably in a pattern consisting of vertical lines on the rounded belly. On sherds S2, T2 and U2 zigzag patterns created using *tiefstich* lines are visible. All these sherds are stone grit- and sand-tempered and have, with one exception (vessel S2), a light outside colour. The previous dating of this site to Brindley (1986) horizon 4/5 or Bakker (1979) transition from the late Drouwen to the early Havelte phase around 3000 BC (Hogestijn and Drenth, 2001: p.45) seems mainly based on this small group of sherds with high-quality and regular *tiefstich* decoration. The assemblage includes more sherds with *tiefstich*-like lines; this decoration is, however, less regular and the fabric is more coarse and of a lesser quality. These sherds were also found not during the excavation but during water sieving. Vessels H, H2, J2, K2, L2, M2 and N2 (figure 2.4) also show decoration made using this technique.

Perforations and round imprints were found on medium-thick-walled and thick-walled vessels with a high upward or slightly inward-sloping neck that are, most often, tempered with stone grit and sand.

Perforations and round imprints were found in the greatest frequency and are often applied just underneath the rim. There is some variation, however. Vessel 48 has small round imprints, and on vessel 76 these imprints are larger (figure 2.4).

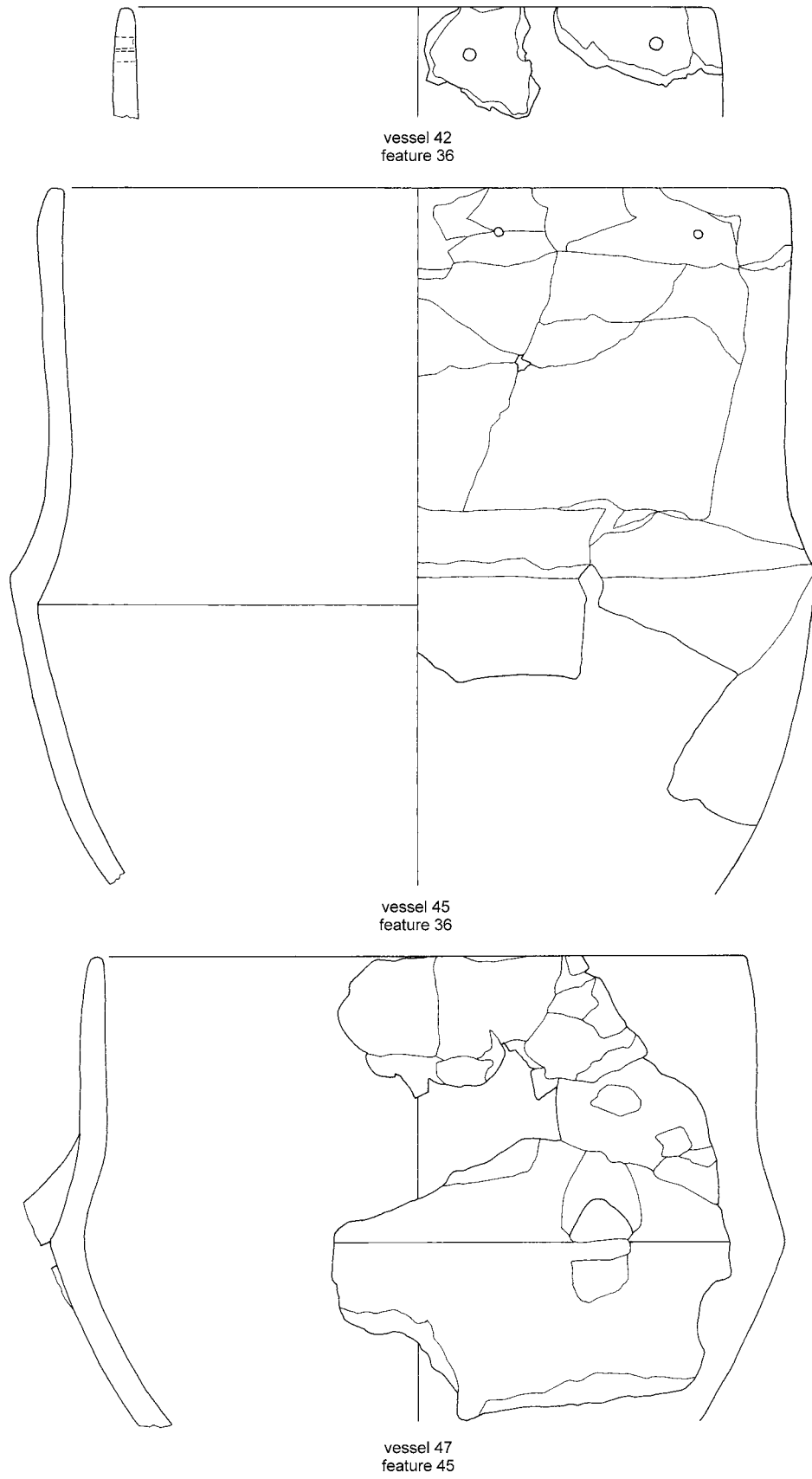
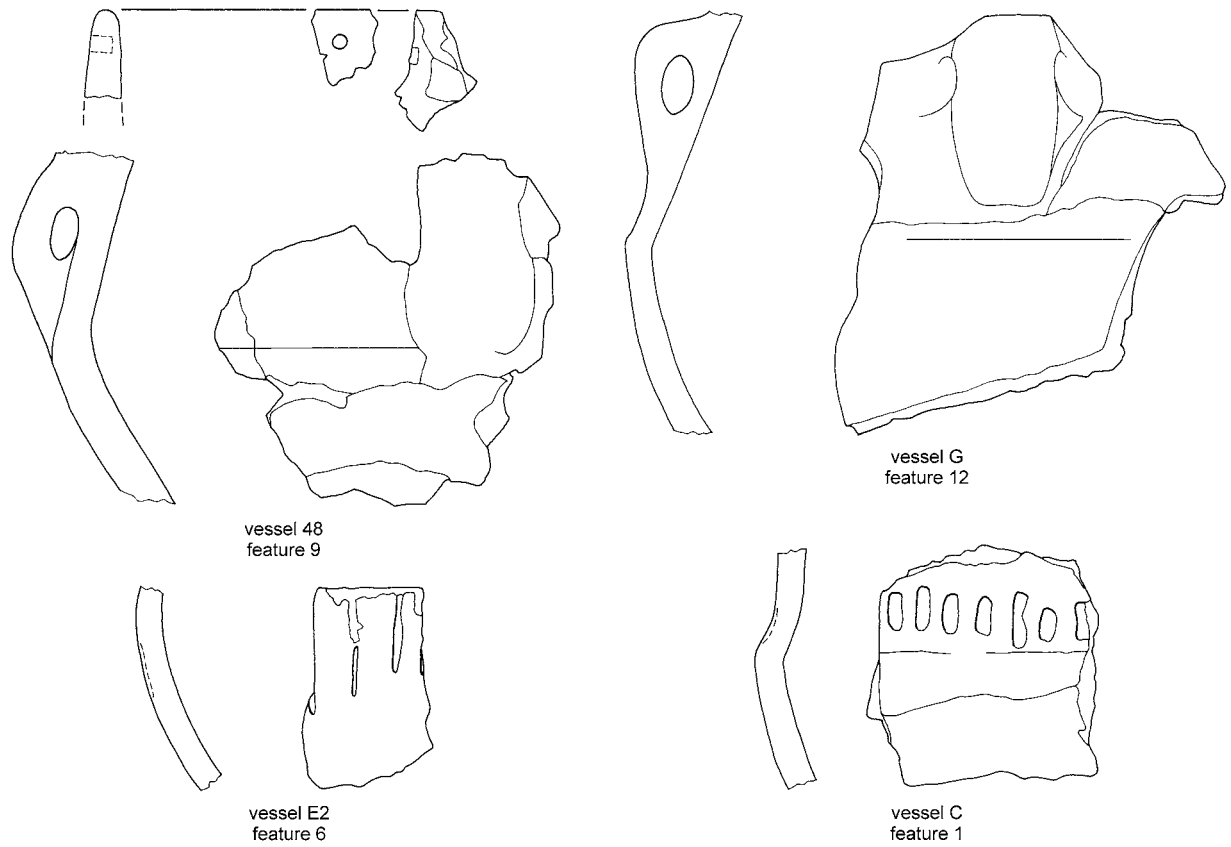


Figure 2.4 Slootdorp-Bouwlust ceramics (scale 1:2).



no feature

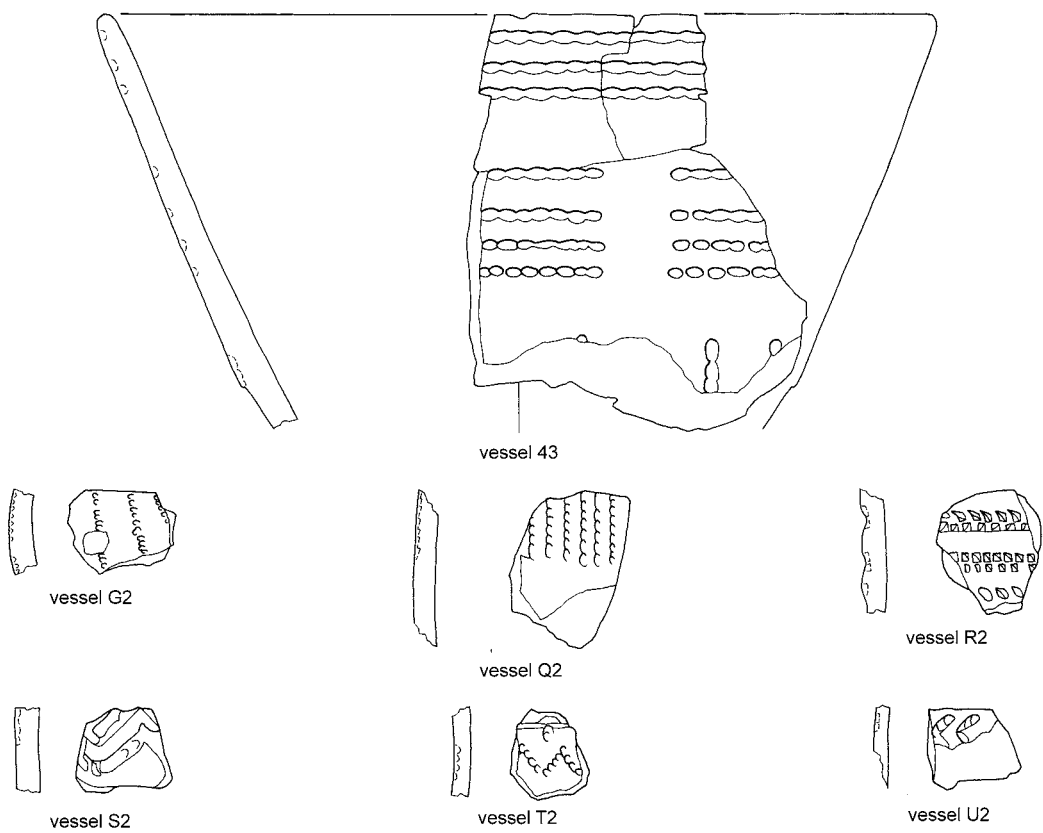
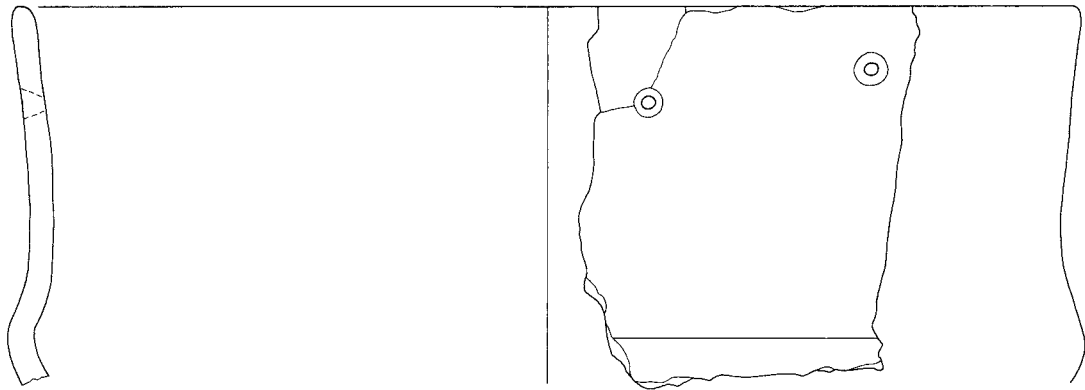
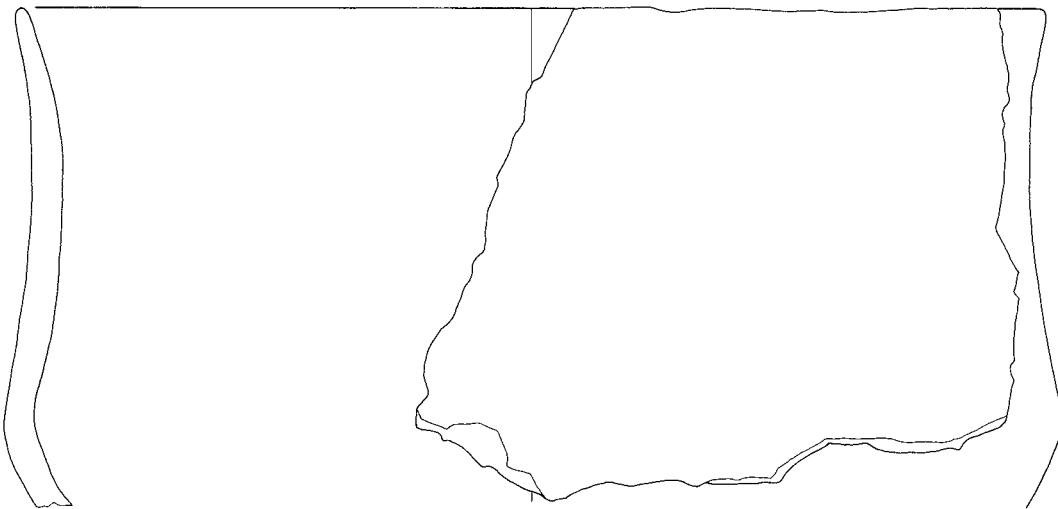


Figure 2.4 (continued) Slootdorp-Bouwlust ceramics (scale 1:2).

no feature



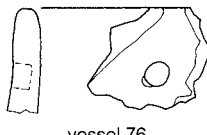
vessel 44



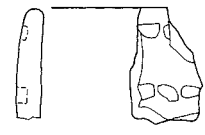
vessel 43



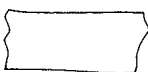
vessel 74



vessel 76



vessel 84



find 1224-1 trench 8



vessel A1



find 1942-1 trench 226



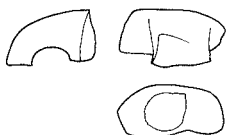
vessel G1



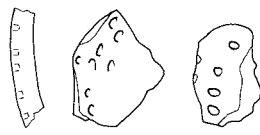
vessel H2



vessel S



vessel W



vessel W2



vessel VIII



vessel XI

Figure 2.4 (continued) Slootdorp-Bouwlust ceramics (scale 1:2).

On vessel 84, two rows of irregular rounded and more square imprints have been applied. Vessel 42 shows two imprints, of which one is a perforation that pierced the pot wall, whereas the other is more superficial (figure 2.4). On vessels 45 and 74 the two round imprints are through and through (figure 2.4). All these imprints were made previous to firing. On some vessels a small so-called *Lochbückel*, a small bulging of the clay is seen on the inside, which resulted from pushing the spatula through the unbaked clay (Ten Anscher, 2012: p.61). On vessel 44 two conical perforations in the neck zone are visible that are not placed on the same height (figure 2.4). These perforations may have been made post-firing and could have been used as repair holes.

Several other sherds are decorated with motifs made with a spatula. On vessels W2 and G2 lines are visible consisting of small, round spatula imprints. On W2 these imprints are more widely spaced, while on G2 the imprints are closely set (figure 2.4). On vessel E2 straight vertical lines are visible (figure 2.4). All these lines were presumably more or less vertical and placed at the belly zone of the vessel, starting just under the transition from shoulder to belly. On one last vessel (vessel C) the spatula decoration is placed just above the accentuated transition point (see section 2.3.1, figure 2.4). On this vessel irregular rectangular spatula imprints are placed in a irregular horizontal line.

Vessel 46 shows a different kind of decoration: the bowl was decorated with blocks filled with lines consisting of round imprints. Near the rim these lines have a horizontal orientation, but in the lower zone the direction changes to vertical (figure 2.4). The lines seem to resemble coarse cord decoration; however, it is unclear whether the lines were indeed made by impressing a cord. The impressions could also have been made with a round to oval spatula.

2.3.1.5 Age and use

A small group of sherds found in the topsoil is of a high quality and was decorated with patterns that are also known from Funnel Beaker funerary contexts. The majority of the material from the excavated features shows different technological and morphological characteristics as well as decoration from the majority of the material from the topsoil (table 2.2 and 2.3). The material from the features is far less fragmented (table 2.8). There are also some clear differences between the material in the two groups. The most striking difference is the absence of high-quality, *tiefstich*-decorated sherds in the features. The sherds with this type of decoration (H, H2, J2, K2, L2, M2, N2, Q2, R2, S2, T2 and U2) were all found in the topsoil. Decoration with round perforations or imprints and decoration with irregular spatula motifs is found most often on sherds from the features, but is also present on sherds found in the topsoil. The majority of the vessels with a high upward or inward-sloping rim were found in the features, but this percentage can be biased due to differences in preservation. The technological characteristics of the sherds from the features show slight differences compared with the sherds from the topsoil (table 2.2 and 2.3). The sherds from the features are, on average, thinner and a little more often tempered with stone grit and grog.

The ceramic material from the features and the majority of the ceramic material from the topsoil is similar to Funnel Beaker material found on settlements, especially at P14 and Beekhuizerzand (Ten Anscher, 2012, Modderman *et al.*, 1976). The small group of sherds with neat *tiefstich* decoration found in the topsoil is also comparable to Funnel Beaker material known from funerary contexts. The differences between the ceramics may be the result of differences in time and/or differences in function and deposition. A comparison with other Funnel Beaker

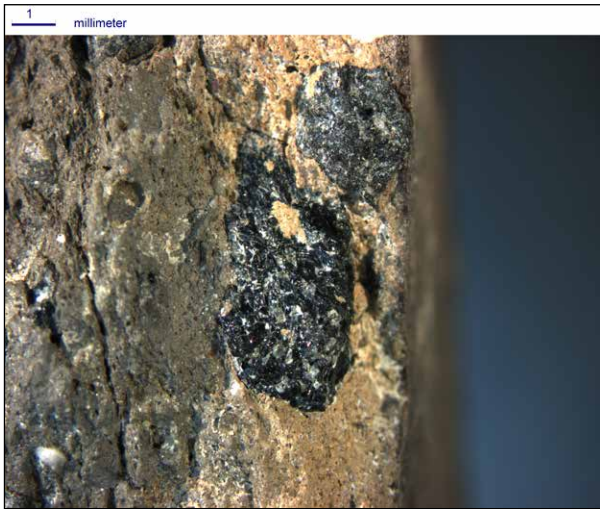


Figure 2.5 Hornblende temper.



Figure 2.6 Shell temper.



Figure 2.7 Flint temper.



Figure 2.8 Bone (and granite) temper.

settlement sites may enhance our understanding of the composition of these assemblages.

Both Hogestijn and Drenth (2001) and Van Heeringen and Theunissen (2001) date this site to the Funnel Beaker Culture: either Brindley (1986) horizon 4/5 or Bakker (1979) transition from the late Drouwen to the early Havelte phase, around 3000 BC. On the basis of the current reanalysis, a slightly earlier date may be proposed. A further comparison of this material and the finds from Funnel Beaker sites will be presented in chapter 3; new ^{14}C dates and the chronological implications will be presented and discussed in chapter 4.

Charred residues have been found on 39% (or 126) of the sherds from the features and on 4% (or 58) of the sherds that were not found in the features. These differences are likely due to preservation differences. It was mainly the thin-walled and the medium-thick-walled wares that were used to prepare cooked meals. The vessels with a high upright or inward-sloping neck were most often used for cooking. The four most complete vessels of this type (vessels 43, 44, 45 and 47) all show charred crusts. The bowl decorated with blocks with lines in deviating directions consisting of round imprints (vessel 46) has also been used to cook in. Other functions of the ceramics are less clear, although storage is plausible. Two thick and flat fragments found in the topsoil possibly stem from baking

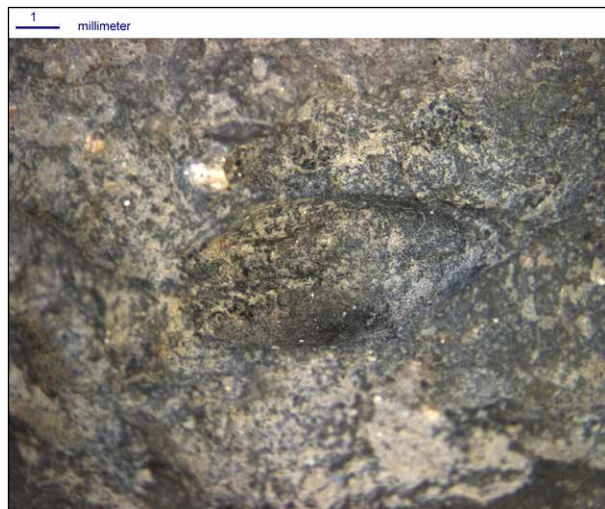
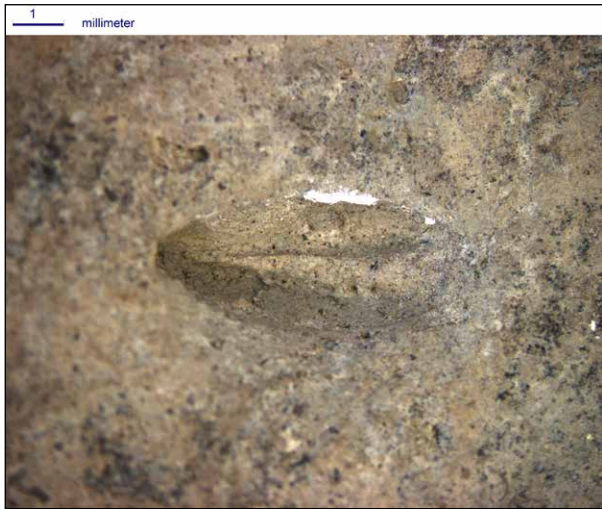


Figure 2.9 Grain imprints (sherds 2072, 1220, 1904, 2100 and 2314).

plates (Hogestijn and Drenth, 2001: p.45). It is unclear whether broken vessels were generally repaired. The majority of the round impressions seems to be made before firing, for decorative purposes. On vessel 44, however, the perforations seem to have been made secondarily and may indicate repair.

2.3.2 Zandwerven

2.3.2.1 Introduction

The settlement of Zandwerven was discovered by Butter in 1928 and represented the first discovered Neolithic settlement site in the coastal area. The site was partially excavated in 1929 by Van Giffen of the Biologisch Archaeologisch Instituut, now Groningen Institute of Archaeology) of the University of Groningen, and then further excavated in 1957 and 1958 by Glasbergen and Bakker of the Instituut voor Pre- and Protohistorie of the University of Amsterdam (Van Regteren Altena and Bakker, 1966: p.33). The site is located on a sand dune. At the basis of the sand ridge a layer of cockles was found, covered by a small band of clay (Van Regteren Altena and Bakker, 1966: p.33). The sand ridge rests on this clay band and consists of several humic bands separated by layers of dune sand, indicating several phases of dune formation and stable surfaces (Van Regteren Altena and Bakker, 1966: p.33). During the 1929 excavation archaeological material was found in three different layers (Van der Waals and Glasbergen, 1956: p.100-101).

In the bottom-most layer (layer I), some very small sherds were found (Van Regteren Altena and Bakker, 1966: p.34). The majority of the ceramics stem from layers II and III, which are separated by a sterile sand layer. These ceramics are interpreted as belonging to two different cultures. Layer II contained ceramics that at that time had never found before. Van der Waals and Glasbergen (1956: p.100-101) compared these ceramics to those found at the site of Hekelingen. Van Regteren Altena and Bakker (1966: p.34) compared these ceramics with those found at Hekelingen as well, but also to those from Haamstede-Brabers and Vlaardingen. In 1962 this type of ceramic was dubbed Vlaardingen ceramics (Van Regteren Altena *et al.*, 1962).

In the higher layer (III), the same ceramics were found in combination with beakers from the Corded Ware Culture (Van der Waals and Glasbergen, 1956: p.101).

The majority of the ceramics recorded are stray finds (Van der Waals and Glasbergen, 1956: p.100). During 1957 and 1958 a different part of the same dune was excavated. At this location, there was no sterile intercalating layer present (Van Regteren Altena and Bakker, 1966: p.34). The stratigraphy of the 1950s excavations is less reliable than that of the 1929 campaign, even though finds were collected in spits. It is possible that some of the material is now missing.⁸

During my reanalysis, I studied a total of 759 sherds, originating from different layers of the 1929 excavation (layer I: 1 sherd; Layer II: 27 sherds; layer III: 18 sherds) and the less reliable layers of the 1958 excavation (highest spits: 241 sherds; lowest spits: 91 sherds). A group of 381 sherds from the 1957 and 1958 campaigns was never assigned a layer number and has been omitted in this study. Material without find numbers (and find location) was also not studied.

2.3.2.2 Technological characteristics

Stone grit tempering occurs very frequently (68%) (table 2.2 and 2.3). Within this category, granite is present most often (48%), but quartz (19%) is found as well. Stone grit is often found in combination with just sand (82%); in another 16%

⁸ Van Regteren Altena and Bakker (1966: p.35) present a spoon that was found at this site, but during my reanalysis I was unable to locate this spoon. The low numbers of decorated sherds may indicate that more material is missing. The 1929 campaign has yielded a far higher percentage of thin-walled wares than the 1958 campaign. This may indicate that a percentage of the thin-walled ware, which is often decorated with cord or spatula imprints, is missing from the material collected during the 1958 campaign.

grog is added as well. Grog is present in 40% of the sherds, whereas a combination of just grog and sand is found in 21% of the sherds. Organic temper is found in 9% of the sherds; the majority of these (7%) are grog-, sand- and organic-tempered (table 2.2).

Both thin-walled, medium-thick-walled and thick-walled ware is present; the latter is found most frequently (36%). About a quarter of the sherds are thin-walled (27%), and another quarter are medium-thin-walled (24%) (table 2.2). There is some correlation between tempering and thickness. Of the thin-walled sherds, 41% are stone grit-tempered, whereas of the thick-walled sherds, 87% are stone grit-tempered. The sherds tempered with organic material are most often (43%) thin-walled.

Exactly half of the sherds have a light outside colour and half have a dark outside colour (table 2.2). Firing in a completely reducing atmosphere, resulting in a dark inside, outside and core, was most common at Zandwerven (46%). Second-most common (31%) is a light outside and a dark core and inside, the result of firing a vessel upside down and letting in oxygen at the end of the firing process. There is no correlation between firing method, thickness and tempering, except for the fact that 77% of the sherds tempered with organic material have a light outside colour. For those 77%, there is no relationship with the thickness of the sherds.

Smoothing of the inner surface (18%) or outer surface (13%) is rare. There is no relationship between smoothing and either tempering, thickness or firing method. The majority of the sherds have a rough outside (87%) and inside (82%). The walls of two sherds have been smitten. Coils are visible on 19 sherds; 11 of these show oblique Hb coils and 8 show straight H coils.

2.3.2.3 Morphological characteristics

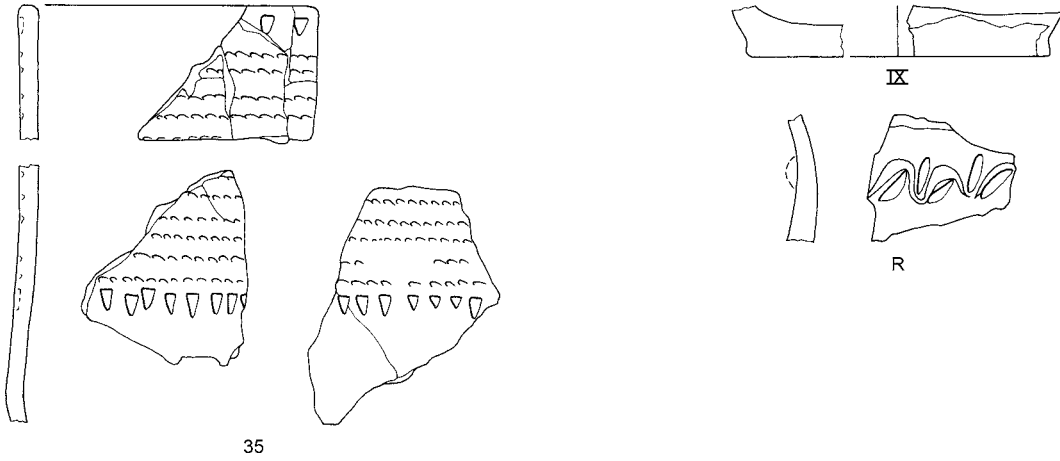
Vessel 44 could be reconstructed down to the largest circumference, and vessels 1 and 21 could be reconstructed to the smallest circumference (table 2.5 and 2.6, figure 2.10). All three vessels have a pronounced S-shape (table 2.1). On vessel 44 a row of small, round perforations has been applied just under the rim. The two other vessels are undecorated. All three vessels are thick-walled and tempered with stone grit and sand; vessel 21 shows additional organic and grog temper.

All other vessels are far less complete. The rim diameters could be measured of 11 of these other vessels. The diameters range between 11 and 28 cm. Vessels 2, 17, 42, 49 and 50 have rim diameters comparable with those of beakers (11–14 cm) (figure 2.10: vessels 17, 49 and 50). Vessel 49 was decorated with cord imprints, vessel 50 with a herringbone pattern. Vessels 15 and 37 have rim diameters of 16 and 17 cm, respectively (figure 2.10: vessel 37). Four vessels have very large rim diameters. That of vessel 12 is undetermined, and that of vessels 13, 31 and 40 is 22–28 cm (figure 2.10: vessels 12 and 40). Vessel 31 was decorated with fingertip imprints; the other vessels are undecorated. The diameters of the 15 base fragments identified range between 3.5 and 13 cm. One base (vessel XII) is protruding (figure 2.10), whereas the others are flat with a rounded or angular transition to the base. Just one handle was found: vessel D has a knob ear (figure 2.10).

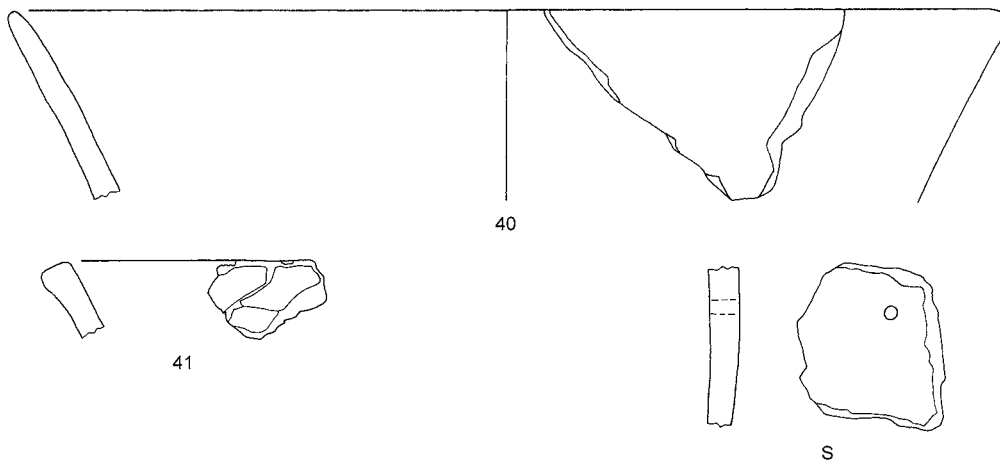
2.3.2.4 Decoration

A very small percentage of the sherds (7%) are decorated; this number may be too low due to sherds that are missing (table 2.2). Cord decoration (20%), spatula decoration (33%) and fingertip impressions (33%) are present.

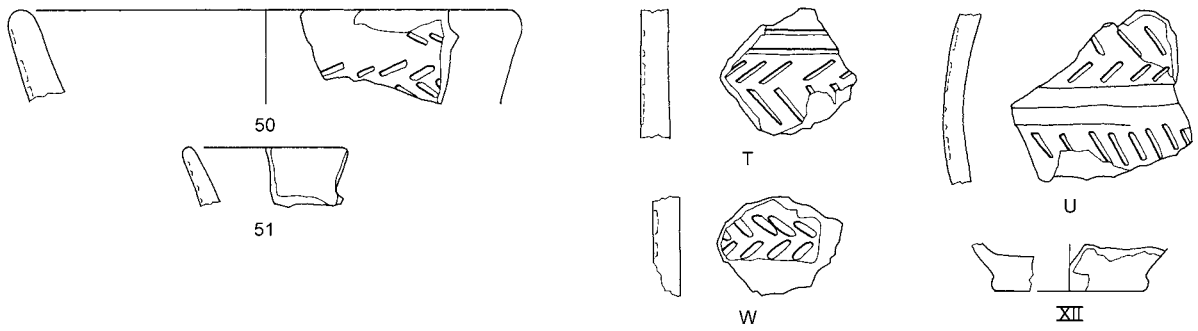
1929 layer III



1929 layer II



1958 high



1958 low

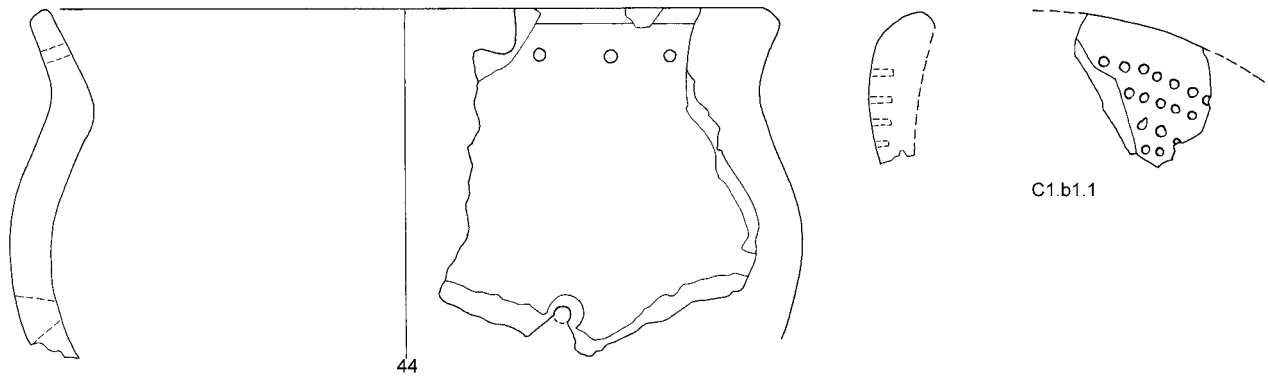


Figure 2.10 Zandwerven ceramics (scale 1:2).

1958 no or unclear layer info

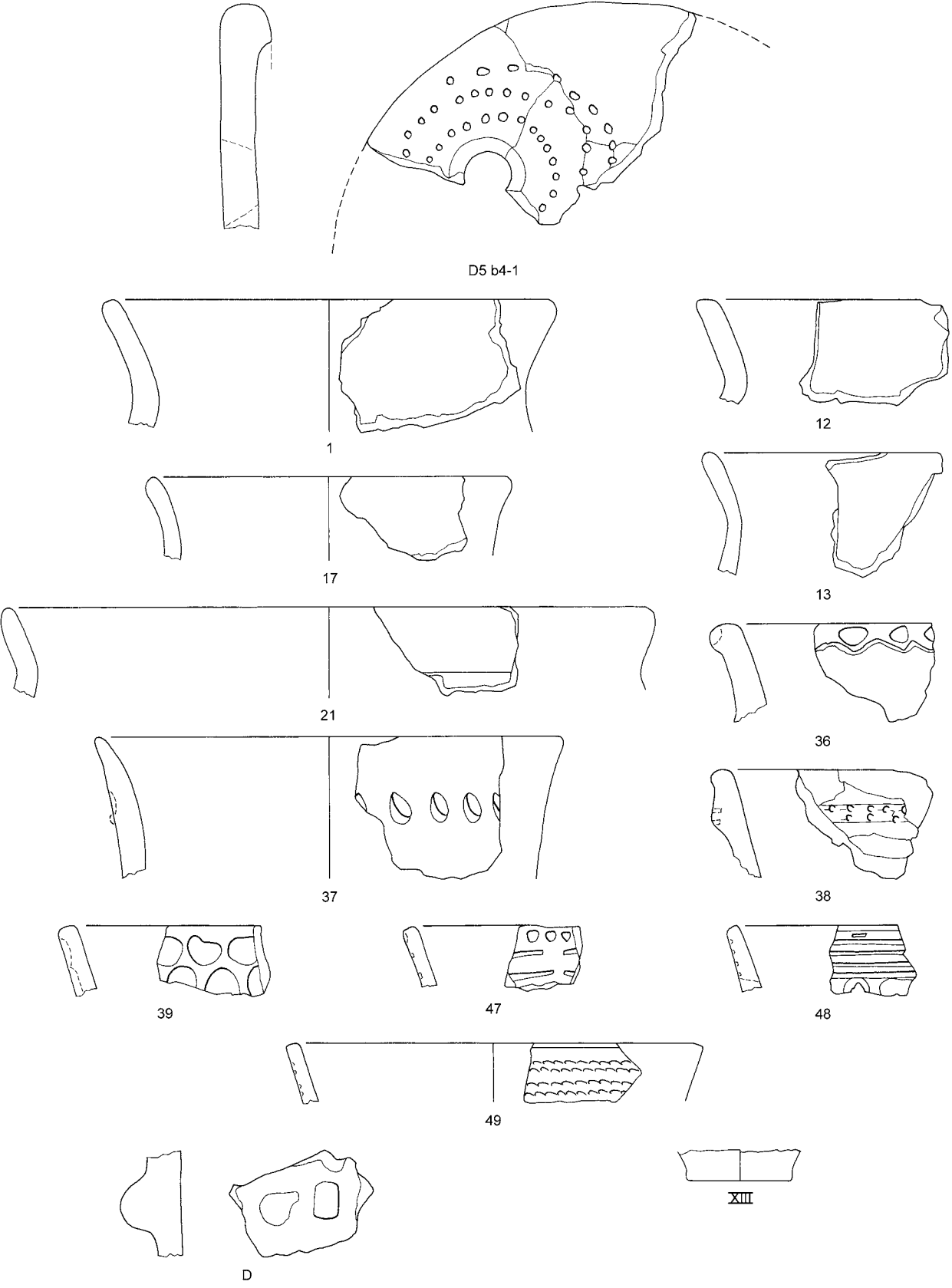


Figure 2.10 (continued) Zandwerven ceramics (scale 1:2).

Vessel 35 is of Van der Waals and Glasbergen (1955: p.8) type 1a. The upper part was decorated with horizontal lines made by impressing a cord. The first and last rows consist of a horizontal row of triangular-shaped spatula imprints (figure 2.10). Cord-decorated vessel 49 is categorised as type 1a/2IIb (Van der Waals and Glasbergen, 1955: p.8, 28-30) (figure 2.10) because the length of the decoration cannot be established. Vessel 51 was decorated with paired cord imprints (figure 2.10). Another cord-decorated sherd shows a combination of cord and spatula decoration: oblique spatula imprints bordered by cord-impressed lines. This sherd may belong to a type 2IIa vessel (Van der Waals and Glasbergen, 1955: p.28). All cord-decorated sherds are thin-walled and grog-and-sand-tempered. Vessel 51 is tempered with just sand.

A total of 15 sherds are decorated with spatula imprints. Vessels 47 and 48 and wall sherds from vessels U and T belong to Van der Waals and Glasbergen (1955: p.11-12) type 1b. Vessels 47 and 48 are decorated with horizontal grooved lines, and the topmost zone just under the rim of vessel 47 also shows a horizontal row of triangular spatula imprints (figure 2.10). On sherds U and T, herringbone motifs are bordered by grooved lines (figure 2.10). These type 1b vessels and sherds are all thin-walled and sand temper. Vessel U is the exception; this one is grog-and-sand-tempered and medium-thick-walled. Herringbone patterns without grooved lines were found on vessel 50 and sherds C and W (figure 2.10: vessel 50 and W). These sherds can be of various types according to the typology of Van der Waals and Glasbergen (1955: p.11-12), but since only the herringbone pattern is visible these are listed as type 1d. Thick-walled vessel 50 and medium-thick-walled vessel W are grog-and-sand-tempered. The thickness of granite-and-sand-tempered vessel C could not be established. Three other sherds show spatula decoration; the S-shaped vessel 44 has a row of perforations under the rim. On sherds A and Q one V-motif and two rows of round spatula imprints are visible, respectively.

Fragments from presumably two baking plates are also spatula-decorated: both show small, round 'pinprick' impressions forming circles (figure 2.10). Both plates are of a brittle fabric and are tempered with high amounts of organic material.

Vessels 32, 33, 36 and wall sherds from vessels E, F, G, H, I, J, K, L, M and R are examples of short wave moulded vessels. All show a wavy, plastic band with fingertip imprints (figure 2.10: vessels 36 and R). On vessels 32 and 36 fingertip imprints have also been applied to the top of the rim. Vessel 33 shows fingertip imprints on the top of the rim and on the shoulder. On the rest of the vessels the fingertip or fingernail impressions are placed on the wall. The vessels are grog-and-sand-tempered and are most often medium-thick-walled or thick-walled.

Vessels 29, 30, 34, 37 and additional wall sherds with vessel numbers G, N, O and P have been decorated with fingertip imprints without the plastic, wavy band (figure 2.10: vessel 37). Again the fingertip imprints are either placed on top of the rim (vessel 30), on the neck or wall (vessels 34, 37, G, N, O and P) or in both locations (vessel 29). These vessels are either medium-thick-walled or thick-walled and grog-and-sand-tempered; two vessels show additional stone grit temper. Vessel 39 was decorated all over the outer surface with round to oval imprints, presumably also made by impressing a fingertip (figure 2.10: vessel 39). The clay shows grog and sand particles, and the wall thickness ranges between 7 and 9 mm.

2.3.2.5 Use, discard and spatial patterning

There are clear differences between the material from layer II (low) and that from layer III (top) of the 1929 excavation (table 2.2). The stratigraphic information from the 1958 excavation is less clear and reliable. However, the material that

is likely to stem from the highest spit is comparable with the material from the upper layer (III) of the 1929 excavation (table 2.2 and 2.3). Sherds from the 1958 excavation that originate from the lowest excavated parts show a strong resemblance to the sherds from the 1929 layer II (table 2.2). Sherds from the 1957 and 1958 excavations that do not have any accompanying stratigraphic information can be placed in between and seem to represent a mixture of the different ceramics.

The most striking differences were found in the decoration of the vessels. Decoration comparable to the Van der Waals and Glasbergen (1955: p.2-12, 28-30) Corded Ware beaker types is only found in the highest layers. It concerns types 1a, 1b, 1d, 1a/2IIb and 2IIa. One of the short wave moulded vessels (vessel R) was found in layer III of the 1929 campaign. The only decorations found on sherds from layer II are small, round perforations under the rim of vessel 44. Also, one of the baking plates decorated with small pinpricks (C1.b1.1) was found in the lowest part of the 1958 excavation.

The main differences in the technological characteristics include a higher average thickness in the lowest layers (table 2.3). In the lowest layers, thick-walled ware is the most common ware, whereas in the top layers thin-walled ware occurs most frequently (table 2.3). Sherds with stone grit temper were more frequently found during the 1958 campaign; the lowest layers yielded the most sherds tempered with this material (table 2.3).

The morphological characteristics also show differences. The most complete S-shaped vessel (vessel 44) was found in the lowest part of the 1958 campaign. For the other two, less complete, S-shaped vessels, (vessels vessel 1 and 21), no stratigraphic information is available. A single fragment of a Protruding Foot vessel was found in the top layer of the 1958 campaign.

Only one sherd with a weight of more than 3 g was found in layer I of the 1929 campaign. This sherd is nevertheless interesting as it has been tempered with two materials that are not present in any of the other sherds. The sherd contains hornblende and flint. These materials were also used to temper sherds at the site of Slootdorp-Bouwlust.

A total of 11 sherds (15%) show residues indicating cooking. The material from the 1929 campaign shows a very low proportion of sherds with residues; the 1958 campaign shows a higher proportion (table 2.4). In the lowest spit of the 1958 excavation the thick-walled ware was most often used for cooking (72%). In the upper spit, thick-walled ware showed residues far less often (28%), and residues are most often found on thin-walled ware (53%). There also is a shift in tempering material. In the lowest spit cooking almost exclusively occurred in stone-grit-tempered vessels (97%). In the top spit very few stone-grit-tempered vessels were used for preparing cooked meals (5%). The percentage of grog-tempered sherds with residues is higher in the top spit (37%) of the 1958 campaign than in the lowest spit (3%) of the 1958 campaign (table 2.4). All fragments with residues from the lowest layers are undecorated. In the top spit several sherds decorated with Van der Waals and Glasbergen (1955) motifs were used for cooking. These include one sherd of type 1b (vessel U), one wall sherd and one vessel of type 1d (50 and C), and one wall sherd of type 2IIa (vessel X, Van der Waals and Glasbergen, 1955: p.2-12, 28-30). On cord-decorated vessel 49 charred residues are present as well, but no contextual information is available for this pot. On two sherds with short wave moulded decoration (vessels K and J) and one sherd with fingertip imprints without a plastic band (vessel O) residues are present as well, but again, layer information is not available.

In addition to the two already discussed decorated baking plates, fragments of a third, undecorated plate were discovered. Other uses for these ceramics, besides preparing cooked meals, are unclear, but storage seems a possibility. On vessel 44, double conical perforations made post-firing presumably reflect decoration. On a total of seven other sherds perforations are also visible. These perforations may be repair holes.

2.3.3 Zeewijk

2.3.3.1 Introduction

The settlement of Zeewijk was partially excavated by the Dutch state service for archaeology in three campaigns (1992, 1993 and 1994). During coring campaigns it was already established that the site consisted of two parts: Zeewijk-Oost, on a levee southeast of a creek, and Zeewijk-West, on the northwest levee of the same creek (Van Heeringen and Theunissen, 2001: p.66). Zeewijk-West was completely excavated (1092 m²). Of Zeewijk-Oost, 2984 m² was excavated, representing 37.5% of the cultural layer (Drenth *et al.*, 2008: fig.7). A selection of the material from Zeewijk has been studied as part of the Odyssee project.

Subsistence at Zeewijk consisted of hunting, fishing and fowling; gathering food and shellfish; and growing crops. About 60–80% of the bones are from domesticated species, mainly young cattle, and 20–40% of the bones are from wild species, including birds and fish (Van Heeringen and Theunissen, 2001: p.73). Naked barley and emmer wheat are the most commonly found cereal species. These were probably grown locally; plough marks found over an area of c. 1 ha indicate crop cultivation (Van Heeringen and Theunissen, 2001: p.73, Hogestijn, 1997: p.31, Kubiak-Martens, 2014).

At Zeewijk-Oost a large house plan of 7 × 22 m was uncovered. Hogestijn (1997: p.40-42) suggests that this structure may have served a ritual function. Nobles (2014) compared the structure to the Mienakker burial structure and concluded that the Zeewijk-Oost house can be seen as a ceremonial structure that represents the last phase of habitation.

At Zeewijk-West a smaller, two-aisled structure of 4 × 10 m was uncovered. Another three to four possible other houses were identified (Van Heeringen and Theunissen, 2001: p.73, Hogestijn, 1997: p.34). Hogestijn postulates that these represent five possible use phases, each with different ceramic assemblages. The northern part of Zeewijk-West may be younger than the southern part of this site according to Hogestijn (Hogestijn, 1997: p.35). Zeewijk was interpreted by Hogestijn as a large residential settlement (Hogestijn, 1997: p.28-29). Reanalysis suggested that the site was either inhabited by several households at the same time for a few generations or that the site was inhabited by one household for a more prolonged period of time (Kleijne *et al.*, in prep.).

During the Odyssee project a sample of ceramics including finds from both Zeewijk-West and Zeewijk-Oost was re-analysed (Nobles, 2014). All Zeewijk-West finds found in particular a rectangular area were studied (Nobles, 2014). For Zeewijk-Oost no specific delineated area was chosen (Nobles, 2014). In total, 3329 sherds with a combined weight of 26 767.94 g were analysed (2700 sherds, weighing 22 139.25 g, from Zeewijk-West and 629 sherds, weighing 4628.94 g, from Zeewijk-Oost). The total number of sherds found at Zeewijk-West is 4014, that at Zeewijk-Oost, 1390 (Van Heeringen and Theunissen, 2001: p.73). Thus, 67% of the Zeewijk-West material and 45% of the Zeewijk-Oost sherds is analysed in the present study. These samples partly overlap with the ceramics studied previously by Sier (2001: p.358), who analysed a selection of 15 460.2 g from Zeewijk-West and 4549.1 g from Zeewijk-Oost.

Zeewijk-oost

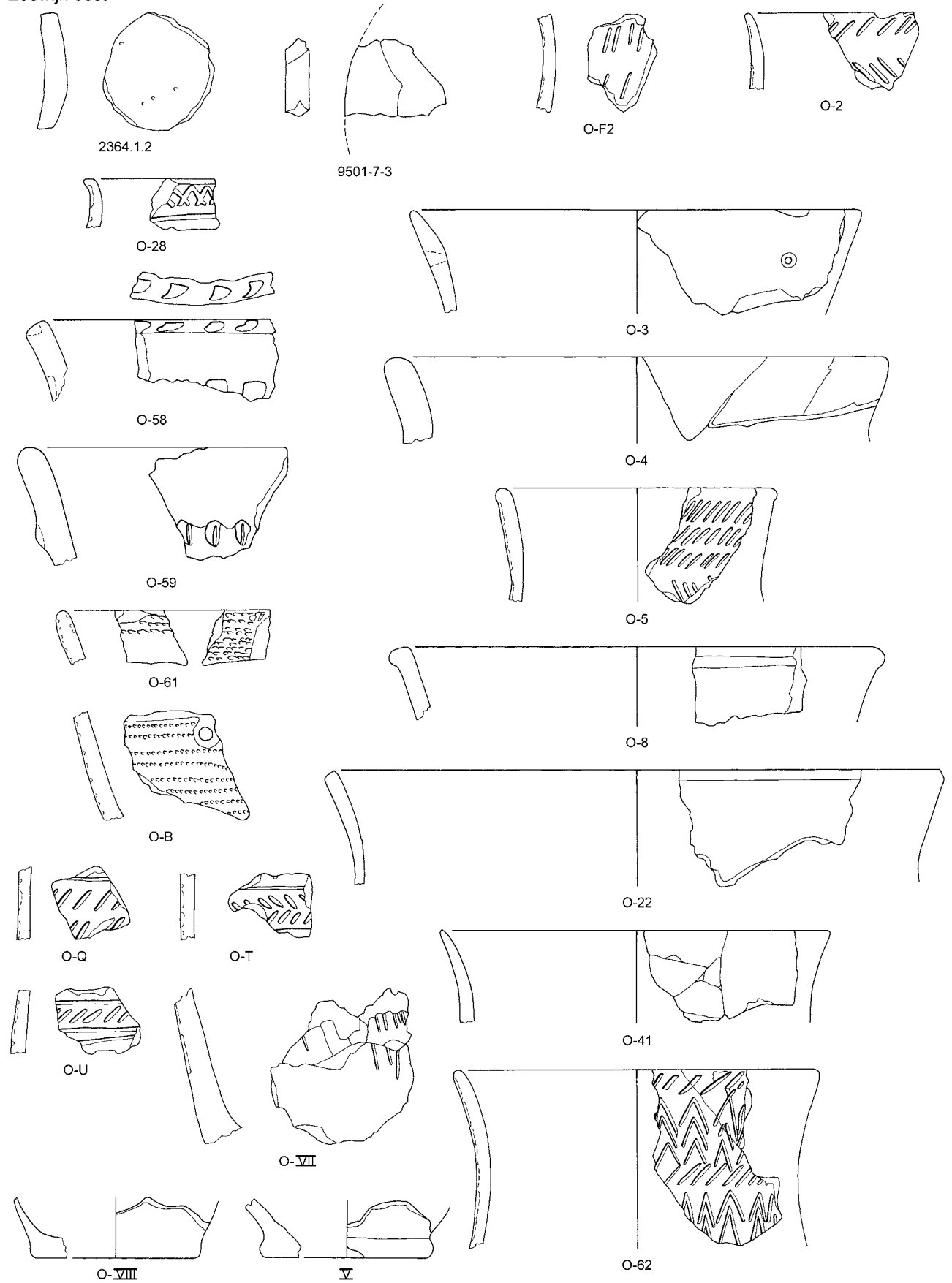


Figure 2.11 Zeewijk ceramics (scale 1:2).

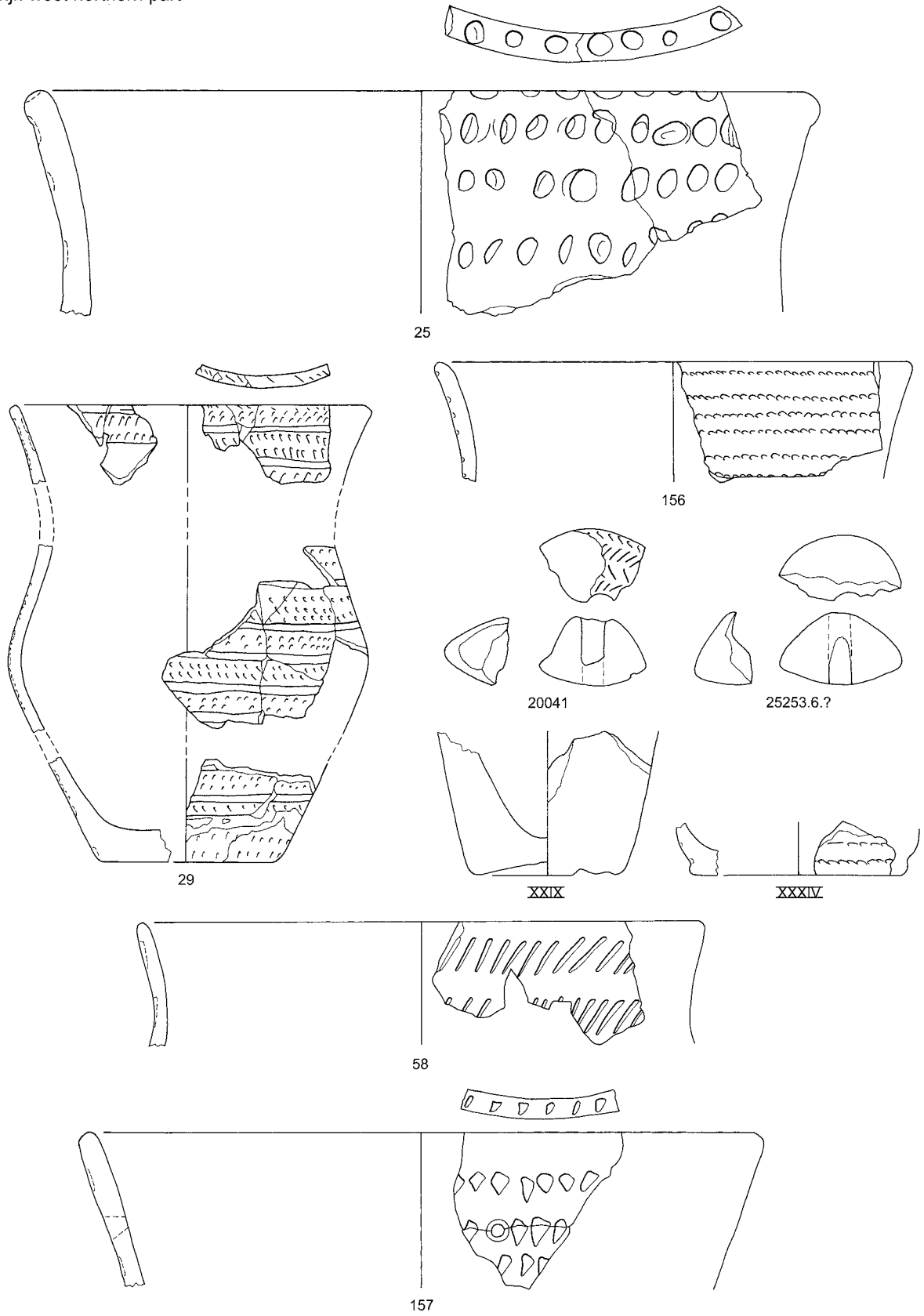


Figure 2.11 (continued) Zeewijk ceramics (scale 1:2).

Zeewijk-west southern part

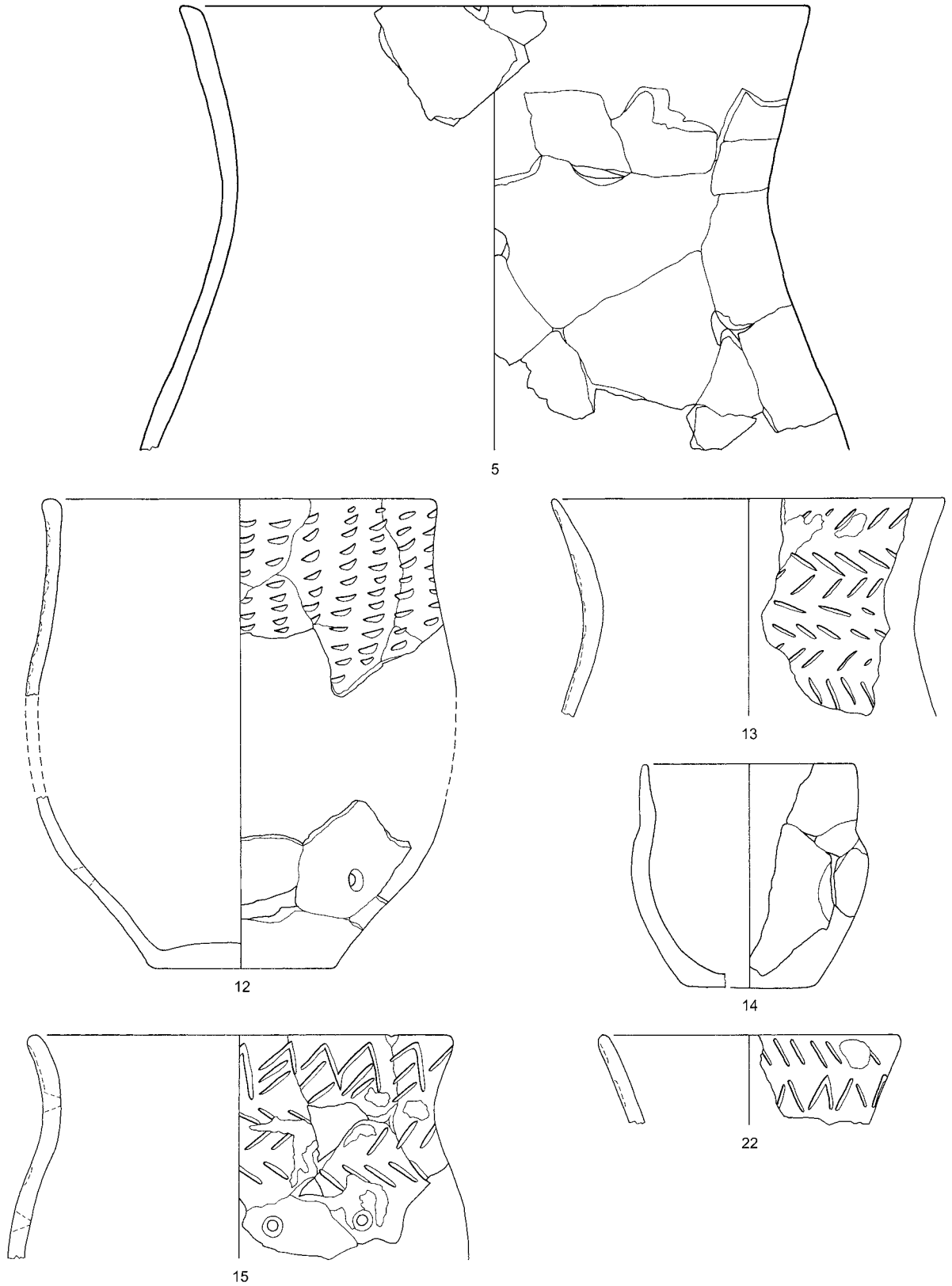


Figure 2.11 (continued) Zeewijk ceramics (scale 1:2).

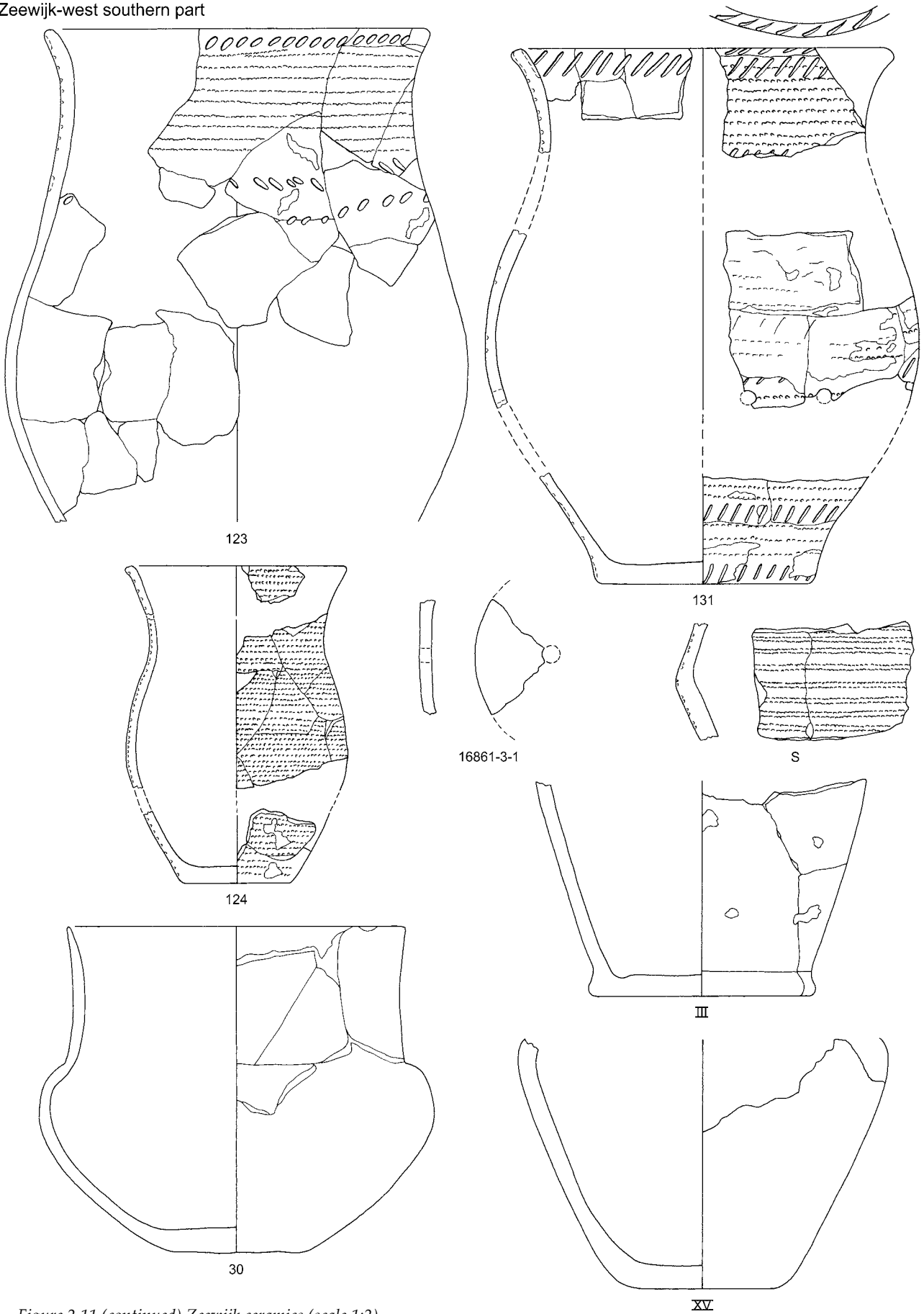
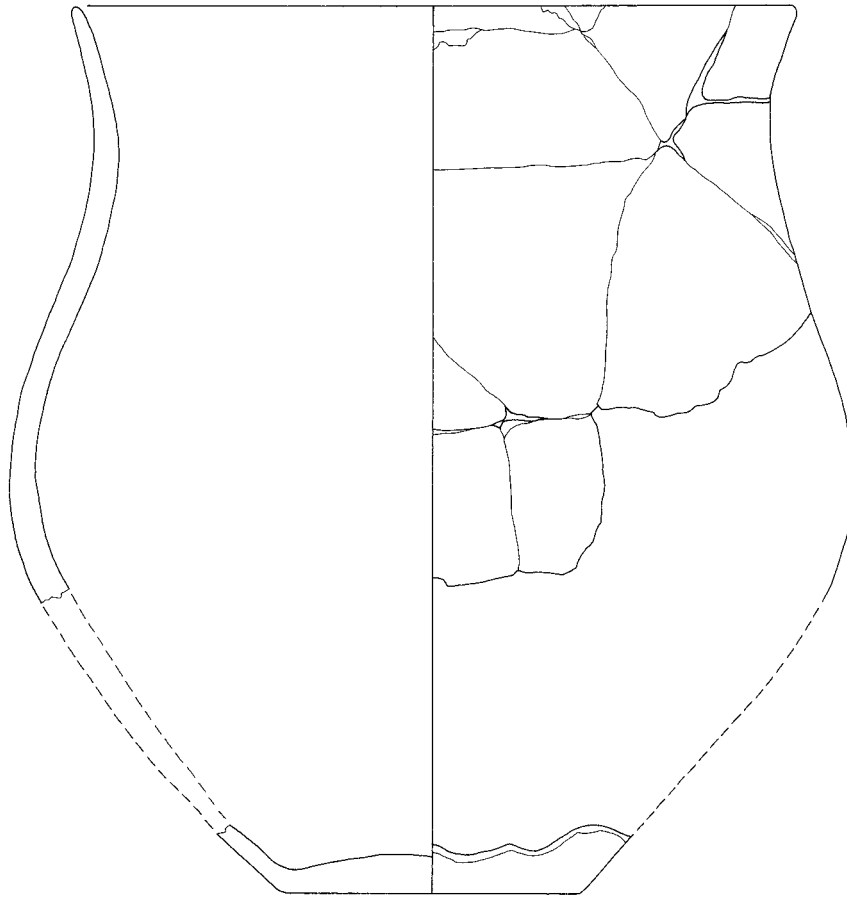
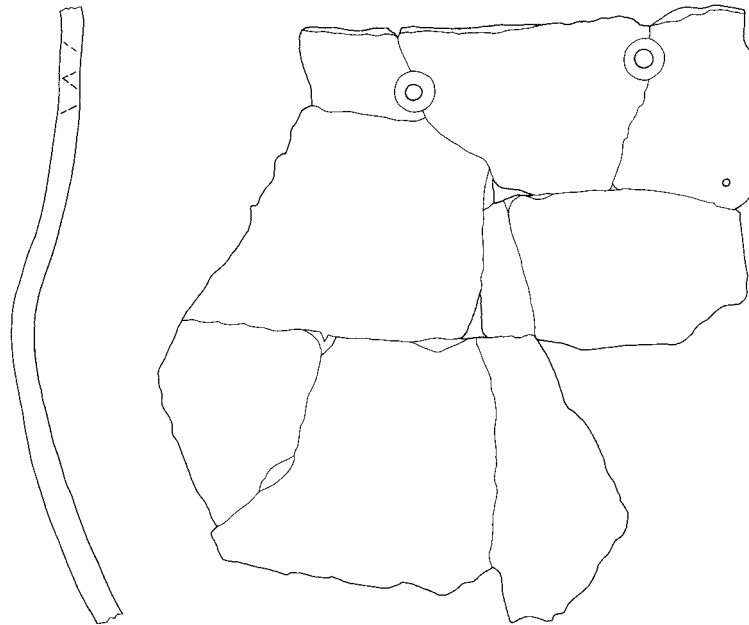


Figure 2.11 (continued) Zeewijk ceramics (scale 1:2).

Zeewijk-west southern part



28



C

Figure 2.11 (continued) Zeewijk ceramics (scale 1:2).

2.3.3.2 Technological characteristics

Analysis of the tempering and the combinations of tempering materials show that a strikingly high number of 20 different combinations were used. The majority of the sherds are grog-and-sand-tempered (82%). Stone grit (either quartz, granite or red granite) is visible in 14% of the sherds (table 2.2). The majority of the sherds are thin-walled (58%). Medium-thick-walled (15%) and thick-walled ware (15%) occurs less frequently (table 2.3). The medium-thick- and thick-walled ware is often tempered with stone grit (18% and 28%), whereas only 11% of the thin-walled ware contains stone grit.

Almost two-thirds (65%) of the sherds have been fired in a completely reduced atmosphere, resulting in a dark inside, outside and core (table 2.2). Just one quarter of the sherds have a light outside colour. This group mainly includes sherds with a light inside, a light outside but a dark core (12%), and sherds with a light outside but a dark inside and a dark core (11%). There is no strong correlation between thickness, tempering and colour, with one exception: 73% of the organic-tempered sherds have a light outside colour.

The majority of the sherds have a rough outside (69%) and inside (74%). A small proportion (3%) of the sherds are smitten. A small group of sherds is smoothed on one or both sides (table 2.2). The sherds with a smoothed surface are frequently thinner. A smitten surface is almost exclusively found on medium-thick-walled and thick-walled sherds. Joins are visible on a very limited number of sherds. Hb-joins are visible on six sherds, while H-joins are visible on one sherd.

2.3.3.3 Morphological characteristics

For 10 vessels the profile could be reconstructed from the rim down to the largest circumference (table 2.5). Eight other vessels could be reconstructed down to the smallest circumference (table 2.6). Six of the vessels that are complete from the rim down to the largest circumference are beakers (table 2.5, figure 2.11). These beakers are all decorated, and several Van der Waals and Glasbergen (1955) types are present. Vessel 123 is of cord-decorated type 1a, vessel 124 is of All Over Ornamented cord-decorated type 2IIb (Van der Waals and Glasbergen, 1955: p.8-9, 28-30). Vessel 131 was decorated with cord and spatula imprints in a motif that is common to All Over Ornamented type 2IIc beakers (Lanting, Mook and Van der Waals, 1973). The other beakers are spatula-decorated: vessel 12 is of type 1e, vessel 15 is of the zigzag type and vessel 29 is of All Over Ornamented type 2IIc (Van der Waals and Glasbergen, 1955: p.12, Sier, 2001: p.397). Four vessels that are complete down to the smallest circumference are beaker-like (table 2.6, figure 2.11). Vessel 41 is undecorated, vessel 13 is of type 1d and vessel O.5 is either of type 1d or type 1e. Vessel O.62 is of the zigzag type (Van der Waals and Glasbergen, 1955: p.11-12).

Two undecorated vessels that are complete down to the largest circumference (vessels 28 and 165) are enlarged beakers (table 2.5, figure 2.11). Vessels O.22 and 5, which are complete down to the smallest circumference, presumably also belong to this shape group. Vessel 5, however, has a high neck and a large rim angle (table 2.6, figure 2.11). Cord-decorated vessel 156 has an intermediate size, having characteristics of both beakers and enlarged beakers (figure 2.11).

Two vessels that are complete down to the largest circumference have a different shape (figure 2.11). Vessel 30 has a long, upright neck terminating in a sharp angle followed by a thick belly; the outer surface has a dark colour and is polished (figure 2.11). Drenth and Hogestijn (2006: p.89) postulate that this vessel is a precursor to the later Veluwe Bell Beaker form, while J.N. Lanting (personal communication) suggested to me the possibility of a date in the Iron

age. The encrusted residue was dated to 4030 ± 40 BP (GrA 56013), which renders it contemporaneous to the rest of the assemblage most likely and rules out a date in the Iron Age.

Vessel 14 also has a deviant shape: this vessel is very small (7.5 cm high) (table 2.5). Vessel 25 is very large and has a diameter of 26 cm (table 2.6, figure 2.11). This vessel was decorated with fingertip imprints on top of the rim and in horizontal rows on the neck (figure 2.11).

Of another 51 vessels the rim diameter could be measured. The range is between 8 and 23 cm. The majority are small; 35 vessels (67%) have a rim diameter comparable to those of beakers (8–14 cm). Fifteen vessels (29%) have a rim diameter comparable to enlarged beakers (15–22 cm). Just one vessel has a larger rim diameter, of 23 cm. The base fragments show diameters ranging between 5 and 11 cm, yet a diameter of 6 cm is the most common (33%). The majority of the bases are flat, while five bases are protruding.

2.3.3.4 Decoration

All three main decorative techniques are present at Zeewijk: 340 sherds (44%) are cord-decorated, 336 sherds (44%) are spatula-decorated and 90 sherds (12%) are fingertip-decorated. A total of 19 vessels and 297 wall sherds are decorated with cord impressions. The majority of these sherds (72%) are thin-walled, and 27% measured between 3 and 4.5 mm. The tempering almost exclusively consists of grog and sand. Different Van der Waals and Glasbergen types are present. Vessel 123 is cord-decorated on the rim and neck and belongs to Van der Waals and Glasbergen (1955: p.8) type 1a. One small beaker (vessel 124) and sherds of the lower part and the base of another vessel (vessel XXXIV) belong to Van der Waals and Glasbergen (1955: p.28-30) All Over Ornamented cord-decorated type 2IIb. For the majority of the cord-decorated sherds, the length over which the decoration extends is unclear; these sherds and vessels are listed as 1a/2IIb (figure 2.11: O.61, 156, S and O.B, Van der Waals and Glasbergen, 1955: p.8, 28-30). The majority of the cord-decorated vessels show uninterrupted horizontal rows of cord imprints. The 10 fragments of vessel S, however, show paired horizontal cord imprints (figure 2.11). On vessel O.61, the inside of the rim was decorated with cord imprints as well (figure 2.11). Vessels 131, Q2, O.D and O.Q show a combination of cord and spatula decoration (figure 2.11: all but O.D). On these vessels, zones with oblique spatula imprints alternate with horizontal cord-impressed lines, resembling All Over Ornamented type 2IIId (Lanting, Mook and Van der Waals, 1973).

Spatula imprints are also mainly found on grog-and-sand-tempered thin-walled ware. Decoration with spatula imprints was applied in different motifs: zigzags; a herringbone pattern; oblique impressions in one direction; oblique impressions in one direction bordered by horizontal lines; and oblique impressions alternating in direction per zone, bordered by horizontal lines (figure 2.11). Oblique impressions in one direction are most common, although the picture might be slightly distorted, the impressions could also be part of a motif that include other elements that are now lost due to fragmentation. Vessels 12, 58 and O.VII show oblique spatula decoration in one direction and can best be compared to Van der Waals and Glasbergen (1955: p.12) type 1e (figure 2.11). On vessel 58, oblique spatula impressions in one direction have been applied, separated by a small undecorated zone between two rows (figure 2.11). Vessel O.5 shows three rows with oblique impressions in one direction followed by one row in the opposite direction (figure 2.11). Herringbone patterns with oblique impressions in rows in alternating directions also occur. Vessels 13 and O.2 are examples that show this pattern, but on the latter small zones are left undecorated. These

vessels can best be compared to Van der Waals and Glasbergen (1955: p.11-12) type 1d. Zigzag patterns occur rather frequently, and there is ample variation in the motifs applied. Crosses occur (figure 2.11: O.28), as well as inverted-V shapes (figure 2.11: O.62, 22). Such motifs are often alternated with grooved lines or rows with oblique spatula impressions. On vessel 15, a motif of inverted-V shapes filled in with two oblique impressions has been applied. This motif is also found on Danish Corded Ware ceramics, and is interpreted by Klassen (2005: p.19) as a representation of grain ears. Vessel 29 is unique, as on this beaker the whole outer surface was decorated by oblique impressions alternate in direction per zone, with the zones being bordered by grooved lines (figure 2.11). Sier (2001: p.397) introduced type 2II_f to the type list for this vessel because grooved lines were not previously known on All Over Ornamented vessels. Several other fragments are decorated with less common spatula motifs. On vessel O.T, a herringbone pattern is bordered on both margins by a grooved line (figure 2.11). On vessel O.U, a single row of oblique impressions is bordered by one and two grooved lines (figure 2.11).

On sherds decorated with fingertips or fingernails, the decoration consists of a row of fingertip imprints either on top of the rim, on the wall or at both locations. Vessels 25 and O.58 show the combination of a row of fingertip impressions on top of the rim and on the shoulder (figure 2.11). Vessel O.59 has a single row of fingertip impressions on the wall (figure 2.11). Almost half of the sherds decorated with fingertip or fingernail imprints are thick-walled, while the remainder are either medium-thick-walled (16%) or thin-walled (25%). Both grog and sand temper as well as an addition of stone grit occur.

2.3.3.5 Age and use

In previous studies, the site was divided into an area west of the gully and an area east of the gully: Zeewijk-Oost and Zeewijk-West. Both parts were excavated in multiple spits (Hogestijn, 1997). Zeewijk-West was interpreted by Hogestijn (1997: p.28-29) as a multi-phased settlement with as many as five house phases, of which the northern ones represent a younger use phase.

Nobles (2014) concluded that the stratigraphic information was not of sufficient accuracy to support accurate phasing. Furthermore, the proposed house plans proved impossible to substantiate by means of spatial analysis. On the basis of differences in ceramics it seemed that there were chronological differences between Zeewijk-Oost and the northern and southern parts of Zeewijk-West. A subdivision of Zeewijk-West into two parts based on the density distribution of postholes was undertaken: this shows a northern and a southern cluster (Nobles, 2014). There were just three ceramic cross-mends between the southern and the northern parts (one of the 165 vessels and two of the 35 bases). This seems to lend support to the arbitrarily drawn division between the two site halves.

The settlement can thus be divided into three areas with distinct ceramic assemblages:

- Zeewijk-West north (west of the gully, northern cluster of postholes): 852 sherds analysed (of which 3 indeterminate)
- Zeewijk-West south (west of the gully, southern cluster of postholes) 1772 sherds analysed (of which 11 medieval or indeterminate)
- Zeewijk-Oost (east of the gully), 629 sherds analysed (of which 7 medieval)

There are clear differences in the technological and morphological characteristics and decoration of the ceramics of the three areas (table 2.2 and 2.3). On the northern part of Zeewijk-West and at Zeewijk-Oost, 23% and 19%, respectively, of the sherds are tempered with stone grit. On the southern part of Zeewijk-West

this percentage is just 8%. On the southern part of Zeewijk-West, the proportion of thin-walled ware is bigger and the proportion of medium-thick-walled and thick-walled sherds is smaller than in the other two areas (table 2.3). The average thickness of the sherds is 7.9 mm on both the northern part of Zeewijk-West and at Zeewijk-Oost. On the southern part of Zeewijk-West the sherds measure just 6.9 mm in thickness on average.

There are hardly any differences in the firing methods used. The variety in surface treatment is also small, although on the southern part of Zeewijk-West smoothing is more common (table 2.2). Smitten sherds are more frequently found on the northern part of Zeewijk-West (4%) and at Zeewijk-Oost (9%) than on the southern part of Zeewijk-West (0%).

There are significant differences between the three areas in the ratios in which different decoration techniques were used and in the motifs applied (table 2.3). Cord decoration is most frequently found on sherds from the southern part of Zeewijk-West (54%), and the motifs are also the most diverse there. This decoration is found in a much lower proportion on the northern part of Zeewijk-West (25%) and especially at Zeewijk-Oost (11%). Types 1a/2IIb and 2IIa (Van der Waals and Glasbergen, 1955: p.8, 28-29) are present in all three areas (table 3.1). Certain examples of type 2IIb (Van der Waals and Glasbergen, 1955: p.28-29) are present in the southern and northern part of Zeewijk-West. The presence of type 1a beakers (Van der Waals and Glasbergen, 1955: p.8) can only be established with certainty in the southern part of Zeewijk-West.

Spatula decoration is most common at Zeewijk-Oost (61%), followed by the southern part of Zeewijk-West (44%) and the northern part of Zeewijk-West (37%). Zigzag, herringbone and oblique impressions in one direction are present in all three areas. At Zeewijk-Oost and on the northern part of Zeewijk-West sherds were found on which herringbone decoration is bordered by horizontal lines (figure 2.11). This motif is not present on the southern part of Zeewijk-West. Zeewijk-Oost is the only area in which both sherds with zoned decoration (figure 2.11: O.2 and O.F2) and sherds with one row of oblique impressions in one direction bordered by horizontal lines (figure 2.11: O.U) were found. Vessel 29 was decorated with oblique impressions in alternating directions per zone, bordered by grooved lines. Of this vessel, 62 sherds were found in the southern part of Zeewijk-West and 1 sherd was found in the northern part.

Decoration with fingertip impressions is very rare on the southern part of Zeewijk-West (2%). This type of decoration is, however, common in the other two areas: Zeewijk-Oost (28%) and the northern part of Zeewijk-West (38%).

On the southern part of Zeewijk-West the sherds are on average larger; consequently, more morphological characteristics are preserved. The absence of vessels that can be reconstructed down to the largest circumference at both Zeewijk-Oost and the northern part of Zeewijk-West hinders a comparison of morphological characteristics. In all three areas small and large vessels were found, but on the basis of a comparison of the rim diameters it can be concluded that on the southern part of Zeewijk-West proportionally more small vessels were found, whereas in the other areas large vessels were more common. A rim diameter of more than 15 cm is found on nine of the Zeewijk-West south vessels (27%), on seven the Zeewijk-West north vessels (39%) and on five of the Zeewijk-Oost vessels (36%).

Residues were observed on a very high percentage (38%) of the sherds from Zeewijk. Cooking residues were found in all three different areas. The percentage of sherds with residues differs slightly between areas (table 2.4). This may be the result of a difference in function of the area; cooking thus may have taken place more often in the southern part of Zeewijk-West. However, on the northern part

of Zeewijk-West and at Zeewijk-Oost, the sherds are smaller on average and show fewer residues. The differences in numbers of residues are therefore perceived as preservation differences. In all three areas, the thin-walled ware is the preferred cooking ware (table 2.4). Cord-decorated vessels are very often used for cooking: 83% of those from the southern part of Zeewijk-West, 71% of those from Zeewijk-Oost and 68% of those from the northern part of Zeewijk-West show cooking residues. In all three areas, vessels decorated with spatula impressions and vessels with fingertip impressions were also used to prepare cooked meals in (table 2.4).

Oudemans and Kubiak-Martens (2014) analysed residues from 25 sherds: 8 from Zeewijk-Oost, 15 from the southern part of Zeewijk-West and 2 from the northern part of Zeewijk-West. Their results suggest that a variety of often well-processed meals were prepared at Zeewijk. In all three areas the prepared meals contained heated proteins and fat, and often also heated polysaccharides. Clear differences were not observed (Oudemans and Kubiak-Martens, 2014).

In the southern part of Zeewijk-West and Zeewijk-Oost a fragment of a baking plate was found—an artefact with a debated function seen on both Vlaardingen, Funnel Beaker and Beaker sites (Van Regteren Altena and Bakker, 1966: p.36) (figure 2.11). The baking plate from Zeewijk-Oost showed residue, and analysis by Oudemans and Kubiak-Martens (2014) shows that it contained the same type of meal as was prepared in the vessels.

Fragments of spindle whorls (n=6) have been found in all three areas (figure 2.11). One of these was decorated with spatula-impressed herringbone motif, whereas the other five are plain. One last ceramic artefact from Zeewijk-Oost, an almost circular disc with a diameter of 3.7–4 cm carved from the wall of a vessel, may have been used as a lid or as a loom weight.

A total of 134 sherds show perforations: 110 from the southern part of Zeewijk-West, 19 from the northern part of Zeewijk-West and 5 from Zeewijk-Oost. Several vessels (see, for example, figure 2.11, vessel 15) show two perforations to both sides of a fracture, indicating the perforations are repair holes. In all three areas there is a relationship between perforations and the use of the vessel for cooking, indicated by the fact that 74% of all sherds with perforations also show residues.

Indications for cooking and spinning have been found in all three areas. Medium to large vessels without residues were found in all three areas as well. It seems plausible that these vessels would have been used for storage. Different ceramic assemblages were found in the three different areas of the Zeewijk site. However, analysis of the use of ceramics shows that in all three areas the same activities were carried out. It is therefore not likely that the differences in the assemblage can be explained in terms of a different function for the different areas. A difference in dating between the three areas seems the most applicable explanation for the differences in the technological and morphological characteristics and decoration. This interpretation will be developed further and tested in chapter 4.

2.3.4 Aartswoud

2.3.4.1 Introduction

The site of Aartswoud has a large cultural layer of 25 150 m², of which 1.4% has been excavated by the Instituut voor Prae- and Protohistorie of the University of Amsterdam (Drenth *et al.* 2008: fig.7). The cultural layer was 80–100 cm thick, and settlement features were found underneath it (Van Heeringen and Theunissen, 2001: p.101). The site proved very rich in finds and yielded more than 200 000 artefacts (Van Heeringen and Theunissen, 2001: p.106).

A total of 6486 pieces of flint were found, yet only a minority of these are tools, such as scrapers and sickles (Van Heeringen and Theunissen, 2001: p.108). The majority is of local (Northern) moraine flint, and a few are imports from the south (Van Heeringen and Theunissen, 2001: p.108-110). A total of 79 stone tools were found, including grindstones and hammer axes (Van Heeringen and Theunissen, 2001: p.110-111). Human foot bones were found as well (Van Heeringen and Theunissen, 2001: p.111).

The subsistence base consisted of domesticated animals, mainly cattle, supplemented by a small number of hunted wild species (mainly beaver and deer), fowled species (mainly ducks), fished species (mainly pike, sturgeon and salmon), and shellfish (mainly common mussel) (Van Heeringen and Theunissen, 2001: p.111). Botanical research yielded remains of crops, namely, emmer, bread wheat, and barley. Wild species were also consumed, such as apple, blackberry, hazelnut and acorn (Van Heeringen and Theunissen, 2001: p.111).

Special finds include a hammerhead needle made from bone, a hearth with over 200 g of charred cereal remains, scatters of red ochre near a hearth, a ceramic 'statuette', a piece of twined rope and some bone awls (Van Heeringen and Theunissen, 2001: p.112). From the scatter of postholes, one small structure of 1 × 2 m was reconstructed (Van Heeringen and Theunissen, 2001: p.112, fig.14).

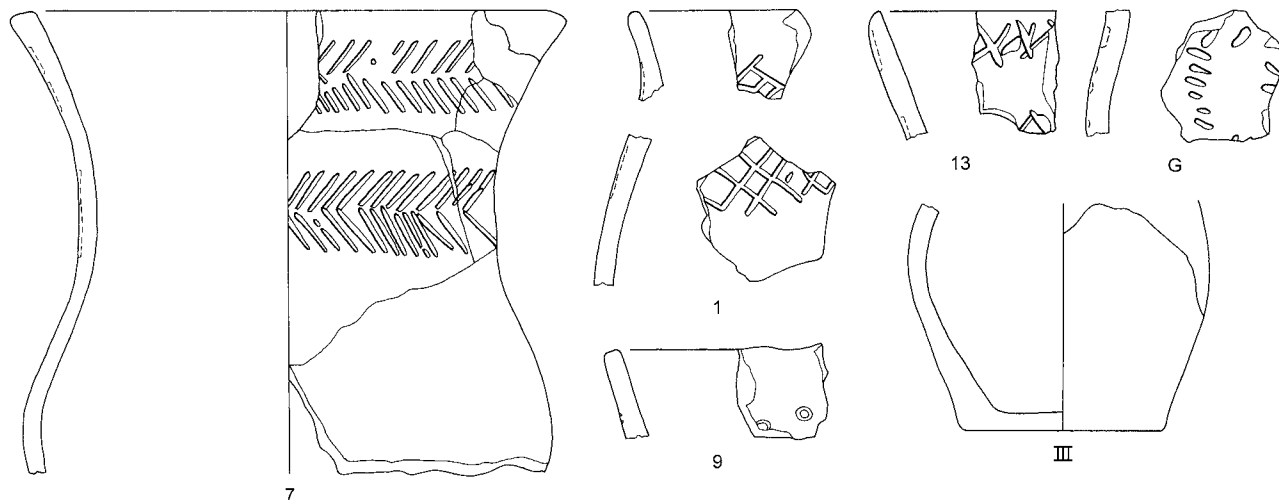
The total number of sherds is 28 109 (Van Heeringen and Theunissen, 2001: p.106), which means that for this study a subsample had to be selected. Trench 1 was chosen because it has clear stratigraphy and section and level drawings were present. Van Itterson Scholten and De Vries-Metz (1981) previously published a report on the finds from the trial excavation that included the ceramics from this trench.

The total of 531 sherds had a weight of over 3 g, and nearly all (n=526) were suitable for analysis. Some ceramics are missing. The boxes containing Aartswoud ceramics from trench 1 contained 41 empty bags. The finds from 18 of them were found back in a collection used by J.A. Bakker for teaching, but 23 are still missing. Of the vessels depicted by Van Itterson Scholten and De Vries-Metz (1981), initially 13 were missing; 3 were later found to be part of the J.A. Bakker collection and 10 are still missing. The Van der Waals and Glasbergen (1955) types of the missing vessels were clear from the images in the Itterson Scholten and De Vries-Metz (1981) publication and were also listed on the find cards present in the empty bags. There may be some overlap: some of the missing vessels depicted by Itterson Scholten and De Vries-Metz (1981) may stem from an empty bag in one of the find boxes.

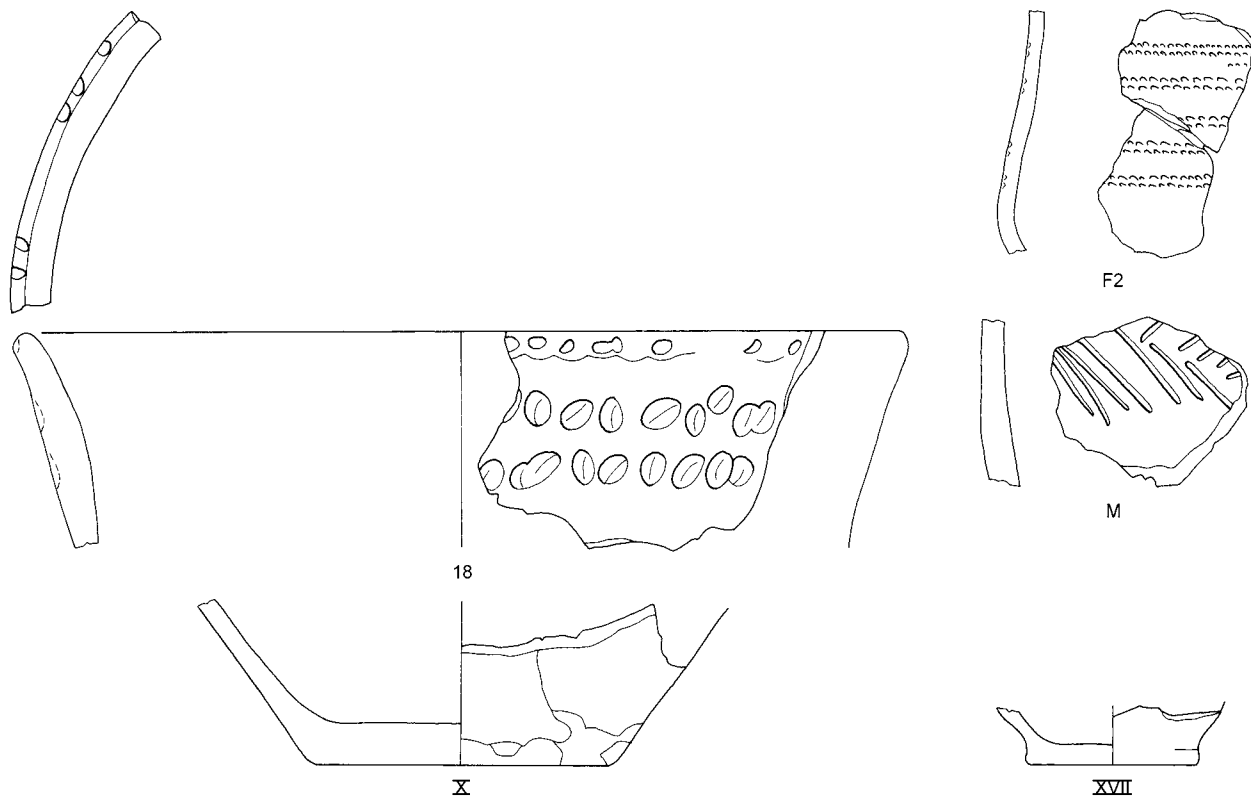
2.3.4.2 Technological characteristics

The Aartswoud ceramics are tempered with 7 different tempering agents in 17 combinations. The combination of just grog and sand is most common (58%). Stone (25%; including quartz, granite and red granite) and organic tempering (11%) are also often used (table 2.2). The majority of the sherds are thin-walled ware. Medium-thick-walled (15%) and thick-walled ware (18%) were found as well. There is a correlation between tempering and thickness. Of the sherds tempered with organic material, about two-thirds (63%) are thicker than 7.5 mm, whereas of the sherds only showing sand temper, three-quarters (76%) have a thickness of less than 7.5 mm. Judging from the colours of the cross-sections, different firing methods were used. Sherds with a completely dark-coloured cross-section are most numerous (42%), followed by sherds with a light inside and outside colour and a dark core (21%) (table 2.2). While there is no strong correlation between colour, tempering and thickness, organic-tempered sherds are

Spit 1



Spit 2



Spit 3



Figure 2.12 Aartswoud ceramics (scale 1:2).

Spit 4



Figure 2.12 (continued) Aartswoud ceramics (scale 1:2).

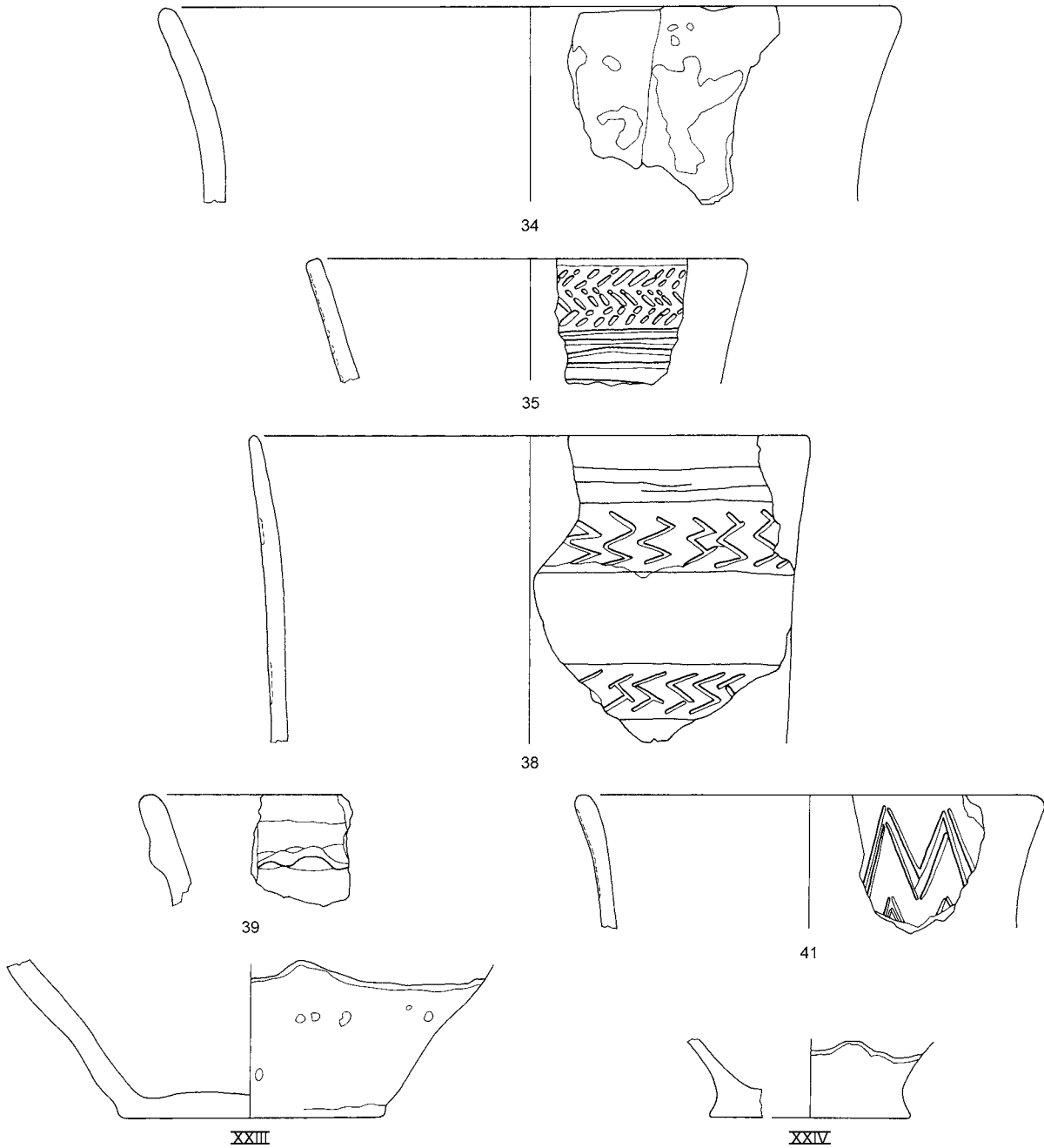


Figure 2.12 (continued)
Aartswoud ceramics
(scale 1:2).

more often light-coloured (62%). The outer and inner surface of the majority of the sherds was left rough (table 2.2). A small group of sherds (6%) has a smitten outer wall surface; this type of surface treatment is often found on the lower part of short wave moulded vessels (Sier, 2001: p.385). Signs of light smoothing of the wall were found on 22% of the sherd outsides and 15% of the sherd insides, while smoothed walls are even more rare (6% of the outsides and 2% of the insides). There is a correlation between surface treatment and thickness: the average wall thickness of smitten sherds is 8.2 mm, that of slightly smoothed sherds 7.7 mm and that of smoothed sherds 6.5 mm. Just six sherds show coil techniques. Only Hb coils were used in their construction.

2.3.4.3 Morphological characteristics

Only vessel 7 was capable of being reconstructed from the rim down to the largest belly circumference. Vessels 24, 27, 31 and 34 are reconstructed down to the smallest circumference (table 2.5 and 2.6). Vessel 7 is a beaker (table 2.5, figure 2.12). The decoration is of Van der Waals and Glasbergen (1955: p.11-12) type 1d: the rim and neck zone are decorated with two herringbone rows with an undecorated zone in between. Vessels 27 and 31 are beaker-like. Vessel 27 also has this type 1d herringbone decoration. Vessel 31 is of type 1a/2IIb and was decorated with zones with cord-impressed lines (see section 2.3.4.4, Van der Waals and Glasbergen, 1955: p.8-9, 29-29). Vessel 24 is larger and has an enlarged beaker-like shape (table 2.6). This vessel was decorated with a row of fingernail imprints on top of the rim. Undecorated vessel 34 is even larger, with a rim diameter of 23 cm (table 2.6).

The rim diameters could be measured of 19 more vessels. Of these, 11 (vessels 3, 5, 20, 25, 26, 30, 35, 36, 37, 41, 42) have a small rim diameter (10–14 cm), comparable to that of beakers. Five of these are decorated with a herringbone pattern (type 1d), one has a zigzag pattern and one has a row of oblique imprints in one direction (type 1e; Van der Waals and Glasbergen, 1955: p.8, 11-12). Five vessels (vessels 28, 29, 33, 38, 40) have a rim diameter measuring 15–17 cm, comparable to vessels with an enlarged beaker shape. Two of these are decorated with zigzags (vessels 28 and 38) and one with a herringbone pattern (type 1d, vessel 40, Van der Waals and Glasbergen, 1955: p.8, 11-12). The two other vessels are also decorated. Vessel 33 is of the short wave moulded type; vessel 29 was decorated with a row of fingertip imprints on the neck. The three remaining vessels are even larger, with rim diameters measuring 23–27 cm. Vessels 18 and 43 are decorated with fingertip imprints on top of the rim and on the neck, whereas vessel 39 is of the short wave moulded type. Bases from 27 vessels have been found (figure 2.12). Their diameter measures 4.5–10 cm. Most of these bases are flat, but two show a protruding foot.

2.3.4.4 Decoration

The Aartswoud ceramics show, in comparison with the other sites currently under study, the largest variety in decorative motifs. These motifs are created by means of spatula, cord or fingertip/fingernail impressions. Many different motifs were applied with spatulas (figure 2.12). Spatula impressions were found in 65% of the decorated sherds, with herringbone motifs the most common. A total of 11 vessels and 11 collections of wall sherds can be assigned to Van der Waals and Glasbergen type 1d (Van der Waals and Glasbergen, 1955: p.11-12).⁹

However, herringbone patterns are also present on Van der Waals and Glasbergen types 1b and 2IIc (Van der Waals and Glasbergen, 1955: 9-10, 27-33). This suggests that several sherds interpreted as type 1d may also belong to these types. Some variation is visible within the group with herringbone patterns. It may be noted that on vessel V the rows are doubled, while on vessel 7 the decoration is zoned. Zigzag decoration is seen on five vessels and on walls sherds from an additional four vessels.¹⁰ Again different motifs are present. On Vessels 1 and 13 (figure 2.12) crosses have been applied. Vessels 41 and Y show zigzags, while on vessel 28 zigzag motifs are interspersed with zones of oblique spatula imprints.

9 Eight empty bags supposedly also contained vessels of this type. Van Itterson Scholten and De Vries-Metz (1981: figure 17b.2) show an example of this type.

10 One bag contained a zigzag-decorated vessel now missing (Van Itterson Scholten and De Vries-Metz, 1981: fig. 16.1).

Vessel 35 and wall sherds of vessels R and X are decorated with type 1b decoration (Van der Waals and Glasbergen, 1955: p.9-10).¹¹ Vessels 35 and X show three horizontal rows with oblique impressions in alternating directions bordered by horizontal grooved lines (figure 2.12). Vessel R shows one row of oblique spatula impressions bordered by a grooved line; this sherd is placed within type 1b but may also be attributed to Van der Waals and Glasbergen (1955: p.11-12) type 1c or 1e or Sier (2001: p.397) type 2IIIf.

Of the type 1b beaker shown by Van Itterson Scholten and De Vries-Metz (1981: fig. 18.4) just one sherd is present (vessel X).¹² One vessel and wall sherds from five other vessels are of Van der Waals and Glasbergen (1955: p.11-12) type 1e. These vessels and sherds are decorated with oblique spatula imprints in rows in one direction. Several more vessels and sherds are decorated with spatula impressions, but their motifs are unclear or cannot be compared to any of the Van der Waals and Glasbergen (1955) types. On vessel 9, two imprints are visible that are made with a round, hollow spatula (figure 2.12). Vessel G shows two horizontal and two vertical rows of small, oblique spatula imprints (figure 2.12). The spatula-decorated sherds are often thin-walled (79%). The tempering is diverse; grog and sand often occur together (79%) and are sometimes mixed with either stone grit (14%) or organic material (14%).

Cord decoration occurs on one vessel and on wall sherds from two other vessels (table 2.3).¹³ Vessel 31 (figure 2.12) is a beaker decorated with zones of four cord-impressed lines interspersed with undecorated zones; the zone closest to the rim was decorated with a wavy line applied with a cord. Vessel F2 shows paired cord imprints interspersed with empty zones (figure 2.12). The cord-decorated sherds are all thin-walled and are either grog-and-sand- or just sand-tempered.

The last group of decorated vessels and sherds are decorated with fingertip and fingernail impressions. Two types are present: vessels without and vessels with a wavy, plastic band.¹⁴ The latter type are the so-called short wave moulded vessels (Floore, 1991). A total of 9 vessels and wall sherds from 11 other vessels are decorated with fingertip and fingernail impressions without plastic bands. On vessel 18, fingertip impressions have been applied to the top of the rim and in multiple rows on the neck (figure 2.12). On vessel 21, the decoration consists of just one row on the neck and one row on the top of the rim (figure 2.12). Vessel 29 just shows one row of imprints on the neck, and vessel G2 has two rows on the wall (figure 2.12). On vessel 24, a row of fingernail imprints has been applied to the top of the rim (figure 2.12). Two vessels are of the short wave moulded type.¹⁵ Vessel 39 (figure 2.12) shows a wavy, plastic band with fingertip imprints on the neck zone of a large vessel. The vessels with fingertip and fingernail impressions (including short wave moulded vessels) are often medium-thick-walled (38%), but thin-walled (22%) and thick-walled (19%) examples are also present. All sherds are tempered with grog and sand, but some also contain stone (19%) or organic material (6%).

11 Van Itterson Scholten and De Vries-Metz (1981: fig. 17b) show a missing type 1b beaker.

12 According to Van Itterson Scholten and De Vries-Metz (1981: fig. 18.4), this beaker stems from spit V; the find card, however, states the provenance as spit IV.

13 In one of the empty bags the finds card states that originally a type 2IIIf cord-decorated vessel was in the bag.

14 Van Itterson Scholten and De Vries-Metz (1981: figure 15.4) show the lower part of a vessel decorated with rows of fingertip imprints.

15 Originally several more short wave moulded vessels from trench 1 were present. Two empty bags must have contained sherds of this type, as shown in Van Itterson Scholten and De Vries-Metz (1981: fig. 14.1, 15.2, 17a.1). Their fig. 14.1 presents a rim fragment with two wavy bands, and their fig. 15.2 shows a wall fragment with one wavy band. In fig.17a.1 another rim fragment with two wavy bands, one very close to the top of the rim, is shown.

	Technological characteristics				Decoration based on vessels (1+2+3+4, 1=rim is present, 2=only walls, 3=empty bags, 4=picture in publication Van Ittersson Scholten and De Vries-Metz, 1981								Decoration based on number of sherds present		
	n	average thickness	Stone temper	Organic temper	1b	Herringbone (1d?)	Oblique spatula (1e?)	ZigZag	Other Spatula	Cord	Short wave moulded	Fingertip imprints	Cord (number of sherds present)	Spatula (number of sherds present)	Fingertip (number of sherds present)
Layer 1	176	8.2	55, 31%	35, 20%	0, 0% (0+0+0+0)	2, 10% (1+1+0+0)	3, 15% (0+3+0+0)	4, 20% (2+1+1+0)	1, 5% (1+0+0+0)	1, 5% (0+0+1+0)	1, 5% (0+0+0+1)	8, 40% (3+5+0+0)	0, 0%	10, 53%	9, 47%
Layer 2	137	7.9	28, 20%	14, 10%	0, 0% (0+0+0+0)	7, 37% (2+5+0+0)	2, 11% (0+1+0+1)	1, 5% (0+1+0+0)	0, 0% (0+0+0+0)	1, 5% (0+1+0+0)	1, 5% (0+0+0+1)	7, 37% (2+4+0+1)	3, 11%	14, 52%	10, 37%
Layer 3	43	8.5	7, 16%	4, 9%	0, 0% (0+0+0+0)	2, 33% (1+0+1+0)	1, 17% (1+0+0+0)	1, 17% (0+0+0+1)	1, 17% (1+0+0+0)	0, 0% (0+0+0+0)	0, 0% (0+0+0+0)	1, 17% (1+0+0+0)	0, 0%	3, 75%	1, 25%
Layer 4	86	6.6	11, 13%	3, 3%	2, 7% (0+1+0+1)	14, 50% (4+4+5+1)	2, 7% (0+1+1+0)	3, 11% (1+2+0+0)	2, 7% (0+2+0+0)	1, 4% (1+0+0+0)	2, 7% (0+0+1+1)	2, 7% (2+0+0+0)	3, 11%	24, 86%	1, 4%
Layer 5	56	7	17, 30%	0, 0%	2, 15% (1+0+0+1*)	5, 39% (2+1+2+0)	0, 0% (0+0+0+0)	3, 23% (2+0+0+0)	0, 0% (0+0+0+0)	0, 0% (0+0+0+0)	3, 23% (2+0+1+0)	0, 0% (0+0+0+0)	0, 0%	8, 73%	3, 27%
Unknown	32	7.9	13, 41%	20, 63%	1, 17% (0+1+0+0)	1, 17% (1+0+0+0)	0, 0% (0+0+0+0)	0, 0% (0+0+0+0)	0, 0% (0+0+0+0)	1, 17% (0+1+0+0)	0, 0% (0+0+0+0)	3, 50% (1+2+0+0)	1, 5%	12, 57%	8, 38%
Total	530	7.8	131, 25%	76, 14%	5, 5%	31, 34%	8, 9%	11, 12%	4, 4%	4, 4%	7, 8%	21, 23%	7, 6%	71, 65%	32, 29%

*One sherd present in spit IV

Table 2.9 Aartswoud stratigraphy.

2.3.4.5 Use, discard and spatial patterning

Trench 1 was excavated in five spits. This stratigraphic control was one of the main reasons for including the site in the current study. However, no clear patterns in the differences between the ceramics from the different layers were observed (table 2.9). Although some minor differences were observed, the material from the top spit shows broadly the same characteristics as the material from the bottom spits. All different decorative techniques and motifs are present across the various layers, with spatula decoration being the most common. The technological characteristics also show some variation between layers, but again no clear patterns can be distinguished (table 2.9). The percentages of stone grit tempering in the top versus bottom layers are comparable. The average thickness is a little higher in the top layers and organic temper is also more frequent in these layers. The percentages may have been distorted somewhat due to the loss of several vessels. The conclusion is that this selection of Aartswoud material does not show clear stratigraphic patterns and that the material from trench 1 can be treated as one assemblage.

Residues indicative of cooking were present on 110 (21%) sherds. Thin-walled vessels were most often used to prepare cooked meals. About a quarter of these sherds show residues (table 2.4). These sherds are most often grog-tempered (85 sherds), with stone (17 sherds) and organic (11 sherds) tempering being far more rare. Most sherds with residues are undecorated (78%). However, some of the decorated vessels have been used for cooking. These mainly include the beakers decorated with spatula motifs: about one-quarter (23%, or 71 sherds) of these have been used for cooking. Two cord-decorated sherds and six fingertip-decorated sherds also show cooking residues. Other vessels may have been used for cooking as well, but this either did not leave charred residues, or the residues have disappeared through post-depositional weathering. However, the vessels must have served different functions as well. On the medium-thick-walled and thick-walled wares, residues are particularly rare. These vessels probably (mainly) served another function, such as storage.

Perforations were found on just five sherds (vessel 18, decorated with fingertip imprints; vessel 31, decorated with cord imprints; and vessel 40, decorated with spatula imprints in a herringbone motif) (figure 2.12: vessels 18 and 31). On vessel 18, two perforations were found that may have served as repair holes through which a string was pulled to reconnect parts of a broken vessel. On the other two vessels, just one hole was observed, which makes it more difficult to reconstruct the original function of the perforations.

Two ceramic artefacts have been found that were probably used as loom-weights, indicating that weaving was conducted at the site. Both have a light colour and are tempered with grog, sand and organic material.

2.3.5 Keinsmerbrug

2.3.5.1 Introduction

The settlement site of Keinsmerbrug was excavated by the by the Dutch state service for archaeology in 1986. The entire site, with a surface area of 369 m², was excavated in 1 × 1 m squares (Kleijne *et al.*, in prep.). Keinsmerbrug is the westernmost of all the settlements included in this study. It was located in a dynamic part of the coastal landscape, relatively close to the tidal inlet (Kleijne *et al.*, in prep.). One of the most remarkable aspects of the site was the extremely high number of duck bones (Zeiler and Brinkhuizen, 2012: p.147). The site was interpreted as a site where people from different other settlements gathered in summer to fowl ducks, to hunt, and to graze cattle (Smit *et al.*, 2012: p.215). Five two-aisled structures with an irregular shape have been reconstructed (Nobles, 2012). The stone and flint assemblages show that locally gathered stones were worked in an ad-hoc technique. The ceramic assemblage is small and consists of just 291 sherds with a weight of over 3 g. (table 2.2). The ceramics show huge variation, especially in their technological characteristics and decoration.

2.3.5.2 Technological characteristics

The tempering of the Keinsmerbrug sherds shows great diversity in the materials and combinations used (table 2.2): 7 materials were added in 15 combination. The majority of the sherds (58%) are tempered with grog and sand. Stone grit is also often used: 36% of the sherds show either quartz, granite or red granite tempering. Organic tempering is uncommon and is visible in only 4% of the sherds. On the basis of their thickness, three classes of ware could be distinguished (table 2.2). Thin-walled ware is most common (57%). Thick-walled vessels make up about one-quarter of the total. Medium-thick-walled ware is uncommon. There is a relationship between tempering and thickness: granite and red granite are often used to temper medium-thick-walled and thick-walled vessels. Organic material was used exclusively to temper the thin-walled ware. Quartz was used for both thick-walled and medium-thick-walled ware. Grog and sand are present in sherds of all thickness classes. There is also variation in the firing methods used (table 2.2). The majority (56%) of the sherds are completely dark-coloured. A quarter of the sherds have a light outside colour, 12% have both a light inside and outside colour but a dark core, and 9% have a light outside colour but a dark inside colour and core. Both thin-walled and thick-walled sherds were observed with a dark or a light outside colour. Most sherds have a rough outer (209 sherds) and inner (228 sherds) surface. Only 33 sherds have been smoothed solely on the outside; 22 sherds have been smoothed only on the inside. The majority of the smoothed sherds are thin-walled or medium-thick-walled, and frequently show stone grit tempering. Coils of type Hb are visible on just one sherd.

2.3.5.3 Morphological characteristics

For a very limited number of vessels part of the profile could be reconstructed. Vessel 1 is complete down to the greatest belly circumference; seven vessels (vessels 2, 3, 4, 6, 9, 12 and 18) are complete down to the smallest circumference (table 2.5 and 2.5). Vessels 3, 4 and 6 show a beaker-like shape and size. Vessel 3 was decorated with a herringbone pattern, vessel 4 shows oblique impressions in one direction, and vessel 6 is cord-decorated. Vessel 2, decorated with a herringbone motif, is of a size combining characteristics of beakers and enlarged beakers. Vessel 1, also decorated with a

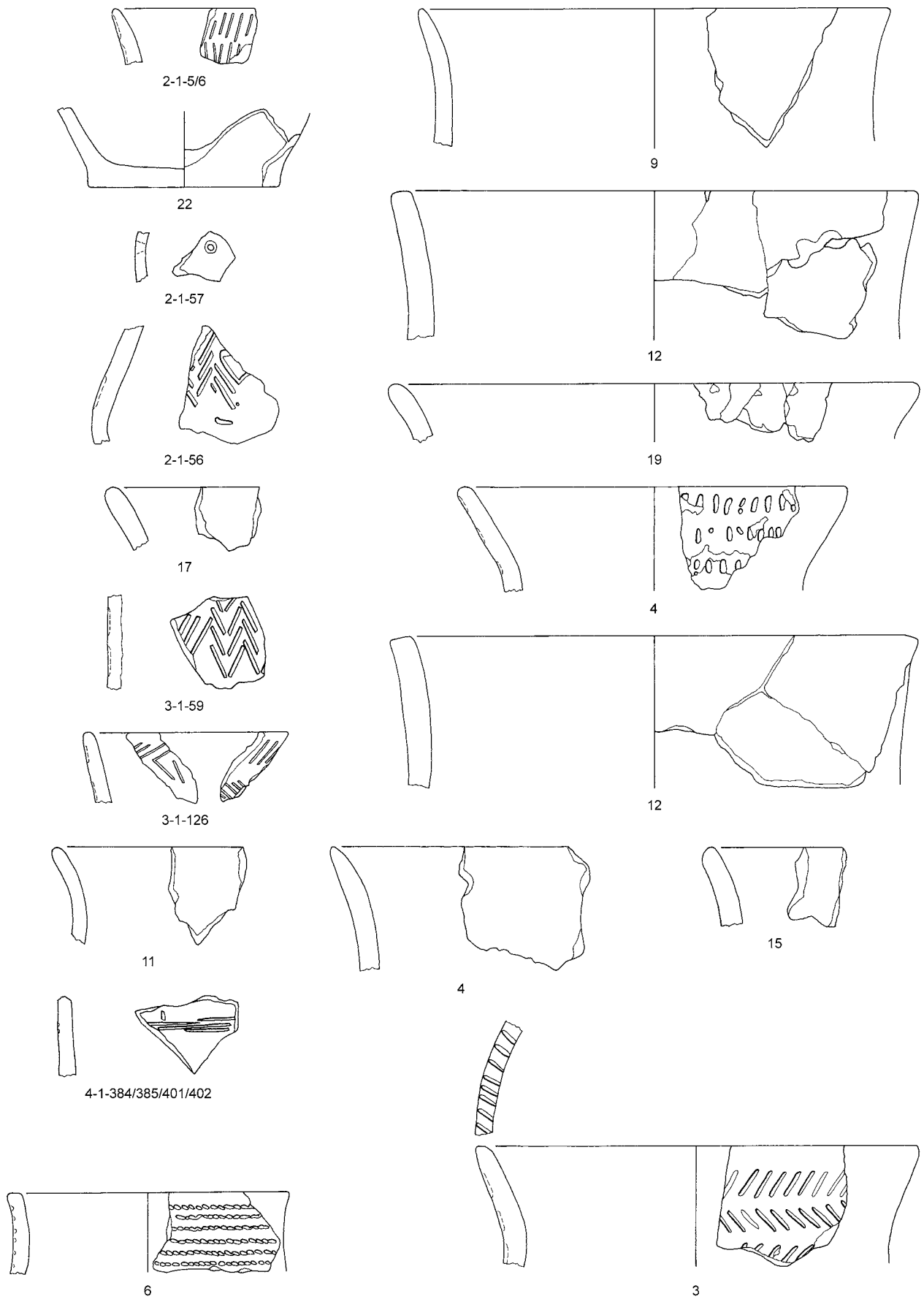
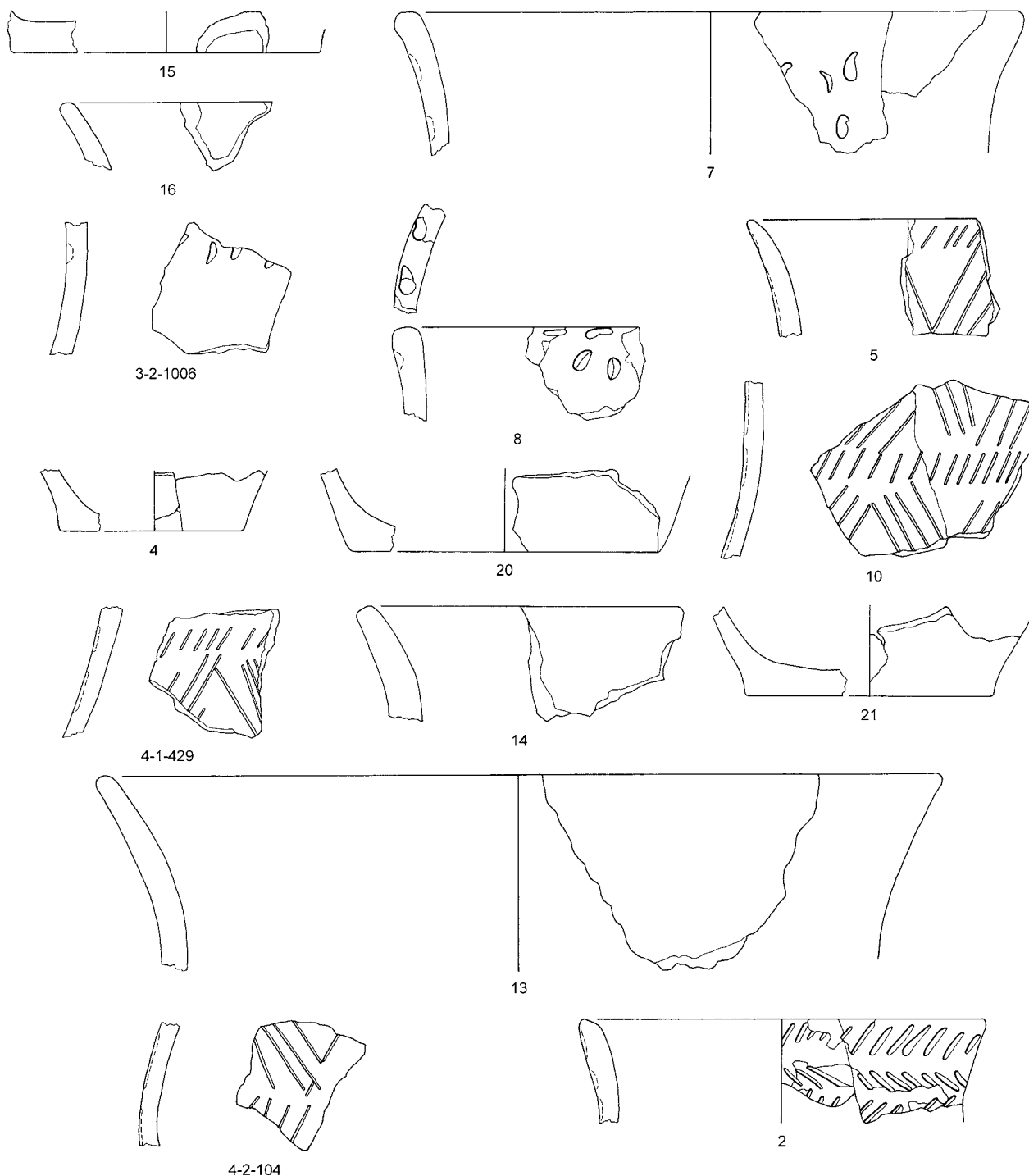


Figure 2.13 Keinsmerbrug ceramics (scale 1:2).



herringbone motif, has a deviant shape. The vessel is very large, with a rim diameter of 24 cm and a diameter of 33 cm at the widest part of the belly. Undecorated vessels 9, 12 and 18 have a shape resembling enlarged beakers.

On the basis of unique rim fragments, 12 more vessels were identified. Eight of these vessels are undecorated (figure 2.13). The rim diameter could be measured of three of these undecorated vessels: two are medium large (19 cm) and one is large (27 cm). Four of these vessels are decorated, and of one (vessel 7), the rim diameter could be measured. This vessel was decorated with nail- and fingertip imprints and has a rim diameter of 20 cm. The bases of the vessels are flat; protruding bases were not found.

Figure 2.13 (continued)
Keinsmerbrug ceramics
(scale 1:2).

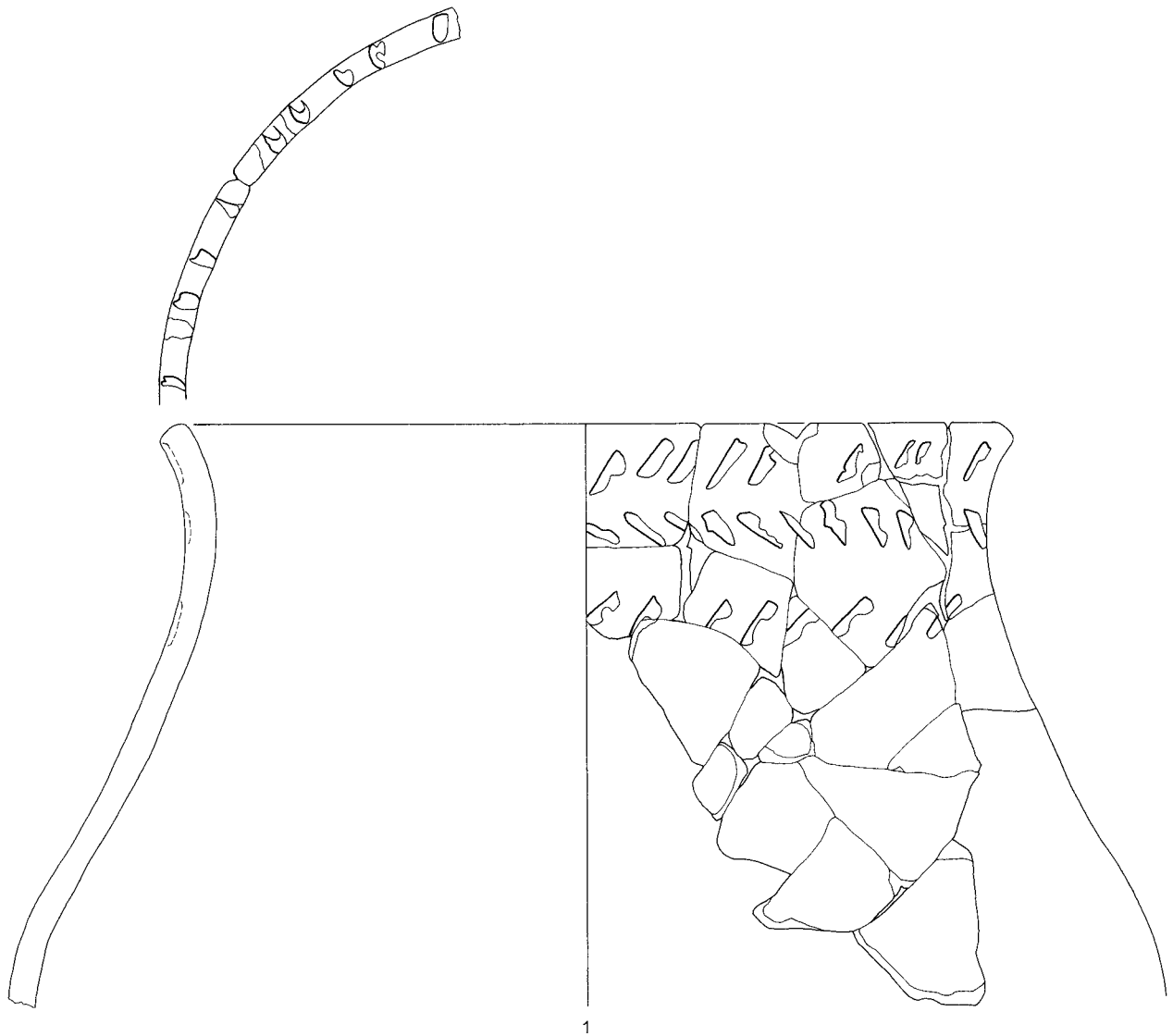


Figure 2.13 (continued)
Keinsmerbrug ceramics
(scale 1:2).

2.3.5.4 Decoration

Just a quarter of the sherds are decorated (table 2.2). Decoration applied with a spatula occurs most frequently (85%). Fingertip decoration is present on 12%, and just one (rim) sherd shows cord decoration (table 2.3).

Three vessels show the decorative motif characteristic for Van der Waals and Glasbergen (1955: p.11-12) type 1d vessels. On these vessels, oblique spatula impressions have been applied in a herringbone pattern. Vessels 4 and sherd 2-1-5/5 are decorated with oblique spatula impressions in horizontal rows in one direction; these can be placed within Van der Waals and Glasbergen (1955: p.12) type 1e. Vessel 5 and sherds 2-1-56 and 3-1-59 are decorated with zigzag patterns (Van der Waals and Glasbergen, 1955: p.8) (figure 2.13). On one wall sherd (4-1-384/385/401/402), irregular spatula lines have been applied (figure 2.13). The majority of the spatula-decorated sherds are thin-walled ware. Vessel 1 has a medium-thick to thick wall. Tempering with grog and sand is visible in all sherds, except vessel 3 (which only contains grog) vessel 4 (which contains grog, sand and organic material) and wall sherds 4-1-384/385/401/402 (which contain only sand).

Vessel 6 is the only vessel decorated with cord imprints. This vessel of Van der Waals and Glasbergen (1955: p.8-9, 28-29) type 1a or 2IIb is thin-walled and tempered with grog, sand and organic material.

Two vessels (vessels 7 and 8) and one wall sherd (3-2-1006) are decorated with fingertip and/or nail imprints (figure 2.13). Vessel 7 shows irregular nail and fingertip impressions on the wall. Vessel 8 was decorated with fingertip impressions on the wall and on top of the rim. On sherd 3-2-1006, an irregular row of nail impressions is visible. All fingertip-decorated vessels are grog-and-sand-tempered. Vessels 7 and 8 are medium-thick-walled, and the sherd is thin-walled.

2.3.5.5 Use, discard and spatial patterning

Charred residues were observed on 51 sherds. The thin-walled ware is often used for cooking, indicated by the fact that 39% of the sherds with residues are thin-walled. Medium-thick-walled and thick-walled ware is less often used for cooking (table 2.4). There also is a strong correlation with decoration: 81% of the spatula-decorated vessels—which are beakers of types 1e and 1d and the zigzag type—were used for cooking. Residue analysis of 16 sherds by Oudemans and Kubiak-Martens (2012: p.218) shows that the vessels were used to prepare one type of meal: emmer porridge with fat.

No clear indications for their use are available for the other, mainly medium and large, vessels. A function as storage vessel is possible. One sherd (2-1-57) was perforated post-firing. This may indicate that the vessel was repaired (figure 2.13). Ceramic artefacts were not found at this site.

Nobles (2012) undertook an intra-site analysis of the site and plotted different ceramic characteristics, such as tempering and decorative motif. No clear patterns were found in the distribution of different characteristics across the site: the different types and characteristics occur dispersed all over the site. Plotting the find locations of the sherds belonging to one vessel showed that most vessels were not found where they were used (Beckerman, 2012: p.48, Nobles, 2012: p.287). Vessels 1 and 4, and to a lesser extent vessel 12, were found close together inside a house near hearth pits (Beckerman, 2012: p.48, Nobles, 2012: p.287). Two of these vessels have charred residues (vessels 4 and 12), indicating that this area was either used for the preparation and cooking of food or for storing cooking vessels.

2.3.6 Mienakker

2.3.6.1 Introduction

In 1990, the entire settlement of Mienakker, with a surface area of 216m², was excavated in 50 × 50 cm squares and 2 cm spits by the Dutch state service for archaeology (Kleijne *et al.*, in prep.). Some information on the results was published, but a full report was lacking. Therefore the site was analysed as part of the Odyssee project. Mienakker is located on a levee of a creek formed as wash-over deposits laid down by larger tidal creeks (Kleijne *et al.*, in prep.). The landscape at the site was very open, with grass and pioneer species (Haaster, 2012: p.105).

Two main phases of use have been established (Nobles, 2013a). During the first phase the site was used as a settlement year-round. An oval, two-aisled structure (MK II) belongs to this phase (Nobles, 2012). Different activities were carried out at the site, including hunting, fishing, growing and gathering foods, and craft production. The latter included the production of flint and stone tools, amber beads and probably ceramics (Kleijne *et al.*, 2013). The crops were mainly barley and emmer (Kubiak-Martens, 2013). Flatfish and haddock were the most often caught fish. The dominance of haddock is remarkable, since it can only be caught in deep water and is therefore rare at Neolithic sites (Zeiler and Brinkhuizen, 2013: p.173, Kleijne *et al.*, in prep.). Another remarkable find is the remains of one or possibly two sealskin-lined canoes (Nobles, 2013b: p.247).

During the second and final phase, the site was used as burial site. In a long, trapezoidal, two-aisled structure (MK I) the remains of a 26–35 year old male were found (Nobles, 2013a: p.236-240). The site of Mienakker was interpreted by Hogestijn (1997: p.28-29) as a small special activity site. Re-analysis, however, showed a broad scale of activities and probably year-round habitation (Kleijne *et al.*, 2013). Therefore the site was probably inhabited by a single household (Kleijne *et al.*, in prep.).

On this site, 654 sherds with a weight of over 3 g were found. Originally this assemblage was larger, as nine reconstructed vessels, pictured on the cover of the Van Ginkel and Hogestijn (1997) publication, have since gone missing.

2.3.6.2 Technological characteristics

The technological characteristics show tremendous uniformity (table 2.2): 98% of the sherds show grog tempering, often (91%) in combination with sand. Stone grit was observed in just two sherds. Organic temper was added to 6% of the sherds. A special find are two sherds tempered with grains of sea barley (*Hordeum marinum*, determination Kubiak-Martens, in: Beckerman, 2013: p.38).¹⁶ The average thickness of the sherds is very thin, at 6.9 mm, and the class of thin-walled ware is very large: 72% of the sherds have a wall thickness measuring between 5 and 7.5 mm (table 2.2). Medium-thick-walled ware (6%) and thick-walled ware (14%) is rare. There is a correlation between thickness and organic tempering: of the 37 organic-tempered sherds for which the wall thickness could be measured, 26 (70%) are thick-walled. This means that 35% of the thick-walled ware is organic-tempered. Different firing methods were used, but the majority of the sherds have a dark outside colour (70%) (table 2.2). Almost all organic-tempered sherds have a dark colour. The majority of the sherds have a rough outside (69%) and inside (76%) surface. Smoothed surfaces were found mostly on thin-walled ware: 79% of the sherds with a smooth outside surface have a wall thickness between 5 and 6.5 mm. Coil joints are visible on 20 sherds: 18 coarse thick-walled sherds from one vessel (vessel aa) and two thin-walled sherds were built in the H-technique. The other vessels were probably also coil-built, but likely using the stronger Hb-technique, thus leaving fewer visible coils.

2.3.6.3 Morphological characteristics

Of four vessels from Mienakker, the profile could be reconstructed from the rim down to the greatest belly circumference (figure 2.14). Vessels 24, 29 and 31 are beakers. Vessel 24 is undecorated, while the other two vessels are of Van der Waals and Glasbergen (1955: p.28-29) All Over Ornamented type 2IIB with cord imprints. Undecorated vessel 30 is an enlarged beaker. For nine vessels, the profile could be reconstructed down to the smallest circumference (figure 2.14). Seven of these (vessels 1, 7, 9, 10, 13, 26 and 28) are beaker-like. Vessels 7 and 9 are cord-decorated, vessel 13 has zigzag motifs, and the others are undecorated. The undecorated small vessel 2 is also beaker-like, but has a very small rim angle. Vessel 6 is larger, with a rim diameter of 17 cm, and has a deviant shape, in that the rim slopes inwards. For the two remaining vessels the rim diameter could be measured. Both are small vessels: undecorated vessel 3 has a rim diameter of 7 cm, whereas cord-decorated vessel 18 has a rim diameter of 10 cm. The bases have diameters ranging between 7 and 10 cm, and these are all flat (protruding bases were not found).

16 Find numbers 1203 and 2713.

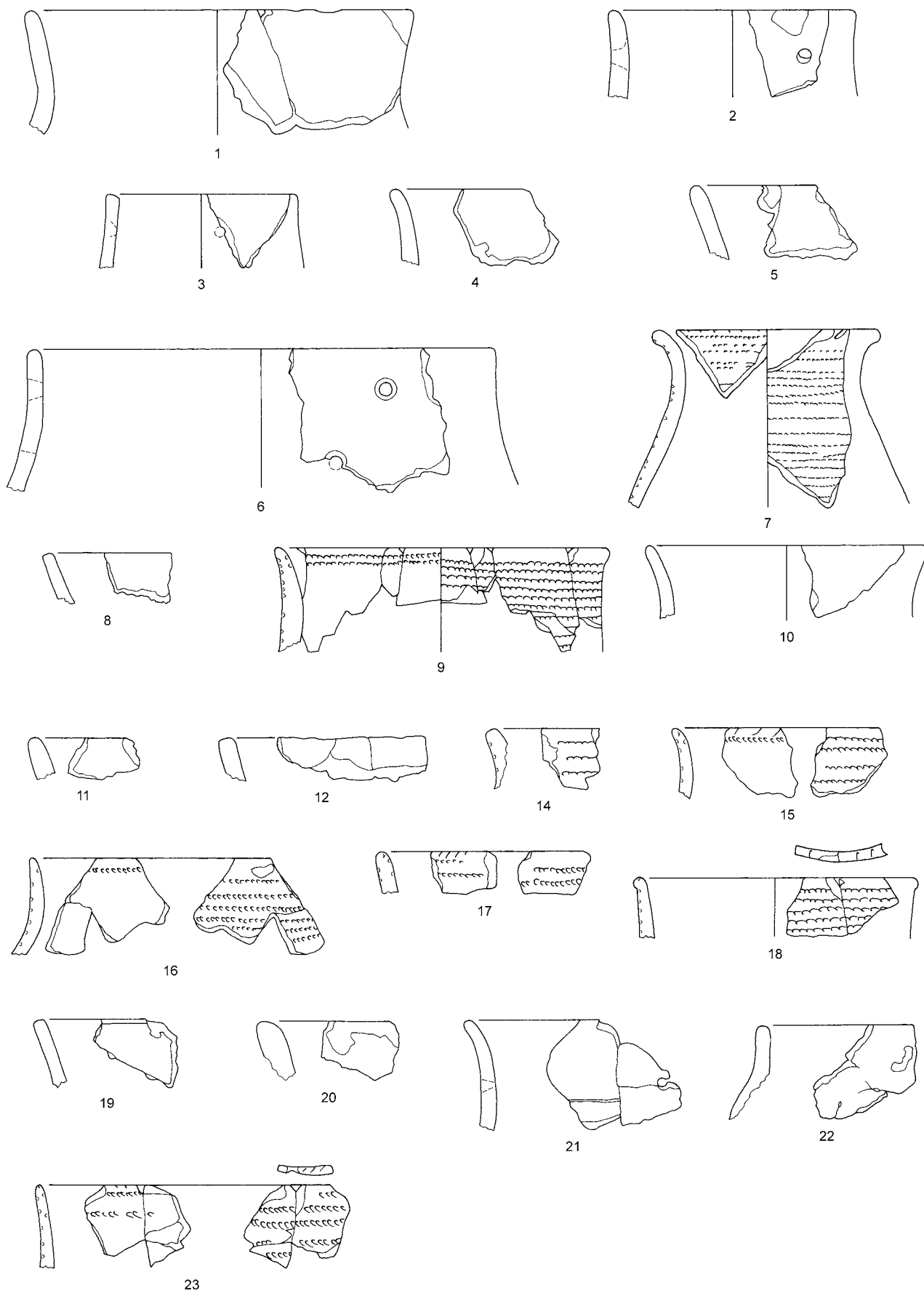


Figure 2.14 Mienakker ceramics (scale 1:2).

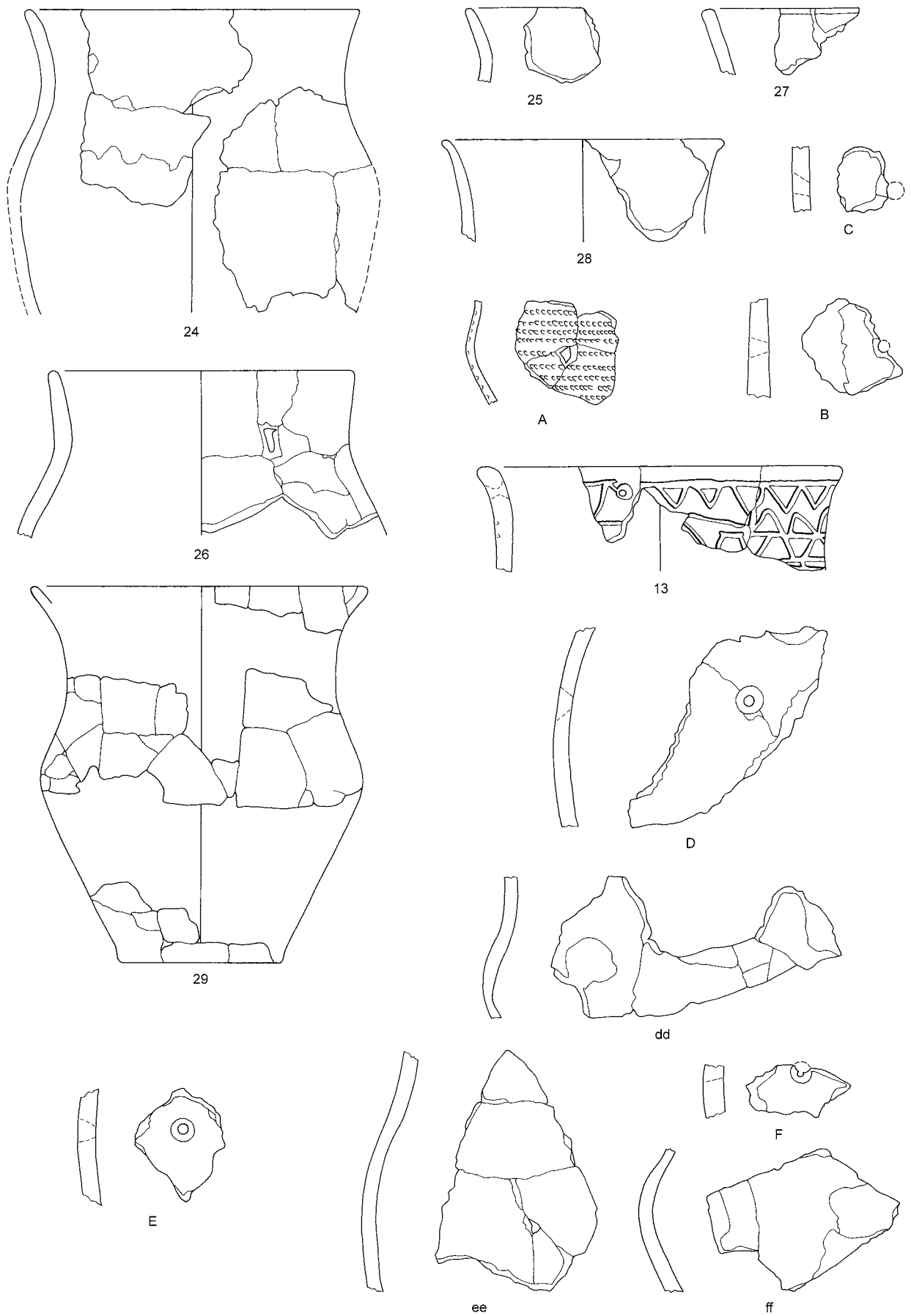


Figure 2.14 (continued) Mienakker ceramics (scale 1:2).

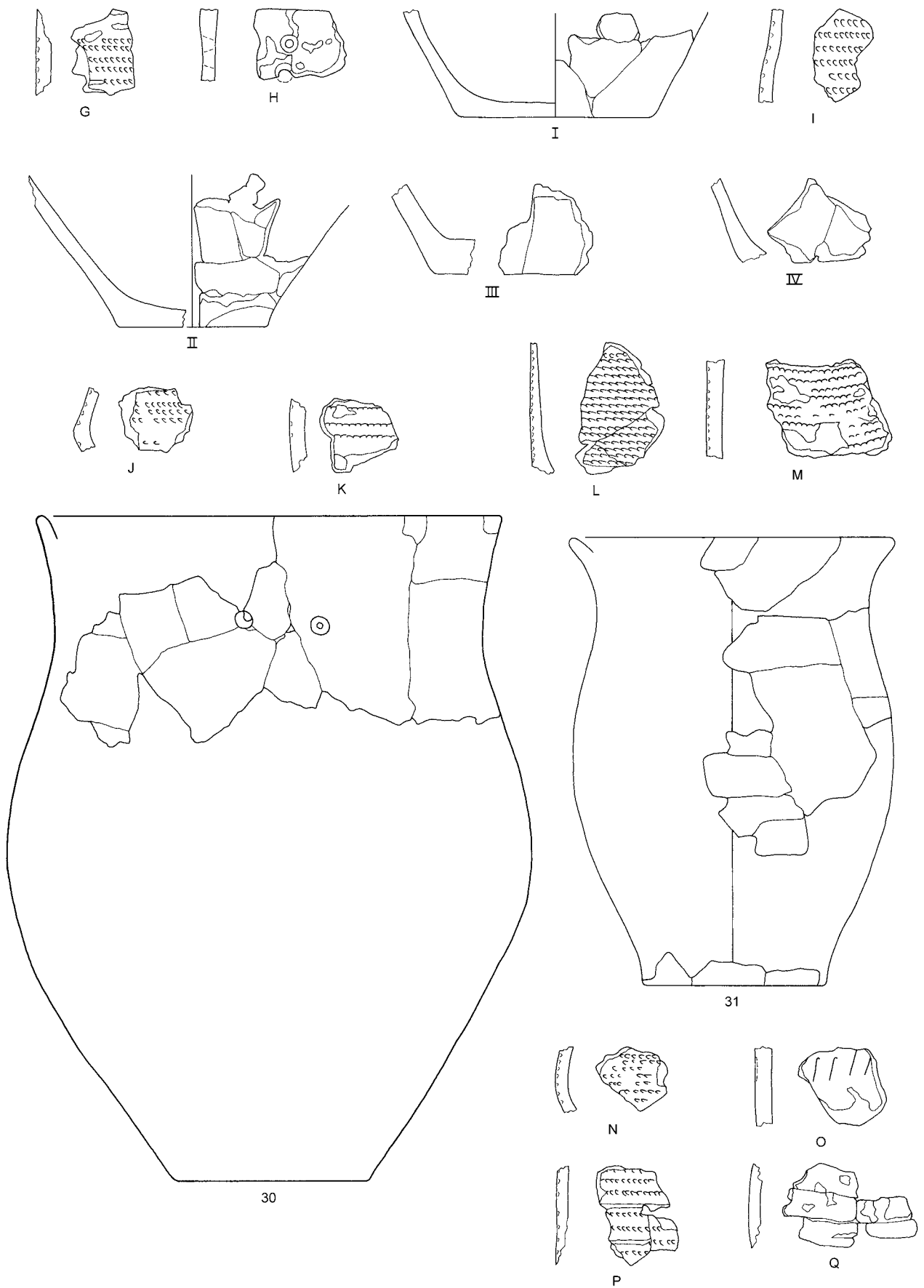


Figure 2.14 (continued) Mienakker ceramics (scale 1:2).

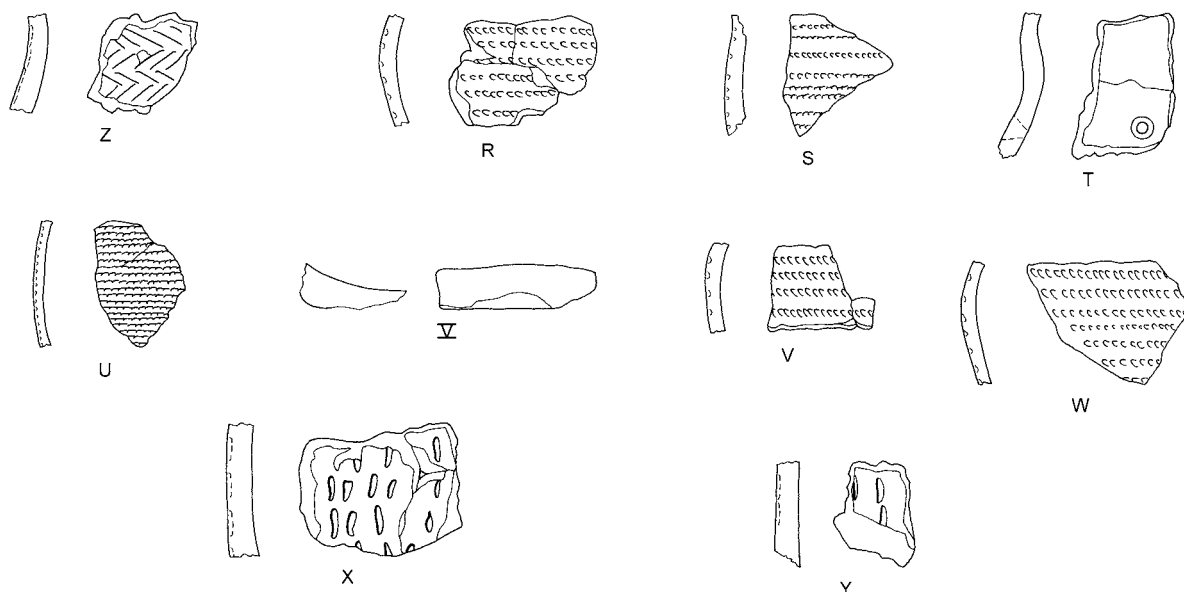


Figure 2.14 (continued)
Mienakker ceramics
(scale 1:2).

2.3.6.4 Decoration

The decoration, like other characteristics of the ceramics, is very uniform (table 2.3). A total of 119 sherds show decoration; of these, 69 (58%) are cord-decorated and 50 (42%) are spatula-decorated. Fingertip impressions were not observed on any of the sherds. A majority of 486 sherds (74%) are undecorated. There is a very strong correlation between decoration technique and thickness. All cord-decorated sherds are thin-walled, with 70% measuring between 4 and 5.5 mm. The spatula-decorated sherds are also generally thin-walled; only one sherd decorated with (oblique) spatula imprints is medium-thick-walled.

2.3.6.5 Use, discard and spatial patterning

Residues were observed on 88 sherds. Almost all residues (90%) are on thin-walled sherds. One-fifth of the thin-walled sherds (21%) show residues (table 2.4). These sherds are often decorated with spatula imprints (21 sherds) or cord imprints (5 sherds). The residues of 16 sherds were analysed by Oudemans and Kubiak-Martens (2013: p.146). Their results indicate broad-spectrum cooking, in that five different groups of residues were found. According to Oudemans and Kubiak-Martens (2013: p.146), different types of food were cooked, often containing charred protein and polysaccharide mixtures, occasionally accompanied by lipids.

Of the medium-thick-walled ware, three sherds show residues. None of the thick-walled ware shows any residues. Because the small groups of medium-thick-walled and thick-walled vessels were not often used for cooking, they may have been used for storage. Use wear analysis on a granite tool found on the site Garcia-Diaz, 2013: p.85) showed that this tool was probably used to polish or smooth ceramics, indicating that ceramics were produced at this site.

A rather large number of sherds (n=29) from a total of six vessels have perforations. Several vessels show two perforations to either side of a fracture. It seems plausible that these perforations, or at least some of them, were made to repair the vessel by putting string through the holes. Ceramic artefacts were not found on this site.

Nobles' (2013a) spatial analysis of the features and cultural remains showed no clear horizontal or vertical pattern in the ceramics (Beckerman, 2013: p.54-55, Nobles, 2013a: p.55, 216, 226 and table 11.7). Most vessels were not found where they had been used (Beckerman, 2013: p.55). Vessels 26, 28 and missing vessel g may be related to Mienakker house MKII (Beckerman, 2013, Nobles, 2013a: p.55, 216, 226 and table 11.7). Both vessels 26 and 28 are undecorated and have a beaker-like shape.

Vessels 24, X and missing vessels b and j appear to be related to the funerary structure MKI (Beckerman, 2013: p.55, Nobles, 2013a: p.55, 216, 226 and table 11.7). Vessel 24 is undecorated and has the size and profile of a beaker, whereas vessel X is a collection of wall sherds decorated with oblique spatula impressions in one direction (Van der Waals and Glasbergen, 1955: p.12, type 1e).

2.3.7 *Sijbekarspel-De Veken*

2.3.7.1 Introduction

This settlement was excavated in 1989 by the Dutch state service for archaeology. Just 0.4% of the 5 850 m² cultural layer was excavated (Drenth *et al.*, 2008: fig.7). The number of sherds found (66 weighing over 3 g) is therefore very limited. The excavation consisted of four test trenches of 2 × 1 m, of which one was enlarged to 4 × 4 m due to the finding of a skeleton (Van Heeringen and Theunissen, 2001: p.80). This skeleton was of a female 30-35 years old, buried in an oval pit (Hogestijn and Woltering, 1990: p.161-163). The body was buried in a flexed position on her left side, facing south in a northeast to southwest orientation (Hogestijn and Woltering, 1990: p.161-163).

The settlement remains include domesticated animals (cattle, sheep/goat and pig), supplemented by wild species (e.g. ducks) and fish (e.g. pike) and shellfish (Van Heeringen and Theunissen, 2001: p.80). Barley and emmer grains were found as well as plough-marks, indicating the local cultivation of crops (Van Heeringen and Theunissen, 2001: p.80-85). The sea beet and hazelnuts remains recovered indicate that these species were presumably collected and consumed as well (Van Heeringen and Theunissen, 2001: p.82).

2.3.7.2 Technological characteristics

Almost all sherds found at Sijbekarspel-De Veken are tempered with grog and sand (table 2.2). Some sherds show other admixtures: 9% show organic temper, 17% show stone temper. The average sherd thickness is small (6.8 mm), and thin-walled ware occurs most frequently (63%, table 2.3). Medium-thick-walled ware makes up about one-fifth of the total (24%). Thick-walled ware is almost entirely absent (4%). Stone grit tempering is present in all the thick-walled sherds, in 7% of the medium-thick-walled sherds, and in 20% of the thin-walled sherds. Organic temper is only found in thin-walled ware.

Different firing methods were used. A firing process with a reduced atmosphere at the start and more oxygen during later phases of firing was common: 38% of the sherds have a dark core and a light inside and outside colour. A firing process in a completely reduced atmosphere has given 28% of the sherds a completely dark colour. There is no correlation between firing method and tempering and/or thickness. The majority of the sherds have a rough inside and outside surface (table 2.2). A lightly smoothed outside surface is found on 30% of the sherds, and just 2% are polished. The inner walls of 22% of the sherds is lightly smoothed; just 4% are smoothed on both the inside and the outside. Smoothing of the inside and outside occurs most frequently on thin-walled ware. Coils were not identified.

2.3.7.3 Morphological characteristics

None of the vessels could be reconstructed down to the largest or the smallest circumference. For five vessels, the rim diameters could be measured. Undecorated vessel 1 has a rim diameter of 14 cm. Two vessels (undecorated vessel 3 and Van der Waals and Glasbergen, 1955: p.19-20, type 2Ia vessel 6) have a rim diameter of 16 cm. Vessels 4 and 5 have a rim diameter of 18 cm, and both of these vessels are undecorated. Fragments of flat bases originating from three vessels were found, but a diameter could be established for only one of these (7 cm).

2.3.7.4 Decoration

The decoration technique that is found most often on the site of Sijbekarspel-De Veken is not found at any of the other sites (figure 2.15). Sherds from three vessels were decorated with a dentated spatula, while on the other sites a plain spatula was used. Vessels 6 and A are of Van der Waals and Glasbergen (1955: p.19-20) Bell Beaker type 2Ia. These sherds are decorated with zones filled with oblique rows of dentated spatula impressions bordered by cord lines. Lanting and Van der Waals (1976: p.6) see this type as the successor to All Over Ornamented type 2IIa. One vessel (vessel B) of that type was found on this site as well. This vessel was also decorated with rows of oblique spatula impressions (in one direction, made with a dentated spatula, bordered by a cord line), yet the decoration on this sherd is not zoned but continuous. The three other decorated vessels (vessels C, D and E) are

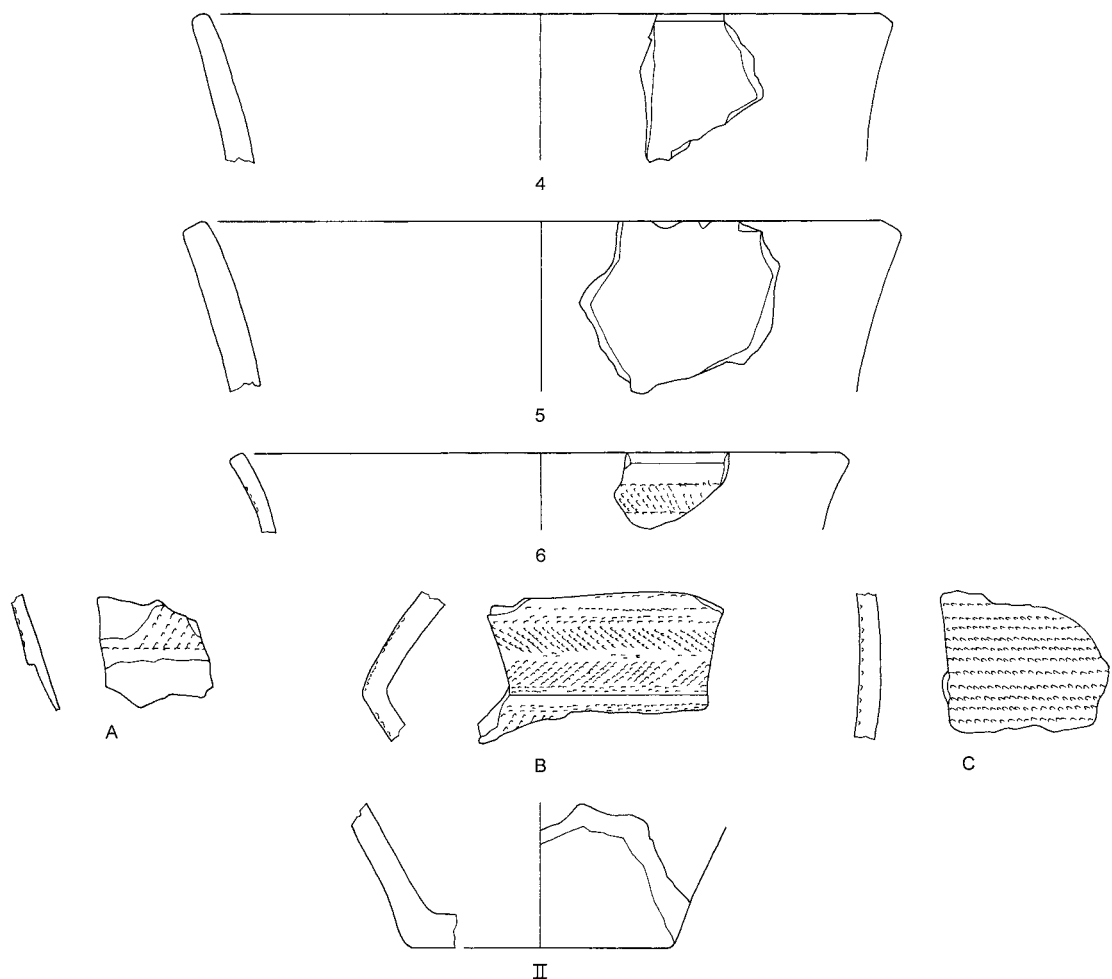


Figure 2.15 Sijbekarspel-De Veken ceramics (scale 1:2).

all decorated with cord impressions (figure 2.15). All decorated sherds are grog-and-sand-tempered and thin-walled. Fingertip or fingernail decoration was not found on this site.

2.3.7.5 Use

Residues are present on nine sherds (14%, table 2.4). These are most often thin-walled (22%) although both medium-thick-walled and thick-walled sherds also occur. All sherds contain grog-and-sand temper, and in three sherds stone temper is also present. Residues are present on vessel A, belonging to type 2Ia (Van der Waals and Glasbergen, 1955: p.19-20). For sherds without residues, no direct indications for their original use are available. Signs of repair were not found, nor were ceramic artefacts. No spatial analysis has been undertaken for this site.

2.4 Diachronic trends

The outline presented above shows that there is ample variation in the ceramic assemblages, both within and between sites. Variation is observed in the technological characteristics, the morphological characteristics, the decoration, the use and the discard. In order to understand whether this variation is caused by chronological, functional and/or social differences, a comparison is necessary among the different sites and of the study sites to sites from the same, preceding and subsequent periods from other regions. This comparison will be undertaken in chapter 3.

Regional and supra-regional comparisons of Neolithic ceramic assemblages

3.1 Introduction

In order to enhance our understanding of Corded Ware chronology and society, the ceramics of the seven sites introduced in chapter 2 will be compared with the ceramics from contemporary and slightly older and younger sites in other regions. These are (a) Funnel Beaker (TRB) ceramics from settlements, (b) Vlaardingen ceramics from the southern part of the coastal zone (Van Regteren Altena *et al.*, 1962, Glasbergen *et al.*, 1967, Louwe Kooijmans, 1974, 1976, Lanting and Van der Plicht, 1999–2000, Beckerman and Raemaekers, 2009) and (c) Corded Ware ceramics from other sites, especially funerary sites from the upland areas of the Netherlands (Lanting and Van der Waals, 1976, Jager, 1985, Furholt, 2003a, Drenth, 2005, Drenth *et al.*, 2008). In section 3.2, the sites used for comparison will be introduced. In section 3.3, the assemblages from the Dutch coastal Neolithic will be compared to various upland sites. In section 3.4, the coastal Corded Ware assemblages will be compared with Corded Ware assemblages from regions outside the Netherlands. In section 3.5 conclusions will be drawn.

3.2 Ceramics and sites used for comparison

3.2.1 Introduction

In this section Neolithic ceramic assemblages will be compared. This comparison includes ceramics traditionally labelled as Funnel Beaker, Vlaardingen and Corded Ware. Cultural labels are not always used in the same, consistent manner (Furholt, 2014a-b). Different authors have used different concepts for the same culture (Furholt, 2014a-b). Moreover, cultural labels often imply a uniformity not present in the actual assemblages (Furholt, 2014a-b).

But although cultural labels are often problematic, in order to be able to compare different assemblages, a shorthand, or definition, of the ceramics of the different cultures is needed. Following a comparison of the assemblages from the Dutch coastal zone region and a supra-regional comparison, the validity of these different labels, or cultural concepts, will be discussed (section 3.5).

3.2.2 Funnel Beaker sites and ceramics

The number of settlement sites in the Netherlands that can be assigned to the Funnel Beaker period is still low. P14 and Beekhuizerzand, both located in the region to the east of the coastal zone, are the nearest, largest and best documented

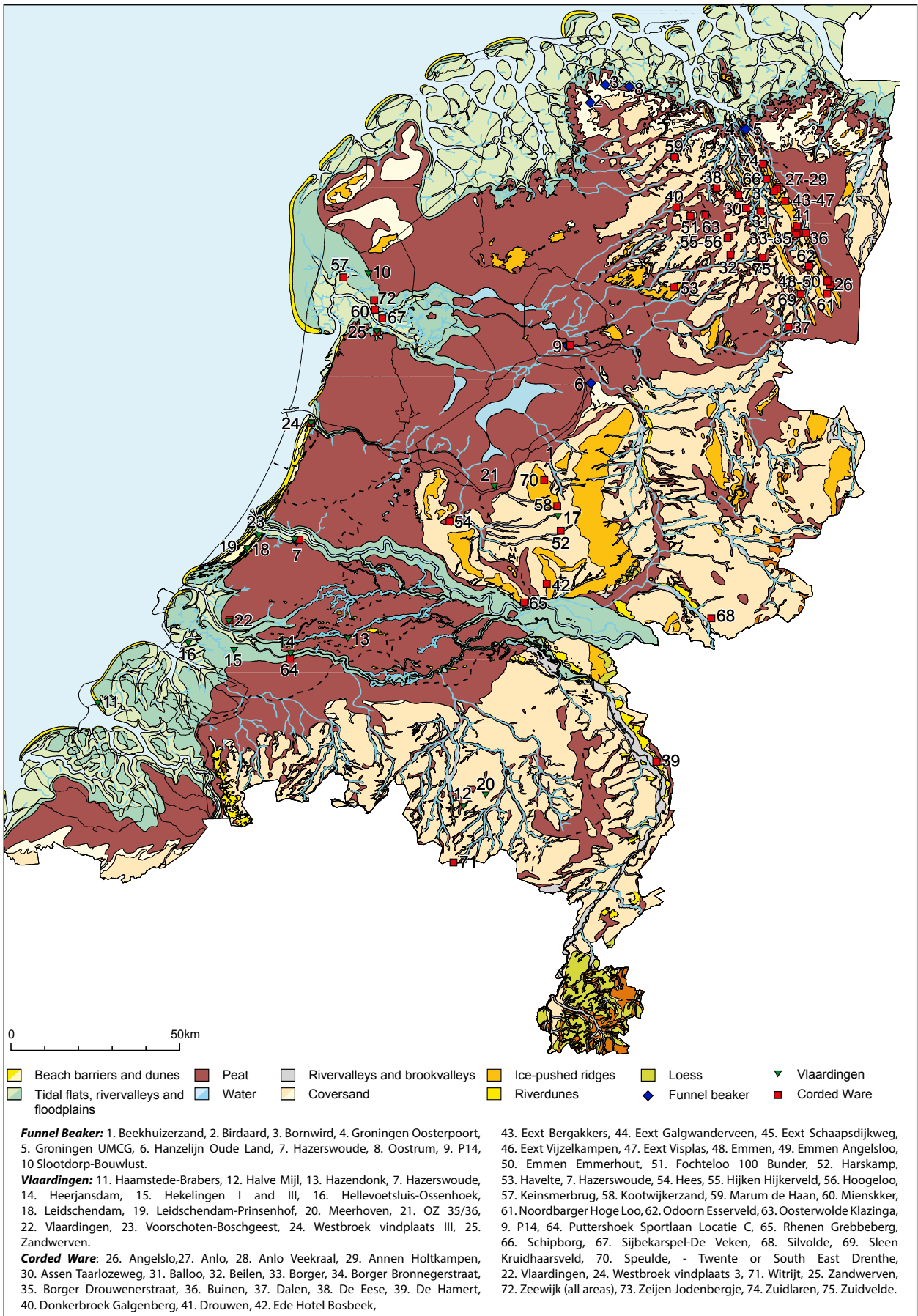


Figure 3.1 Map with sites used for comparison (after: Theunissen et al., 2014 and Vos and De Vries, 2013).

Funnel Beaker settlements and are thus used here for comparison.¹⁷ The ceramic assemblage found at Hazerswoude, located in the southern part of the coastal zone, is said to contain Vlaardingen, Corded Ware as well as several Funnel Beaker sherds (Drenth, 2010: p.109). The characteristics of these Funnel Beaker Culture sherds will be compared to those found on the Noord-Holland settlements as well.

A definition of Funnel Beaker settlement ceramics needs to be fixed upon in order to be able to compare the characteristics of the ceramics across different sites. The most striking feature of Funnel Beaker ceramics presumably is its decoration. Very common is *tiefstich* decoration: lines consisting of small and deep spatula imprints. These *tiefstich* lines are either straight lines, zigzag lines, crosses or wavy lines (Modderman *et al.*, 1976: p.54-55, Bakker, 1979: p.178, Brindley, 1986: fig. 2, Ten Anscher, 2012: p.155). Another decoration technique is *tvaerstik* decoration: small horizontal lines placed at intervals on the horizontal plane (Bakker, 1979: p.179, Brindley, 1986: fig. 2). Decoration patterns are either simple (consisting of one or more lines) or more complex (including zones and/or blocks filled with *tiefstich* lines or patterns consisting of strips resembling chevrons, ladders or zippers) (Brindley, 1986: fig. 2). Another very distinctive decorative motif of the Funnel Beaker period is vertical fringes, starting at the shoulder and covering the upper part of the belly (Brindley, 1986: fig. 1). A row of perforations or impressions under the rim as well as perforations in the wall occur (Modderman *et al.*, 1976: p.51, Ten Anscher, 2012: p.164). A large variety of vessel types is seen as characteristic for the Funnel Beaker period (Ten Anscher, 2012: p.164). Shoulder-pots, amphorae, buckets, funnel beakers, bowls, collared flasks and baking plates occur most frequently (Modderman *et al.*, 1976: p.49, Ten Anscher, 2012: p.164). Strap handles and knobs are well known (Modderman *et al.*, 1976: p.49). The tempering often consists of stone grit: at P14 granite is most common, yet at Beekhuizerzand quartz dominates, yet at both sites organic tempers also occurs (Modderman *et al.*, 1976: p.47, Ten Anscher, 2012: p.163). Average wall thicknesses are only known for the Funnel beaker assemblage of P14; there a wall thickness between 5 and 8 mm is most common (Ten Anscher, 2012: p.162).

The Funnel Beaker settlement nearest to the coastal zone is the well-published site of P14 (Ten Anscher, 2012). The site is located to the east of the Noord-Holland settlements, on a sand ridge in the direct vicinity of the river Vecht in the province of Flevoland. This sand ridge was occupied for a long time, and material from various Neolithic phases has been found, including pre-Drouwen, Funnel Beaker, Corded Ware and Bell Beaker material (Ten Anscher, 2012).

Here the characteristics of the large early Funnel Beaker assemblage and the smaller Funnel Beaker assemblage from P14 will be outlined. A summary of the main characteristics of the Corded Ware ceramics will be presented below. The early Funnel Beaker ceramics at P14 are most often tempered with granite, but quartz, plant, grog and sand also occur in different combinations (Ten Anscher, 2012: p.91). The wall thickness ranges between 4 and 13 mm, yet a wall thickness of 7–8 mm is most common (Ten Anscher, 2012: p.93). The vessels are coil-built, and Hb coils occur most frequently (Ten Anscher, 2012: p.93-94). A light outside colour and dark core and inside are found most often (Ten Anscher, 2012: p.99). Four main vessel shapes have been distinguished: vessels with an S-shaped profile, bi-conical vessels, bowls and possibly bag-shaped vessels (Ten Anscher, 2012: p.65). Knob ears and strap handles are found in small numbers (Ten Anscher,

17 At the settlement of P14, a group of sherds pre-dates the oldest phases of the Funnel Beaker culture as described by Baker (1979) and Brindley (1986). This assemblage is the subject of debate: it is seen as either early Funnel Beaker (pre-Drouwen, Ten Anscher, 2012: p.22, 63) or late Swifterbant (Lanting and Van der Plicht, 1999–2000: p.32). In this study no position will be taken, although the assemblage will be referred to as early Funnel Beaker.

2012: p.83-84). The bases of the vessels either have a knob, pointed, round or flat shape (Ten Anscher, 2012: p.84). Decoration consists of nail imprints, round imprints, perforations, *tiefstich*, other imprints, grooved lines and roughening of the wall (Ten Anscher, 2012: p.85). Most patterns are, however, rather simple and consists of one linear motif: a single row of imprints on the inside or outside of the rim or on the pot shoulder (Ten Anscher, 2012: p.85). A rather high number of sherds yielded charred residues (Ten Anscher, 2012: p.101). There is no clear correlation between thickness of the wall and the occurrence of residues (Ten Anscher, 2012: p.101). Perforations, presumably made post-firing, are often observed on sherds with residues (Ten Anscher, 2012: p.101).

At P14, a smaller assemblage dates to the younger Funnel Beaker period. In comparison with the early Funnel Beaker ceramics, these younger ceramics are more likely to be thin-walled, with an average thickness between 5 and 8 mm, and are most often tempered with just granite (c. 85%, Ten Anscher, 2012: p.163). The walls are often polished (Ten Anscher, 2012: p.163). The firing techniques and the colours of the vessels are not described in the site report. A wide range of shapes has been found, including the funnel beaker, bucket, jar, bowl, plate, terrine, amphora, shoulder-pot, baking plate and collared flask (Ten Anscher, 2012: p.155-159, table 7.1). The decoration is often applied with a spatula, either in straight lines, in *tiefstich* lines or in *tvaerstik* lines (Ten Anscher, 2012: p.155-159, fig. 7.4). The motifs are diverse and show vertical fringes, horizontal and vertical lines, and zigzags—as well as more complex patterns in which the decoration is organised in blocks (Ten Anscher, 2012: p.155-159, fig. 7.4).

At the settlement of Beekhuizerzand, quartz was used most often as the tempering agent for Funnel Beaker sherds (Modderman *et al.*, 1976: p.47). Many sherds additionally contain sand and some also contain organic tempering (Modderman *et al.*, 1976: p.47). The walls are often polished (Modderman *et al.*, 1976: p.47). Shoulder-pots and amphora are the most common vessel shapes (Modderman *et al.*, 1976: p.49). These vessels often have strap handles, applied with a plug, or knobs (Modderman *et al.*, 1976: p.49). Other shapes include funnel beakers, bowls, baking plates and a collared flask (Modderman *et al.*, 1976: p.49-51). The decoration consists of perforations and impressions under the rim and spatula and *tiefstich* decoration in different motifs: horizontal and vertical lines and zigzags in zones or blocks filled with the same or different patterns (Modderman *et al.*, 1976: p.51-53). Remarkable about the Beekhuizerzand assemblage is the high percentage of undecorated ceramics (Lanting and Van der Plicht, 1999–2000: p.66). Over 80% of the ceramics are undecorated; however, part of this group presumably dates to the Late Bronze Age (Modderman *et al.*, 1976: p.47). The Funnel Beaker assemblage has been dated to the early Havelte phase of the Funnel Beaker period (E2, Modderman *et al.*, 1976: p.45).

At Hazerswoude, just five Funnel Beaker sherds have been found (Drenth, 2010: p.109). These include three sherds from one necked bowl dated by Drenth (2010: p.109) to the latest phase of the Funnel Beaker period, horizon 7. The bowl was decorated on the shoulder with blocks filled with four horizontal lines consisting of small, round imprints (Drenth, 2010: p.123). Diatom analysis showed that this bowl was likely produced locally (Drenth, 2010: p.123). Another Funnel Beaker sherd belongs to a second necked bowl, dating to the same horizon (Drenth, 2010: p.109). This bowl was decorated as well: two horizontal lines of irregular rectangular imprints were placed at the shoulder (Drenth, 2010: p.123). The remaining Funnel Beaker sherd at Hazerswoude was decorated with a zigzag pattern and has been dated by Drenth (2010: p.109) to one of the early phases of the Funnel Beaker period, horizon 2-4. All Funnel Beaker sherds contain both

quartz and sand as temper (Drenth, 2010: appendix 14). The Vlaardingen and Corded Ware ceramics found at Hazerswoude will be described in section 3.2.4.

3.2.3 Vlaardingen sites and ceramics

Vlaardingen settlements are found directly to the south of the tidal area in which the Corded Ware settlements discussed in this study are located. These Vlaardingen settlements are found in the coastal zone in the rivers area as well as on the edges of the sandy area (Van Gijn and Bakker, 2005: p.293). Four types of sites have been recognised (Raemaekers, 2003: p.744-745, Van Gijn and Bakker, 2005: p.293, Amkreutz, 2013: p.398). The first group is located on coastal dunes, beach barriers and river delta levees. Haamstede-Brabers, Leidschendam and Voorschoten-Boschgeest belong to this group (Raemaekers, 2003: p.744, Van Gijn and Bakker, 2005: p.293). These sites have been interpreted as settlements that were inhabited year-round and where crop cultivation and livestock were important (Raemaekers, 2003: p.744, Van Gijn and Bakker, 2005: p.293). The second group comprises the sites of Vlaardingen and Hekelingen, both of which are located on levees (Raemaekers, 2003: p.744). These sites were presumably only inhabited during specific seasons and for specific activities (Raemaekers, 2003: p.744, Van Gijn and Bakker, 2005: p.293). The third group of sites, exemplified by Hazendonk, is found on river dunes (Raemaekers, 2003: p.745). Hazendonk has been interpreted as a hunting camp (Raemaekers, 2003: p.745, Van Gijn and Bakker, 2005: p.293). The last site, Ewijk, is located on a levee in the central rivers area (Van Gijn and Bakker, 2005: p.293).¹⁸

Currently, different classifications for Vlaardingen period ceramics and different chronological subdivisions of the Vlaardingen period are in use. In the oldest classification system, the Vlaardingen culture is subdivided into two main and five sub-phases on the basis of their ceramics (Glasbergen *et al.*, 1967, Louwe Kooijmans, 1976, Lanting and Van der Plicht, 1999–2000). The earliest of the two main phases is VL1: the classical phase characterised by S-shaped vessels with a bulging body that are quartz-tempered and often decorated with knobs, perforations and pits under the rim and less often with lines (Glasbergen *et al.*, 1967: p.10, 26). This VL1 phase is followed by a more recent phase, VL2 (Glasbergen *et al.*, 1967: p.10, 26). During the VL2 phase the vessels are undecorated and more pear-shaped, and the temper consists of sand and grog and sometimes quartz. VL1 was later subdivided into VL1a, b and c (Louwe Kooijmans, 1976, Lanting and Van der Plicht, 1999–2000). VL1a consists of only two vessels from the Hazendonk that are seen as the oldest Vlaardingen vessels (Louwe Kooijmans, 1976). The subdivisions VL1b and 1c were created to distinguish between the high S- or bucket-shaped vessels with perforations and impressions under the rim found at the Hazendonk (VL1b) and the vessels with a more rounded belly and less perforations and impressions under the rim found at the sites of Vlaardingen and Voorschoten-Boschgeest (VL1c) (Lanting and Van der Plicht 1999–2000). Glasbergen (*et al.* 1967: p.26) subdivided the youngest Vlaardingen phase, 2b, into two phases: VL2a, without Corded Ware ceramics, and VL2b, with Corded Ware material. The Vlaardingen ceramics in both sub-phases are the same (Lanting and Van der Plicht, 1999–2000: p.33). Corded Ware sherds have been found on the Vlaardingen sites of Voorschoten-Boschgeest, Leidschendam, Hazendonk, Waardhuizen-Almkerk, Vlaardingen and Hekelingen I.

18 In the Dutch provinces of Limburg and Noord-Brabant, remains of the so-called Stein group have been discovered. The ceramics of this group are very similar to the ceramics from the Vlaardingen sites (Beckerman and Raemaekers, 2009: p.17).

Beckerman and Raemaekers (2009: p.65) criticized these traditional classifications for the fact that the definitions used for different pot types are not clearly defined. Furthermore, some phases are defined on the basis of changes in the ceramics, whereas other phases are based merely on differences in the absolute dates. A different approach using vessel morphology was therefore presented (Beckerman and Raemaekers, 2009). Based on a metrical analysis, they distinguished five shapes, and by combining these shapes with the ^{14}C dates related to these shapes, they divided the Vlaardingen period into three sub-periods (figure 3.3, Beckerman and Raemaekers, 2009: p.18-19): an early phase comprising the compact S-shaped vessel group A from the Hazendonk; a middle phase comprising S-shaped vessel types A, B and C as well as the more elongated vessel type D; and a late phase consisting exclusively of vessels with an elongated S-shape (types D and E) (Beckerman and Raemaekers, 2009: p.18-19).

In this study the morphological shape groups A–E defined by Beckerman and Raemaekers (2009) will be used to describe the Vlaardingen morphology (figure 3.2). Impressions and perforations in rows under the rim and on the wall, as well as knobs, are considered to be typical Vlaardingen decoration. Descriptions of changes in the technological characteristics over time of Vlaardingen ceramics are sparse. The description by Glasbergen *et al.* (1967, p.10, 26) will be used. They state that the tempering changes from exclusively quartz to exclusively grog. The amount of thin-walled ware, according to Glasbergen *et al.* (1967: p.11, table 1), increases slightly over time. In addition to the shape definitions, the current study will also use the phases of Beckerman and Raemaekers (2009: p.73). These are (1) a early phase with group A vessels; (2) a middle phase with group A, B and C vessels with a pronounced S-shape and group D vessels with an elongated shape; and (3) a late phase with group D and E vessels, both with an elongated shape (Beckerman and Raemaekers, 2009: p.73). During the late Vlaardingen phase Corded Ware ceramics—including decorated beakers of the Van der Waals and Glasbergen (1955) types as well as short wave moulded vessels—are found on various settlements as well.

Four sites, Voorschoten-Boschgeest, Leidschendam, Westbroek vindplaats 3 (*tr.* location 3) and Hazendonk, will mainly be used for comparison (Glasbergen *et al.*, 1967, Arnoldussen, 2005, Ten Anscher and Bosman, 2010, Louwe Kooijmans, 1976, Beckerman and Raemaekers, 2009). These are not necessarily the sites most comparable to the Corded Ware settlements, but they have the advantage of having most detailed publications, featuring drawings of the ceramics and/or stratigraphy and ^{14}C dates.

The settlement of Hazendonk, located on a dune in the rivers area, is very important because material was collected from different find layers separated by sterile peat deposits that were ^{14}C dated (Louwe Kooijmans, 1976: p.230). The lowest Vlaardingen layer contained two vessels of Beckerman and Raemaekers (2009: p.11) shape A, a shape that also occurs in younger contexts. The Vlaardingen material from this lowest layer is most often tempered with stone grit, but grog and organic temper occur as well (Raemaekers, 1999: p.171). The middle layers yielded vessels with a compact shape of groups A, B and C and vessels with an elongated shape of group D (Beckerman and Raemaekers, 2009: p.11). According to Louwe Kooijmans (1976: p.286) these vessels are most often grog-tempered. Raemaekers (1999: p.171), on the contrary, states that stone grit and organic material are most often used as tempering agents and that grog temper is uncommon. Vessels were decorated with a row of perforations under the rim, and knob ears are uncommon (Louwe Kooijmans, 1976: p.280, Raemaekers, 1999: 171, 174). In the middle layer two sherds were found that had been decorated with irregular *Tiefstich* in chevron motifs (Louwe Kooijmans, 1976: p.280). The

top-most layer with Hazendonk material contained vessels with elongated profiles, shapes D and E (Beckerman and Raemaekers, 2009: p.11). In addition to these Vlaardingen vessels, this layer also contained decorated Corded Ware ceramics of types 1d and 1a or 2IIb (Van der Waals and Glasbergen, 1955: p.8-9, 11-12, 28-30, Louwe Kooijmans, 1976: fig. 24). The number of Corded Ware decorated sherds is unknown.

The site of Voorschoten-Boschgeest was also excavated in different layers. Beckerman and Raemaekers included 11 vessels from this site in their analysis; 5 of these had accompanying stratigraphic information. In the lowest layer, layer 10, a vessel with a compact shape of group B was found (Beckerman and Raemaekers, 2009: fig. 14). In the middle layers, 7–9, one vessel with a pronounced S-shape and one vessel with an elongated profile of group D were found (Beckerman and Raemaekers, 2009: fig. 15, 16). In the upper layers, 2–5, two more vessels with an elongated profile of group D were found (Beckerman and Raemaekers, 2009: fig. 16). The six vessels for which the stratigraphic location is not known are of shape groups A, B, C and E (two vessels). A final vessel did not fit in with any of the groups. In the upper layers, Corded Ware sherds were found as well (Glasbergen *et al.*, 1967: p.26). This Corded Ware material can be compared to Van der Waals and Glasbergen (1955) Protruding Foot Beaker types 1a, 1b, 1d, All Over Ornamented type 2IIb. Vessels with fingertip or fingernail imprints and short wave moulded vessels were also found (Glasbergen *et al.*, 1967: p.16-18, fig.11, 13, 14, 16-18) (table 3.1). Unfortunately only photos of the Corded Ware material are presented in the report. Because drawings are lacking it is impossible to compare the morphological characteristics with equal validity.

The site of Leidschendam was interpreted as a Vlaardingen site inhabited for a shorter period of time (Glasbergen *et al.*, 1967: p.112). At this site two vessels were found that fit within one of the shape groups of Beckerman and Raemaekers (2009): one vessel with a pronounced S-shape fits with group C, and one vessel with an elongated profile fits with group D. Both quartz-tempered and grog-tempered vessels were found (Glasbergen *et al.*, 1967: p.106-109). Corded Ware ceramics were present as well. The Corded Ware assemblage consists of vessels with fingertip impressions as well as vessels comparable to Van der Waals and Glasbergen (1955) beaker types 1a–1e and the zigzag type (Glasbergen *et al.*, 1967: p.106-109, table 3.1). Again only photos are presented (Glasbergen *et al.*, 1967: fig. 29 and 30), no drawings.

New research at Leidschendam (Prinsenhof) yielded a small group of sherds, of which 97 were suitable for analysis (Arnoldussen, 2005: p.21). The most common thicknesses of these sherds is between 10 and 14 mm (Arnoldussen, 2005: p.21). A mixture of grog, quartz and sand is the most common tempering, followed by a mixture of grog and sand and just grog (Arnoldussen, 2005: table 4). Morphological characteristics are almost completely absent. One sherd presumably stems from a tripartite vessel; another sherd was likely part of a protruding foot (Arnoldussen, 2005: p.23). The ceramics from Leidschendam (Prinsenhof) are dated to the middle or late part of the Vlaardingen period (Arnoldussen, 2005: p.24).

Westbroek vindplaats 3 (also referred to as Velsbroek) is located on the northeastern-most part of the beach barrier of Haarlem (Ten Anscher and Bosman, 2010: p.173). This site yielded only 35 sherds, but it is nevertheless very interesting because it is located in the area in between the areas traditionally seen as being part of the Vlaardingen and Corded Ware culture zones. According to Ten Anscher and Bosman (2010: p.175), on this site both Vlaardingen and Corded

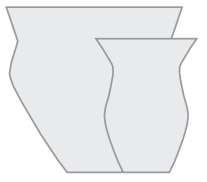
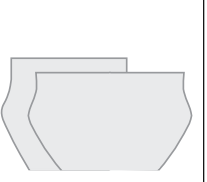
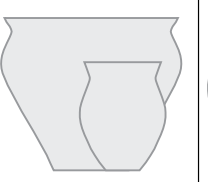
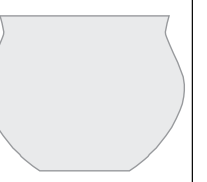
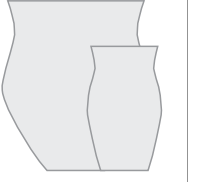
					
Shape	A	B	C	D	E
Number of vessels	4	6	23	6	4
Rim diameter [^]	Under 14.5 cm=f (0 vessels), Over 14.5=A (4 vessels)	Under 14.5 cm=b (2 vessels), Over 14.5=B (4 vessels)	Under 14.5 cm=c (10 vessels), Over 14.5=C (13 vessels)	x	Under 14.5 cm=e (0 vessels), Over 14.5=E (4 vessels)
Rim height	3.5-5.8 (4.1-5.0)	0-3.5 (0-1.8)	1.2-3.5 (1.2-3.3)	1.2-3.5 (2.4-3.3)	3.5-5.8 (3.6-4.9)
Rim angle	1.1-2.0 (1.1-1.7)	0 (0)	0.1-1.0 (0.1-1.0)	0.1-1.0 (0.3-1.0)	0.1-1.0 (0.6-0.9)
Shoulder height	2.5-8.4 (3.0-6.0)	0-5.5 (2.7-4.7)	0-5.5 (1.0-5.4)*	over 5.5 (6.6-11.4)	5.5-8.4 (5.6-8.3)
Shoulder angle	0.4-2.2 (0.6-1.8)	0.4-2.2 (1.0-2.0)	0-2.2 (0.3-1.8)	over 2.3 (2.7-3.6)	0.4-3.1 (1.4-3.0)
Decoration	Perforations under the rim (3), undecorated (1)	Perforations under the rim (2), undecorated (1)	Perforations under the rim (7), perforations in the wall (1), Perforations under the rim and in the wall (1), knob ear (2), undecorated (2)	Perforations under the rim (2), perforations under the rim and knob ear (2), undecorated (2)	Perforations in the wall (1), undecorated (3)
Sites	Hazendonk and Voorschoten-Boschgeest	Hazendonk, Voorschoten-Boschgeest, Haamstede-Brabers and Vlaardingen	Hazendonk, Voorschoten-Boschgeest, Hekelingen I, Leidschendam, Haamstede-Brabers, Halve Mijl, Vlaardingen	Hazendonk, Voorschoten-Boschgeest, Leidschendam	Hazendonk, Voorschoten-Boschgeest, Heerjansdam
Phase	A: Early and middle, f: late	Middle	Middle	Middle and late	Late

Figure 3.2 Vlaardingen vessel shapes (after: Beckerman and Raemaekers, 2009).

Ware Culture material was found (Ten Anscher and Bosman, 2010: p.175).¹⁹ Of the two depicted vessels that are complete down to the largest circumference, a vessel with a knob is of group D, and a vessel with perforations under the rim fits with group B (Ten Anscher and Bosman, 2010: fig. 3.2.2 and 3.2.3, Beckerman and Raemaekers, 2009). The Corded Ware sherds include Van der Waals and Glasbergen (1955) types 1b and possibly 1d and 1e, as well as three smitten sherds (Ten Anscher and Bosman, 2010: p.177-178). According to Ten Anscher and Bosman (2010: p.176, 178-179) the Vlaardingen sherds are granite-and sometimes quartz-tempered, whereas the Corded Ware sherds are grog-tempered. Ten Anscher and Bosman (2010: p.178-179) postulate that the finds stem from two different periods: during V11b or V11c the site was presumably inhabited briefly or just visited, during the Corded Ware period the site was inhabited for a short period and used to hunt and practice agriculture.

19 The ceramics from Westbroek vindplaats 3 have, unfortunately, gone missing (Ten Anscher and Bosman, 2010: p.175).

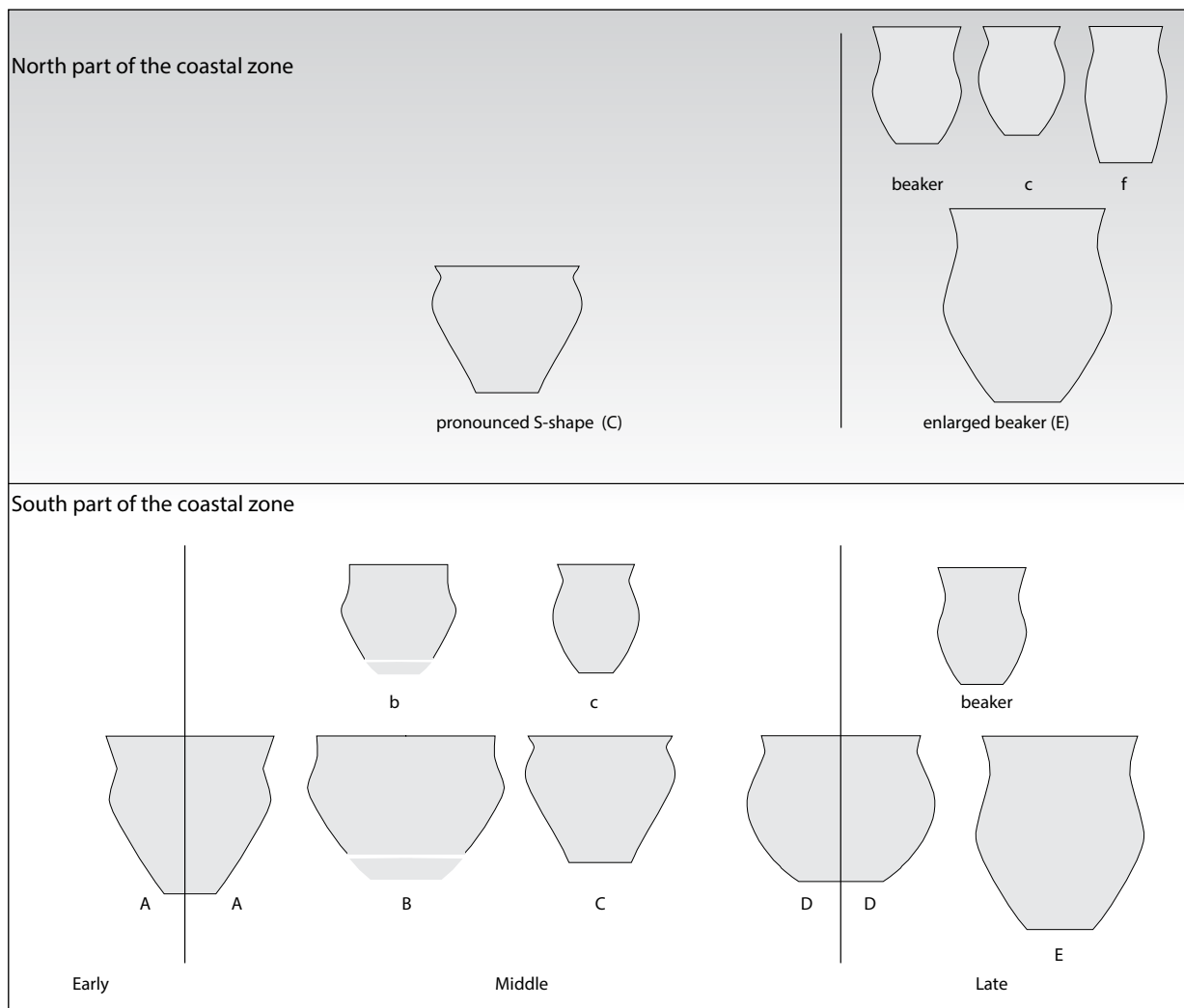


Figure 3.3 Vessel shapes by phase at Corded Ware and Vlaardingeng Culture settlements.

3.2.4 Other Corded Ware sites and ceramics in the Netherlands

Corded Ware sites are found in large parts of the Netherlands. Settlements are mainly found in the Holocene clay soils in the western part of the Netherlands, whereas funerary sites are mainly found on the Pleistocene sandy soils in the eastern part of the Netherlands (Drenth, 2005: p.336, Drenth *et al.*, 2008: p.150-151). Both types of sites will be used for comparison.

Beakers, decorated with either cord or spatula impressions in different patterns and with different lengths of decoration (half ornamented and All Over Ornamented) are seen as typical Corded Ware ceramics (Van der Waals and Glasbergen, 1955). Beakers are found in both funerary and settlement contexts. Corded Ware settlements are said to yield few beakers and more so-called 'settlements ceramics', (including short wave moulded vessels, proto pot-beakers, beaker pots, amphora, *dosen* and bowls with feet) (Lanting and Van der Waals, 1976: p.71, Floore, 1991: p.55, Drenth, 2005: p.338, Ten Anscher, 2012: p.179-181). Floore (1991: p.55) claims that the short wave moulded vessel is the typical domestic ware. His catalogue, however, contradicts this. It lists 51 find locations: 20 are graves (15 non-megalithic graves, 5 megalithic graves) and 9 are settlements. For the other 22 locations, which consist mainly of surface finds, the type of site is

unknown.²⁰ The short wave moulded type is found in all parts of the Netherlands except for the southern part. According to Floore (1991: p.55), the number of short wave moulded vessels decreases in the later phase in favour of vessels with fingertip imprints. Drenth and Lanting (1991: p.42-43, 46), however, postulate that this type was present in all phases of the Corded Ware culture. In addition to short wave moulded vessels, other large vessels have also been found in funerary contexts, namely, amphora (at Beilen and Zeijen Jodenbergje) or beakers of types 1b, 1d, 1e, zigzag and 2IIb that are larger than ordinary beakers—for example, type 1b at Oosterwolde Klazinga; type 1d at Eext Galgwanderveen Vindplaats 3; type 1e at Eext Galgwanderveen Vindplats 1; zigzag at Eext Visplas; and 2IIb at De Hamert (table 3.2).

A precise working definition of Corded Ware ceramics needs to be chosen to compare different assemblages and to determine to which extent the assemblages from Noord-Holland are comparable with other assemblages. This definition of typical Corded Ware ceramics should include thin-walled beakers and different thick-walled vessel types from both settlement and funerary contexts.

Based on the older definitions outlined above, we would expect more thick-walled vessels at settlements and more beakers in funerary contexts (Lanting and Van der Waals, 1976: p.71, Floore, 1991: p.55, Drenth, 2005: p.338, Ten Anscher, 2012: p.179-181). The beaker types and their decoration as described by Van der Waals and Glasbergen (1955, with later additions of Lanting, Mook and Van der Waals, 1973, and Sier, 2001: p.397) are here considered typical thin-walled Corded Ware ceramics. These include types of half ornamented (1a–1e) and All Over Ornamented (2IIa–2IIb) beakers with cord and spatula impressions in horizontal rows, zigzags, herringbone, oblique spatula imprints in one direction or more complex patterns combining these elements. Additionally, short wave moulded pots, amphorae, and large beaker pot-beakers or beaker-pots are here considered to be typical thick-walled Corded Ware vessel types (Lanting and Van der Waals, 1976: p.71, Floore, 1991: p.55, Drenth, 2005: p.338, Ten Anscher, 2012: p.179-181). These are decorated with either wavy or straight plastic ridges, with fingertip or fingernail imprints, or with spatula impression in motifs also found on beakers, or as vertical bundles (Drenth, 2005: p.338). *Dosen* and bowls are also characteristic of the Corded Ware period (Drenth, 2005: p.338). Little is known about the technology of Corded Ware ceramics outside the coastal zone. At P14, the proportion of thin-walled ware increases over time (Ten Anscher, 2012: p.181-183). The tempering agents most frequently used differ between sites; at P14, sand and granite were used most often (Ten Anscher, 2012: p.182-183), whereas at Hazerswoude, quartz and to a lesser extent grog tempering is most common (Drenth, 2010: appendix 14).

The Corded Ware finds from two settlement sites are of particular relevance to the current comparison: P14 and Hazerswoude. The Corded Ware material from P14 consists of both fine and a coarse ware (Ten Anscher, 2012: p.165-188) (table 3.2). Because the sherds are small, profiles could be reconstructed for only one 1d beaker and one undecorated beaker with a straight wall (Ten Anscher, 2012: fig.8.4). Ten Anscher (2012: p.169-175) argues that, all different Van der Waals and Glasbergen (1955) types of beakers are present in the collection (1a–1f, 2IIa–2IIb and Bell Beaker type 2Ia). Furthermore, short wave moulded vessels, vessels decorated with fingertip imprints and beaker pots were found as well (Ten Anscher, 2012: p.179-181). The vessels are said to become more thin-walled over

20 Settlements: Bornwird, Steenendam, Bronneger, Schokland P14, Zandwerven, Aartswoud, Leidschendam and Voorschoten. Graves: Zeijen, Noordsche veld, Eext, Nieuw-Roden, Kruidhaarsveld, Eeserveld, Emmerhout, Buinen, Emmen, Exloo de Paasberg, Odoorn, Putten, Vassen, Ginkelse Heide Hazepad. Megalithic graves: Havelte, Buinen, Drouwen and Emmen.

time (Ten Anscher, 2012: p.182). The tempering consists most often of sand, followed by granite, yet grog and quartz tempering occurs as well (Ten Anscher, 2012: p.182, fig. 8.11).

Hazerswoude is located on the bank of the old River Rhine to the south of the settlements in Noord-Holland. The ceramic assemblage found at Hazerswoude, located in the southern part of the coastal zone, is said to contain Vlaardingen and Corded Ware ceramics, as well as several Funnel Beaker sherds (described above, section 3.2.2, Drenth, 2010: p.109). The ceramics from Hazerswoude are rather fragmented and vessels could not be reconstructed (Drenth, 2010). According to Drenth (2010: p.109-110) the ceramics stem from multiple phases. Drenth (2010: p.109-110) dates the Vlaardingen material to the classical Vlaardingen phase and the Corded Ware material to the youngest Corded Ware phase—phase 4 or possibly phase 3 (Drenth, 2010: p.109). Van der Waals and Glasbergen (1955) types 1a, 1b, 1c, 1e, zigzag beakers, types 2IIa, 2IIb and possibly type 1d were identified (Drenth, 2010: p.135-137). Furthermore, short wave moulded vessels, a sherd of an amphora and sherds with cordons have been found (Drenth, 2010: p.137-138). All sherds are mainly quartz- and, to a lesser extent, grog-tempered (Drenth, 2010: appendix 14).

Drawings are available for four of the beakers deriving from settlement contexts; for three of these a ^{14}C date is available as well (table 3.2). These four vessels are thus well suited for a comparison to the Corded Ware ceramics from Noord-Holland. A total of 78 Corded Ware vessels from funerary contexts were used for comparison (table 3.2). For 16 of these vessels, both a ^{14}C date and a drawing are available.

3.3 Variability in the ceramics

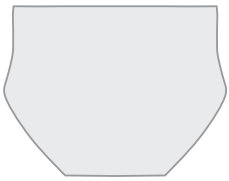
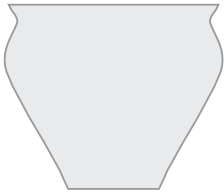


3.3.1 Comparing the morphological characteristics

3.3.1.1 Introduction

The seven different sites studied provided 22 vessels that can be reconstructed down to the largest circumference. Of an additional 32 vessels, the profile can be reconstructed down to the smallest circumference (table 2.5 and 2.6). Four main shapes have been identified: (1) vessels with an high upright or inward-sloping neck, (2) medium to large vessels with an pronounced S-shape, (3) medium to large vessels with an enlarged beaker shape and (4) beakers. There are clear differences in the morphological characteristics of the ceramics found on the different sites (table 2.1). Vessels with different forms were found as well; these include very small beakers and extremely large vessels (see 3.2.1.5). Several vessel types typical for the Corded Ware Culture, such as amphora, *dosen* and bowls (with feet, Drenth, 2005: p.338) were not found. Short wave moulded vessels are considered to be typical domestic pottery (Lanting and Van der Waals, 1976: p.71, Floore, 1991: p.55), yet these were only found at Aartswoud and Zandwerven (see section 2.3).

3.3.1.2 High upright or inward-sloping neck

At the site of Slootdorp-Bouwlust one type of vessel occurs frequently that is not present on any of the other sites (table 2.1). These vessels have a very high upright or slightly inward-sloping neck, and the transition to the largest circumference forms a sharp angle (figure 2.4). On or just above the greatest circumference vertical strap handles have often been applied, by means of a plug. Decoration

				
Shape	Vessels with a high upright or inward bending neck	Medium to large vessels with an pronounced S-shape	Medium to large vessels with an enlarged beaker shape	Beakers
Number of vessels	4	1 (+2)	4 (+5)	all 10 (+17), group c 5(+12), group f 1(+2)
Rim diameter	17-28	15-22	15-22	8-14.5
Rim height	4-5.4	1.2-3.3	3.5-5.8	1.9-8.4
Rim angle	-0.2-0.6	0.5-1.0	0.6-1.0	0.2-1.2
Shoulder height	3.2-6.1	1	7.4-8.4	1.9-8.4
Shoulder angle	0.6-1.0	3.8	1.3-2.0	0.7-2.1
Decoration	Strap handles, perforations or round imprints under the rim, irregular spatula imprints	Row of perforations under the rim	Nailimprints on top of the rim (one)	Spatula and cord imprints. Glasbergen and Van der Waals Protruding Foot and All Over Ornamented types
Sites	Slootdorp-Bouwlust	Zandwerven	Zeewijk-west southern part, Zeewijk-oost, Keinsmerbrug and Aartswoud	Zeewijk-west southern part, Zeewijk-oost, Keinsmerbrug, Zandwerven and Aartswoud
Phase	Funnel Beaker	Vlaardingens (middle)	Corded Ware	Corded Ware

consists of single horizontal rows of perforations or round imprints underneath the rim. On one vessel (vessel C) just above the accentuated transition, an irregular horizontal row of rectangular spatula imprints has been applied. Four specimens could be reconstructed down to the largest circumference (table 2.5, figure 3.4).

The early Funnel Beaker Culture assemblage at P14 comprises vessels with a biconical shape with a long, inward-sloping rim or a more upright rim (Ten Anscher, 2012: p.52-79, 667-668, fig. 5.1, 5.16). The shoulder-pots from Beekhuizerzand also have a profile comparable to those from Slootdorp-Bouwlust (Modderman *et al.*, 1976: Fig. 3, 8-10). The profile of vessel 45 from Slootdorp-Bouwlust, which has a 6.5 cm high neck and is carinated at the largest circumference, however, seems unparalleled.

The handles found for this vessel type at Slootdorp-Bouwlust would have been applied with a plug. The Funnel Beaker assemblages from both P14 and Beekhuizerzand yielded plugs (Modderman *et al.*, 1976: p.51, fig. 8-9, Ten Anscher, 2012: p.159), but the early Funnel Beaker assemblage at P14 did not (Ten Anscher, 2012).

3.3.1.3 Pronounced S-shape

Medium to large vessel with a pronounced S-shape were only found on the site of Zandwerven (figure 2.10, Figure 3.4). The one vessel for which the profile could be reconstructed (vessel 44) belongs to this type; two vessels (vessels 1 and 21)

Figure 3.4 Comparator sites ceramic vessel shapes.

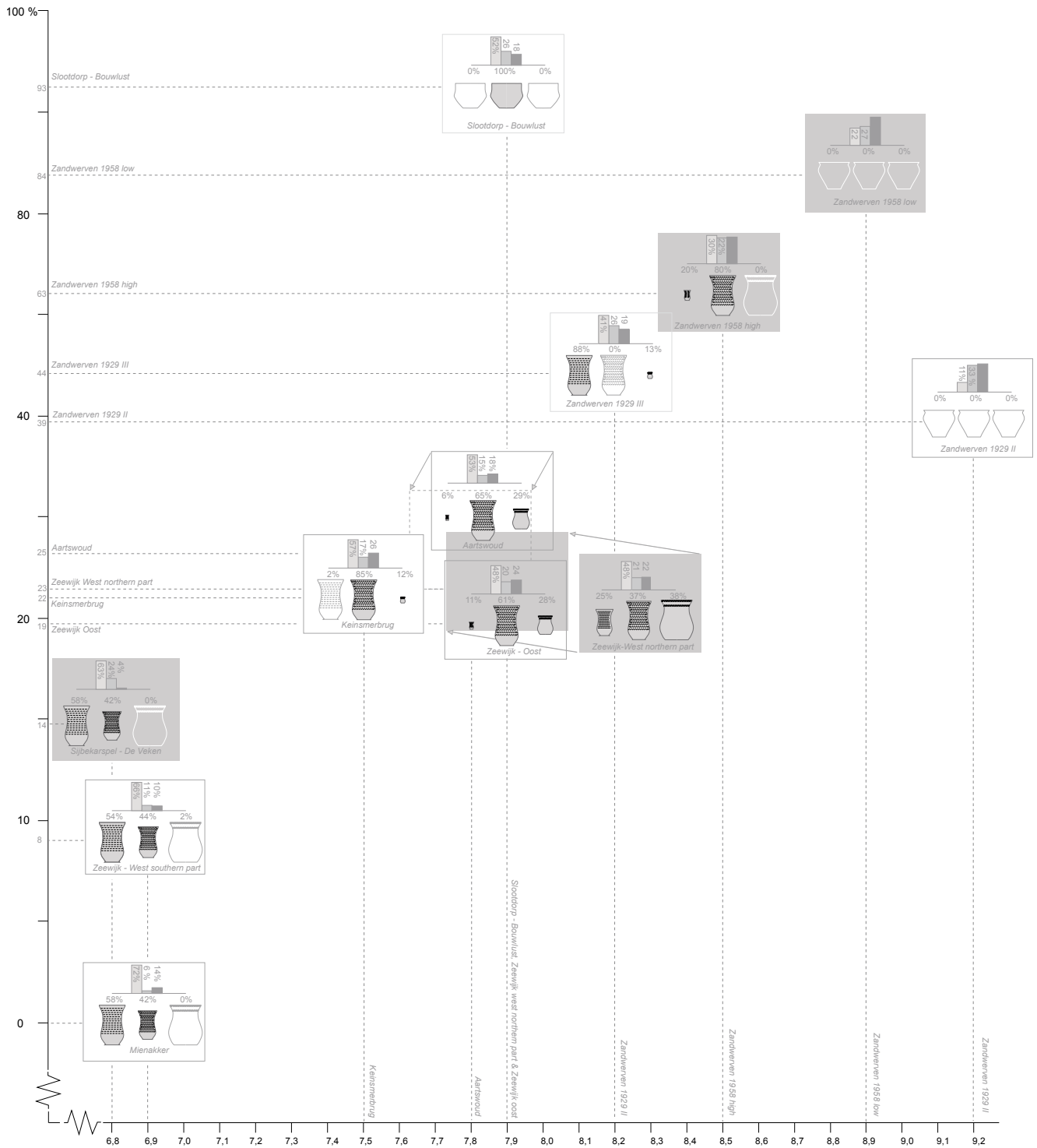


Figure 3.5 Comparison of the ceramics from the study sites and the comparator sites. (y-axis percentage of stone grit tempering, x-axis average thickness, vessels from left to right: cord decorated, spatula-decorated and fingertip-decorated, bar graphs: % of sherds in different thickness classes).

that are complete down to the smallest circumference probably had a comparable profile. Vessel 44 originates from the lowest layer of the 1958 excavation and has a row of perforations under the rim. The context of the other, undecorated, vessels is unknown.

Type or characteristic	Settlement										Literature						
	Zandwerven bottom	Zandwerven top	Zeewijk-west northern part	Zeewijk-oost	Aartswoud	Keinsmerbrug	Zeewijk-west southern part	Mienakker	Sijbekarspel-De Veken	Voorschoten-Boschgeest late (Glasbergen et al. 1967)		Leidschendam (Glasbergen et al. 1967)	Westbroek vindplaats 3 (Ten Anscher and Bosman, 2010)	Hazendonk late (Louwe Kooijmans, 1974, 1976)	Hazerswoude (Drenth, 2010)	P14 (Corded Ware material) (ten Anscher, 2012)	Phase
Vessels, special walls, bases	7, 1, 0	9, 7, 5	74, 44, 9	61, 40, 17	43, 39, 27	19, 8, 6	58 (17), 66, 32	31, 26, 9	6, 5, 3	exact numbers unknown	exact numbers unknown	35 sherds, 20 Vlaardingen, 15 Corded Ware	exact numbers unknown	?	?	More common in late phase	Floore, 1991: p.55
Fingertip impressions	x	x	8+9	6+10	9+11	2+1	2+5	x	x	?	?	x	?	?	?	Less common in late phase, or present in all phases.	Floore, 1991: p.55, Drenth and Lanting, 1991: p.46
Short wave moulded vessels	x	0+1	x	x	2+0	x	x	x	x	?	?	x	?	?	?	Only corded-oldest PFB, long lifespan possibly 1, or phase 2-4 and Middle PFB?, or phase 3 and 4	Lanting and Van der Waals, 1976: p.5-9, Drenth and Lanting, 1991: p.42-43
1a	x	1+0	?	?	0+1	?	1+0	?	x	?	?	x	?	?	?	Middle PFB?, or phase 2-4 and possibly 1, or phase 3 and 4	Lanting and Van der Waals, 1976: p.5-9, Drenth and Lanting, 1991: p.42-43
1b	x	0+2	x	x	1+2	x	x	x	x	?	?	x	?	?	?	Middle PFB?, or phase 3 and 4	Lanting and Van der Waals, 1976: p.5-9, Drenth and Lanting, 1991: p.42-43
1c	x	x	x	x	x	x	x	x	x	?	?	x	?	?	?	Middle PFB?, or phase 3 and 4	Lanting and Van der Waals, 1976: p.5-9, Drenth and Lanting, 1991: p.42-43
1d	x	1+2	1+5	1+4	11+11	4+0	4+4	0+1	x	?	?	?	?	?	?	Middle PFB?, or phase 3 and 4	Lanting and Van der Waals, 1976: p.5-9, Drenth and Lanting, 1991: p.42-43
ZigZag	x	x	5+1	3+3	5+4	1+5	3+4	1+0	x	?	?	x	?	?	?	Young PFB (related to 1d and 1e) or phase 4.	Lanting and Van der Waals, 1976: p.5-9, Drenth and Lanting, 1991: p.42-43
1e*	x	x	8+5	5+11	1+5	2+0	5+9	0+3	x	?	?	?	?	?	?	Youngest PFB, or phase 3 and 4	Lanting and Van der Waals, 1976: p.5-9, or phase 3 and 4
1a/21lb	x	2+0	4+11	1+5	1+2	1+0	11+28	8+4	0+3	?	?	?	?	?	?	Whole PFB/Old AOO	Lanting and Van der Waals, 1976: p.6.
21b	x	x	0+1	?	?	?	1+0	2+1	x	?	?	?	?	?	?	Oldest AOO	Lanting and Van der Waals, 1976: p.6.
21c/21e**	x	x	?	?	?	?	?	?	?	?	?	?	?	?	?	Oldest AOO	Sier, 2001: p.397.
21d	x	0+1?	0+1	0+2?	x	x	1	x	x	?	?	?	?	?	?	Between 21b+21c and 21a	Lanting and Van der Waals, 1976: p.6
21f	x	x	x	x	x	x	1^	x	x	?	?	?	?	?	?	Young AOO	Sier, 2001: p.397.
21b	x	x	x	x	x	x	x	x	0+1	?	?	?	?	?	?	Youngest AOO	Lanting and Van der Waals, 1976: p.6.
21a	x	x	x	x	x	x	x	x	1+1	?	?	?	?	?	?	Youngest AOO	Lanting and Van der Waals, 1976: p.6.
Protuding foot	x	1	3	x	2	x	2	x	x	x	?	?	?	?	?	Old	Lanting and Van der Waals, 1976: p.5-9.
Zoned decoration	x	4	6	17	25	6	30	8	3	?	?	?	?	?	?	Young	Lanting and Van der Waals, 1976: p.5-9.
Flat or hollow base	x	x	x	1	x	1	5	6	x	?	?	?	?	?	?	Young	Lanting and Van der Waals, 1976: p.6.
Decoration inside of the rim	x	x	x	x	x	x	x	x	x	?	?	?	?	?	?	Young	Lanting and Van der Waals, 1976: p.6.
Vlaardingen group C	1	x	x	1	3+3	x	x	x	1+0	?	?	?	?	?	?	Drenth and Hogestijn, 2006: p.79.	Drenth and Hogestijn, 2006: p.79.
Vlaardingen group D	x	x	x	x	x	x	x	x	x	x	x	1 between C and D	?	?	?	Middle Vlaardingen	Beckerman and Raemaekers, 2009: p.73
Vlaardingen group E	x	x	x	x	x	x	x	x	x	x	x	x	?	?	?	Middle and Late Vlaardingen	Beckerman and Raemaekers, 2009: p.73
Precursor to Velluwe shape	x	x	x	x	x	x	1	x	x	?	?	x	?	?	?	Late Vlaardingen	Beckerman and Raemaekers, 2009: p.73

Most present decorated vessel on site
Second most present decorated vessel on site
Third most present decorated vessel on site
Present
x=Not present
?=Unknown

* Often just one row of oblique impressions, can thus also be other types including 1b and 21c
 ^ one sherd is found in the northern part of Zeewijk-west, 62 sherds are found in the southern part of Zeewijk-west
 ^^ no clear examples of this type are found. (some of) the (small) sherds with oblique impressions can be of this type
 PFB: Protuding Foot Beaker, AOO: All Over Ornamented

Table 3.1 Site typochronology.

Site	Context	Shape	Characteristics	Rim diameter	Rim Δ	Rim height	Shoulder Δ	Shoulder height	Foot type	Comparable to Vlaardingen group	Figure from	Lab-id:	Date	Problems with date
Angelslo	Grave	Beaker	1a	13	0.6	1.9	1.1	7.2	Protruding	none	Drawings BAI			
Angelslo	Grave	Beaker	1d	12	0.6	3.1	0.7	7.0	Slightly protruding	none	Drawings BAI			
Angelslo	Grave	Beaker	Plain	11	0.7	2.6	1.2	6.3	Protruding	none	Drawings BAI			
Anlo	Grave	Beaker, large rim angle	21lc?	13	1.5	4.5	1.4	7.7	Flat	f	Drawings BAI			
Anlo 1922	Grave	Deviant shape, very small	Plain	6	0.4	1.0	0.3	2.9	Flat	none	Drawings BAI			
Anlo tumulus II	Grave	Large beaker	Nailimprints?	15	1.0	3.7	1.4	6.3	Flat	E	Drawings BAI			
Anlo veekraal graf B	Grave	Beaker, large rim angle	21lb	13	1.4	3.2	1.5	4.7	Flat	none	Waterbolk, 1960: fig.32	GrN 851	4140±70 BP	None
Anlo veekraal graf C	Grave	Beaker, large rim angle high shoulder	21lb	14	1.4	4.0	0.9	6.6	Flat	f	Jager, 1985: fig.26	GrN 1967	3965±50	One minus: t.a.q
Anlo veekraal graf D	Grave	Beaker	1a	14	1.1	4.2	0.9	4.4	Protruding	f	Drawings BAI			
Anlo veekraal graf E	Grave	Beaker, large rim and shoulder angle high shoulder	1a	14	1.8	3.9	2.5	8.7	Slightly protruding	none	Drawings BAI, Jager, 1985: fig.30	GrN 1855	4420±55BP	Rejected: old wood effect
Annen Holtkampen	Grave	Beaker	1e	11	0.9	3.4	0.7	5.9	Slightly protruding	none	Drawings BAI, Jager, 1985: fig.10	GrN 11918	4165±30 BP	One minus: old wood effect
Assen Taarlozeweg	Grave	Beaker, small	1e?	7	0.3	2.7	0.5	3.3	Protruding	c	Drawings BAI			
Balloo	Grave	Beaker	1b	13	1.2	6.6	0.9	5.4	Protruding	none	Drawings BAI			
Balloo	Grave	Very large	1a herringbone with cord	15	2.2	7.0	1.3	8.6	Protruding	none	Drawings BAI			
Beilen	Grave	Deviant shape, amphora	broad ears	10	0.3	1.4	2.5	4.4	Slightly protruding	none	Drawings BAI			
Beilen	Grave	Deviant shape, very small	Plain	6	0.3	0.8	0.0	1.0	Flat	none	Drawings BAI			
Borger	Grave	Beaker	21lb	11	1	3	0.8	5.0	Flat	c	Lanting, 2007-08: fig. 3			
Borger Drouwenerstraat tumulus I	Grave	Beaker, small	Plain	6	0.0	1.8	0.5	2.2	Flat	b	Drawings BAI			
Borger tumulus II	Grave	Beaker	1b	13	1.0	5.0	1.1	7.1	Flat	e	Drawings BAI			
Borger tumulus IV	Grave	Beaker	1d	14	0.9	4.7	0.9	8.2	Slightly protruding	e	Drawings BAI			
Borger tumulus IV	Grave	Beaker	1e	13	1.2	5.0	1.0	5.5	Protruding	f	Drawings BAI			
Buinen	Grave	Beaker	21a	11	1.2	3.2	1.0	4.6	Flat	none	Lanting and Van der Waals, 1976: fig.2, scale?	GrN 6152	3945±35 BP	Rejected: sample treatment and relation uncertain
Dalen	Grave	Beaker	no type	10	0.4	2.2	0.7	3.8	Flat to hollow	c	Lanting and Ufkes, 1989: fig.3	GrA 13617	3910±50 BP	None
De Eese	Grave	Beaker	1a	13	1.3	6.8	0.4	4.5	Protruding	none	Drawings BAI			
De Eese tumulus VIII	Grave	Beaker	1e with fingernail imprints	14	1.7	4.9	0.6	6.9	Flat	f	Drawings BAI			
De Hamert	Grave	Beaker, large rim and shoulder angle	21lb	14	1.6	3	2	7.8	Flat	none	Lanting, 2007-08: fig. 3			
De Hamert	Grave	Very large	21lb	15	1.8	2.2	1.6	4.5	Flat	none	Lanting, 2007-08: fig. 3			
Donkerbroek Galgenberg	Grave	Beaker	Plain	13	1.2	4.5	1.0	5.9	Protruding	f	Drawings BAI			
Drouwen vlakgraf in urnenveld	Grave	Beaker	1a herringbone with cord	11	0.9	6.4	0.8	4.8	Flat	none	Drawings BAI			
Ede Hotel Bosbeek	Grave	Beaker	1a	12	1.6	6.0	1.0	7.0	Flat	none	Modderman, 1954: fig. 18	GrN 6129	4165±55 BP	None
Eext Bergakkers grafheuvelzool II	Grave	Beaker	1b	11	1.0	3.7	0.8	5.7	Flat	e	Drawings BAI, Jager, 1985: fig.42	GrN 6349	3945±40 BP	None
Eext Galgwanderveen 1	Grave	Very large	1e	15	1.5	5.9	1.3	9.0	Slightly protruding	none	Drawings BAI, Jager, 1985: fig. 32	Gr-6368	3935±35 BP	None
Eext Galgwanderveen 3	Grave	Very large	1d	15	1.5	4.2	0.9	10.9	Protruding	none	Drawings BAI, Jager, 1985: fig. 34	GrN 6368	3935±35 BP	None
Eext Schappsdijkweg tumulus B	Grave	Beaker, large rim angle	ZigZag	12	1.4	3.1	1.6	7.0	Flat	none	Glasbergen, 1957: fig.13	GrN 939 GrN 946	3885±65 BP 3880±50 BP	One minus: t.a.q One minus: t.a.q
Eext Vijzelkampen	Grave	Beaker	1d	9	0.4	1.3	1.1	4.8	Flat	c	Drawings BAI			

Table 3.2 Comparator site vessel types.

Site	Context	Shape	Characteristics	Rim diameter	Rim Δ	Rim height	Shoulder Δ	Shoulder height	Foot type	Comparable to Vlaardingen group	Figure from	Lab-id:	Date	Problems with date
Eext visplas	Grave	Very large	ZigZag	16	1.6	8.3	0.9	7.3	Flat	none	Drawings BAI, Furholt, 2003a: tafel 197	GrN 6727	4145±30 BP	One minus: old wood effect
Emmen	Grave	Beaker	1e	13	1.0	3.4	1.0	5.5	Flat	c	Drawings BAI			
Emmen Angelsloo	Grave	Beaker	1d	9	0.6	2.2	0.7	3.6	Protruding	c	Drawings BAI			
Emmen Angelsloo	Grave	Beaker	1d	13	0.6	3.9	0.6	6.5	Protruding	e	Drawings BAI			
Emmen Angelsloo blok 1	Grave	Beaker	Plain	11	0.9	3.0	1.4	6.1	Protruding	none	Drawings BAI			
Emmen Emmerhout	Grave	Beaker	2llc	10.5	0.8	2.5	0.5	3.5	Flat	c	Lanting, 2007-08: fig. 3			
Emmen Emmerhout	Grave	Beaker	2llc	14	1.5	5.8	0.4	4.3	Flat	f	Lanting, 2007-08: fig. 3			
Emmerhout	Grave	Beaker	1b?	11	1.1	4.7	0.6	4.4	Flat	f	Drawings BAI			
Fochteloo 100 bunder	Grave	Beaker	1b	13	1.1	5.9	0.9	7.2	Slightly protruding	none	Drawings BAI			
Harskamp?	Grave?	Very large	2llb	17	1.6	3.3	2	11.5	Flat	none	Lanting, 2007-08: fig. 3			
Havelte graf VI	Grave	Beaker	1b?	10	0.7	3.5	0.3	3.1	Protruding	c	Drawings BAI			
Hees, gemeente Ruinen	Grave	Beaker	1a	13	1.8	7.7	0.7	3.3	Protruding	none	Drawings BAI			
Hijken settlement	Settlement	Very large	1a herringbone with cord	15	1.3	6.2	0.7	5.9	Protruding	none	Drawings BAI			
Hijkerveld	Grave	Beaker	1c	12	0.9	3.3	1.0	7.4	Flat	none	Drawings BAI			
Hijkerveld graf II	Grave	Beaker	1a	14	0.9	5.3	1.5	5.2	Protruding	none	Drawings BAI, Furholt, 2003a: tafel 203	GrN 6352	4290±45 BP	Rejected: sample treatment and uncertainty of association
Hijkerveld graf III	Grave	Deviant shape, very small	Plain	7	0.6	2.4	0.0	2.0	Protruding	c	Drawings BAI			
Hijkerveld graf V	Grave	Beaker	1b	11	0.9	3.3	1.2	7.5	Slightly protruding	none	Furholt, 2003a: tafel 204 scale?	GrN 6126	3970±35 BP	One minus: relation uncertain
Hijkerveld graf VIII	Grave	Very large	1e	16	1.8	7.5	1.2	5.6	Flat	none	Drawings BAI			
Hoogeloo graf II	Grave	Beaker, small	1b	6	0.3	1.4	0.4	2.8	Flat	c	Drawings BAI			
Hooghalen	Grave	Deviant shape, very small	Plain	6	0.4	2.3	0.0	1.6	Flat	c	Drawings BAI			
Kootwijkerzand	Grave	Beaker	2lla	12	1.8	4.8	1.1	5.3	Flat	f	Lanting, 2007-08: fig. 3			
Marum de Haan tumulus IV	Grave	Beaker	1a	13	1.0	3.5	1.3	7.4	Protruding	none	Drawings BAI			
Noordbarge	Grave	Beaker	1d	9	0.7	1.7	0.8	4.0	Flat	c	Drawings BAI			
Noordbarge	Grave	Beaker	Plain	12	0.9	5.3	0.5	4.9	Protruding	none	Drawings BAI			
Noordbarger Hoge loo	Grave	Beaker	1b	12	1.0	5.1	1.4	7.1	Slightly protruding	e	Drawings BAI			
Noordbarger Hoge loo, graf I	Grave	Beaker	1e?	13	1.0	5.0	0.8	4.9	Protruding	none	Drawings BAI			
Odoom Esserveld	Settlement	Beaker	1a	13	1.0	5.2	1.2	6.0	Flat	e	Drawings BAI	GrN-5068	3955±50 BP	None
Oosterwolde Klazinga	Grave	Very large	1b	16	1.6	3.7	1.7	7.8	Slightly protruding	A	Drawings BAI			
P14	Settlement	Beaker	1d	11	0.6	3.0	0.6	4.0	Flat	none	Ten Anscher, 2012: fig. 8.4			
P14	Settlement	Deviant shape, beaker with straight wal	Plain	13	x	x	x	x	Flat	none	Ten Anscher, 2012: fig. 8.4	UTC 1908	3990±60 BP	?
Peelo	Grave	Beaker	1b	13	1.5	5.3	1.0	7.0	Flat	f	Drawings BAI			
Peelo	Grave	Beaker	1e	13	1.5	5.4	0.9	5.9	Protruding	f	Drawings BAI			
Peelo	Grave	Beaker	1b	12	1.2	6.1	0.7	5.0	Flat	none	Drawings BAI			
Puttershoek Sportlaan locatie C	Settlement	Beaker, straight rim	1d	12	0	3.6	0.6	2.7	x	none	Drenth and Hogestijn, 2006: fig.33	GrA 12299	3920±60 BP	Rejected: bad sample quality
Rhenen Grebbeberg	Grave	Beaker	2llb	12	0.8	2.8	0.8	4.8	Flat	c	Lanting, 2007-08: fig. 3			
Rhenen Grebbeberg	Grave	Beaker	2llb	13	1.0	3.8	0.8	4.5	Flat	none	Lanting, 2007-08: fig. 3			
Schipborg	Grave	Beaker	1a	13	1.0	5.0	0.9	2.9	Protruding	none	Drawings BAI			
Silvolde	Grave	Beaker	1a	12	2.0	6.3	0.8	5.7	Protruding	none	Bantelmann et al. 1979-80: fig. 17	GrN 10345	4270±70 BP	One minus: sample treatment
Sleen Kruidhaarsveld	Grave	Beaker	1e	13	1.4	4.7	1.6	6.9	Flat	f	Drawings BAI			
Speulde	Grave	Very large	2llb	17	1.8	4.8	1.4	9.5	Flat	none	Lanting, 2007-08: fig. 3			

Table 3.2 (continued) Comparator site vessel types.

Site	Context	Shape	Characteristics	Rim diameter	Rim Δ	Rim height	Shoulder Δ	Shoulder height	Foot type	Comparable to Vlaardingen group	Figure from	Lab-id:	Date	Problems with date
Twente or South East Drenthe	Grave	Very large	2lb	15	2.5	4.5	2.5	7	Flat	none	Lanting, 2007-08: fig. 3			
Vlaardingen	Settlement	Beaker, large rim angle	2la	14	1.3	3.6	1.8	8.4	Flat	f	Glasbergen et al. 1967: fig.17	GrN 2158 GrN 2419 GrN 2481 GrN-3097	3910±30 BP 3910±100 BP 3860±110 BP 3850±50 BP	One minus: sample treatment None One minus: sample treatment
Witrijt	Grave	Beaker	2llc	14	1.2	4.3	0.7	6.8	Flat	f	Beex, 1957: fig.6, scale?	GrN 6128	4035±55 BP	None
Zeijen Jodenbergje	Grave	Deviant shape, amphora	broad ears	10	0.9	1.8	1.5	4.3	Flat	c	Drawings BAI			
Zeijen Jodenbergje	Grave	Deviant shape, amphora	ears	10	0.6	1.4	1.5	3.9	Flat	c	Drawings BAI			
Zeijen Jodenbergje	Grave	Beaker	1e	11	1.4	5.0	1.1	5.3	Flat	f	Drawings BAI			
Zeijen Jodenbergje	Grave	Very large	1b?	16	1.9	8.8	0.9	5.7	Flat	none	Drawings BAI			
Zuidlaren	Grave	Beaker	1b	14	1.7	7.1	0.7	4.2	Flat	none	Drawings BAI			
Zuidvelde	Grave	Beaker	Plain	9	0.6	3.1	1.0	4.2	Protruding	c	Drawings BAI			

Table 3.2 (continued)
Comparator site vessel types.

The vessels from Zandwerven are similar to the medium and large Vlaardingen vessels of group C (Beckerman and Raemaekers, 2009: fig. 15, p.68) (figure 3.6). Vlaardingen group C vessels comprise 10 smaller (rim diameters 7.5–14 cm) and 13 medium to large vessels (rim diameters 15–28 cm (Beckerman and Raemaekers, 2009). Group C is the most frequently occurring Vlaardingen type; it is found on the sites Hazendonk, Hekelingen I, Voorschoten-Boschgeest, Vlaardingen, Haamstede Brabers, Halve Mijl, Leidschendam and OZ 35/36 (Beckerman and Raemaekers, 2009: fig. 15, p.68-71). At the site of Zandwerven, a knob ear was found. These knobs are also found on Vlaardingen vessels of type C (Beckerman and Raemaekers, 2009: table 1). Group C dates to the middle phase of the Vlaardingen Culture (Beckerman and Raemaekers, 2009: p.73).

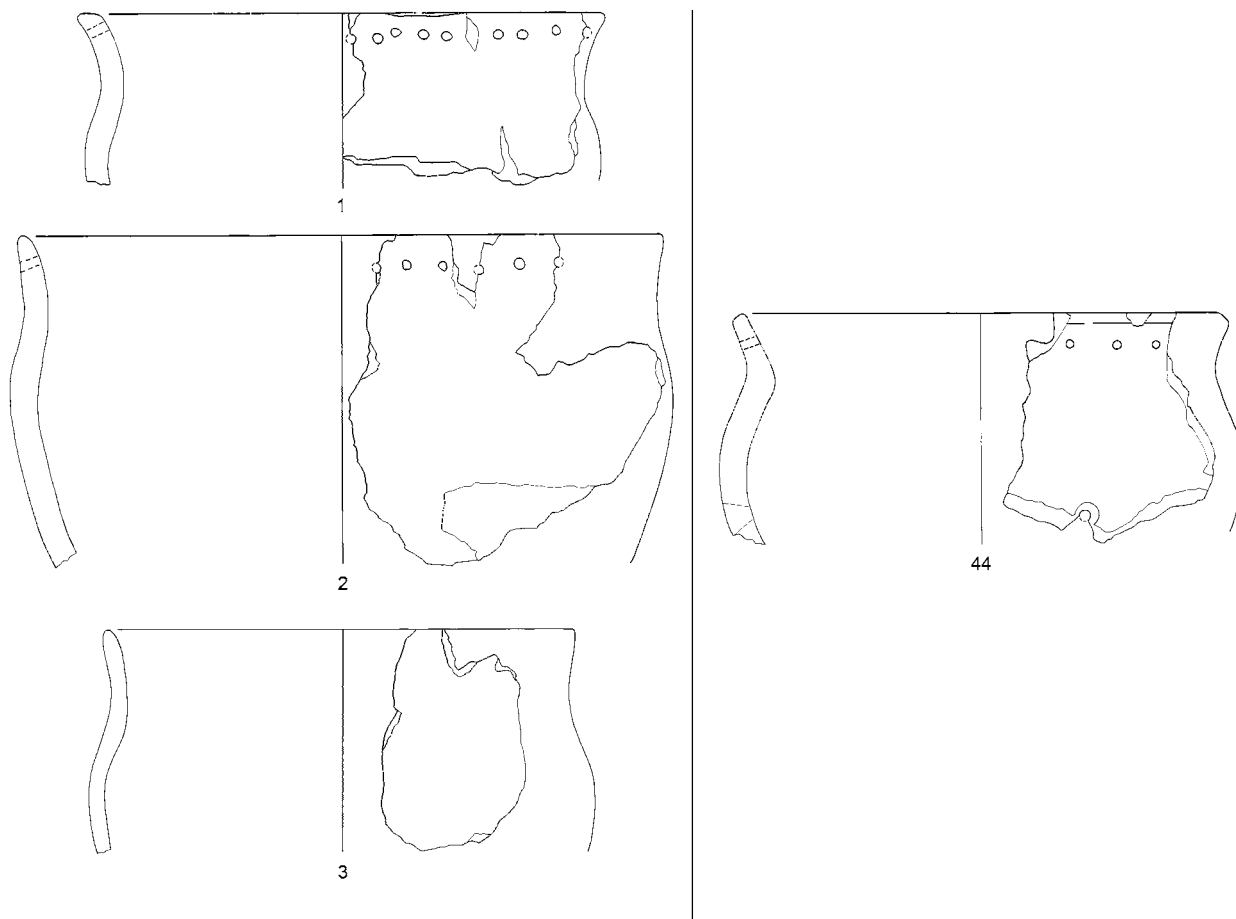
3.3.1.4 Enlarged beaker shape

There are three enlarged beaker vessels (figure 3.4). These vessels, two from Zeewijk-West (vessels 28 and 165) and one from Mienakker (vessel 30), have a rim and shoulder that have a combined length of more than 10 cm and an elongated S-shape (figure 3.4). The angle of the rim and the shoulder is comparable to that of vessel 44 from Zandwerven; however, both the rim and the shoulder of the Zeewijk-West and Mienakker vessels are longer.

These vessels with an enlarged beaker shape share similarities with the three medium to large Vlaardingen group E vessels (rim diameter 23–27 cm, Beckerman and Raemaekers, 2009: p.68-69) (figure 3.7). These group E vessels were found on the sites of Voorschoten-Boschgeest and Heerjansdam. A group E vessel with a smaller rim diameter (16 cm) was found at the Hazendonk site (Beckerman and Raemaekers, 2009: p.72, fig. 17). Group E vessels date to the late Vlaardingen phase (Beckerman and Raemaekers, 2009: p.81). Enlarged beakers have so far not been found in funerary contexts (table 3.2).

3.3.1.5 Beaker shape

The most common vessel shape is the beaker. A total of 8 (36%) of the reconstructed vessels and 15 (47%) of the vessels that are complete down to the smallest circumference belong to this type (figure 3.4). There is variation in the heights of the shoulder and the rim, in that some vessels have a more pronounced S-shape, while others show an elongated S-shape. Beakers are not only the most common shape on the studied settlements, but also in the Corded Ware graves, which are found in other parts of the Netherlands (table 3.2). The beakers from



South medium to large group C vessels: 1 & 2 Hazendonk, 3 Haamstede Brabers

North vessel from Zandwerven

funerary contexts also show variation in the height of the rim and the shoulder (table 3.2). A more pronounced S-shape is found on 45 vessels, with a shoulder height of less than 5.8 cm, whereas a more elongated profile is found on 37 vessels, with a shoulder height of more than 5.8 cm. A possible chronological explanation for this will be discussed in section 4.4.2.2.

The beaker shape is also present on Vlaardingen sites. My literature review suggests that half decorated and All Over Ornamented beakers were found at the Vlaardingen sites of Voorschoten-Boschgeest²¹, Leidschendam²², Hazendonk²³, Waardhuizen-Almkerk²⁴, Vlaardingen²⁵ and Hekelingen I²⁶. Unfortunately, the percentage of beakers in relation to other types of vessels has never been published and drawings are rare. The Hazendonk site is the exception; drawings of several vessels from this site (including beakers) have been published (Louwe Kooijmans, 1976: fig.24). The 1d beaker (vessel H8) and the undecorated beakers (vessels H7 and H9, the latter of group E) from the Hazendonk VL2b phase have, like many other beakers, a slender S-shape with a high rim and shoulder (figure 3.8).

Figure 3.6 Comparing vessels and beakers with a pronounced S-shape with Vlaardingen medium to large group C vessels, drawings of Vlaardingen vessels after: Beckerman and Raemaekers, 2009 (scale 1:3).

21 Glasbergen *et al.*, 1967: p.10-27, 1a, 1b, 1d, 1f, 2IIb, undecorated, short wave moulded, amphorae, spindle whorls.

22 Glasbergen *et al.*, 1967: p.106-108, 1a-f, fingertip imprints.

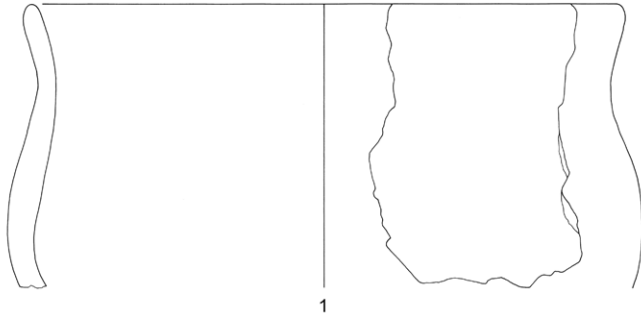
23 Louwe Kooijmans, 1976: p.287, 1d and 2IIb.

24 Louwe Kooijmans, 1974: p.345, All Over Ornamented and Veluwe beakers.

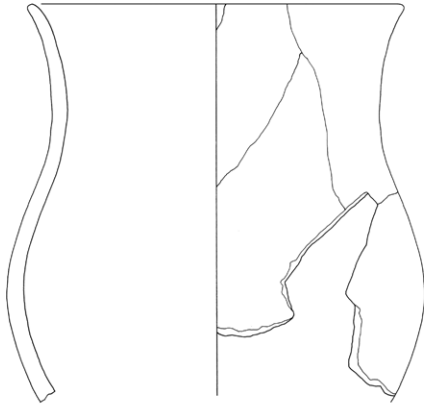
25 Louwe Kooijmans, 1974: p.344, Protruding Foot Beakers.

26 Modderman, 1953: p.8, fig. 6, herringbone, line and point imprints made with a spatula.

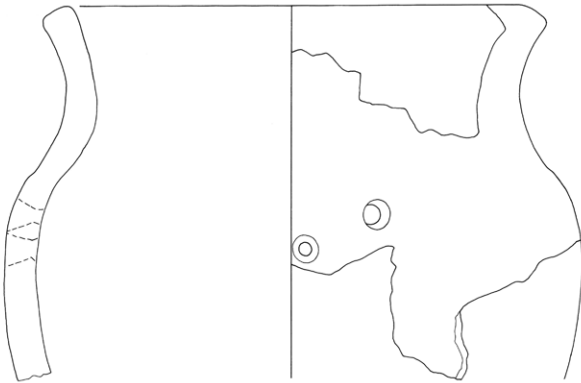
Figure 3.7 (following page) Comparison of vessels with an enlarged beaker shape with medium to large Vlaardingen group E vessels, drawings of Vlaardingen vessels after: Beckerman and Raemaekers, 2009 (scale 1:3.3).



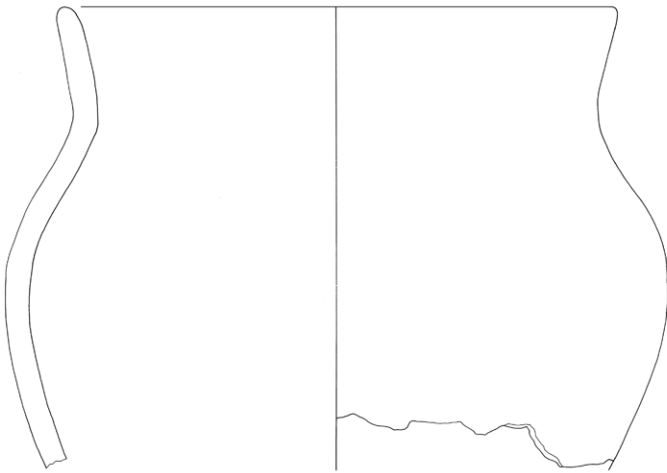
1



2

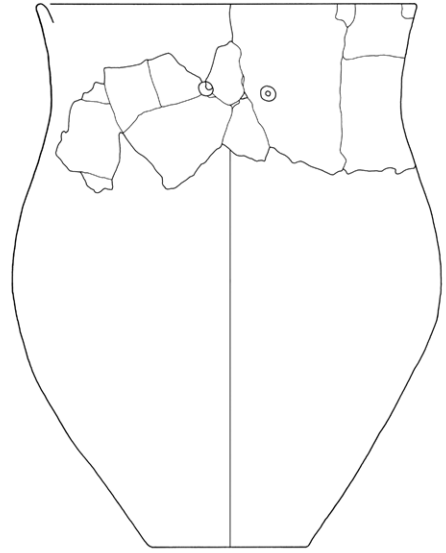


3

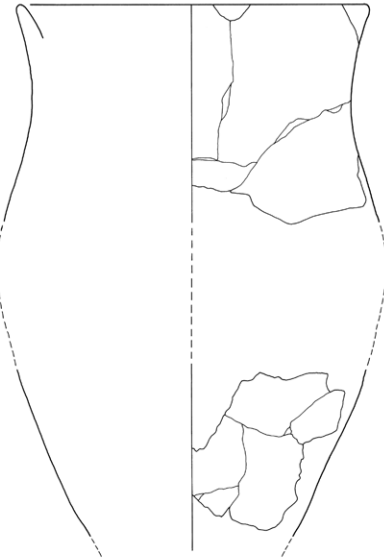


4

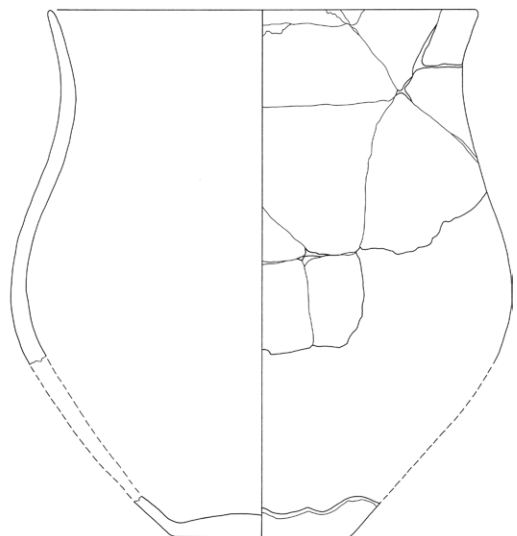
South Group E vessels: 1 & 4 Voorschoten Boschgeest, 2 Hazendonk, 3 Heerjansdam



30

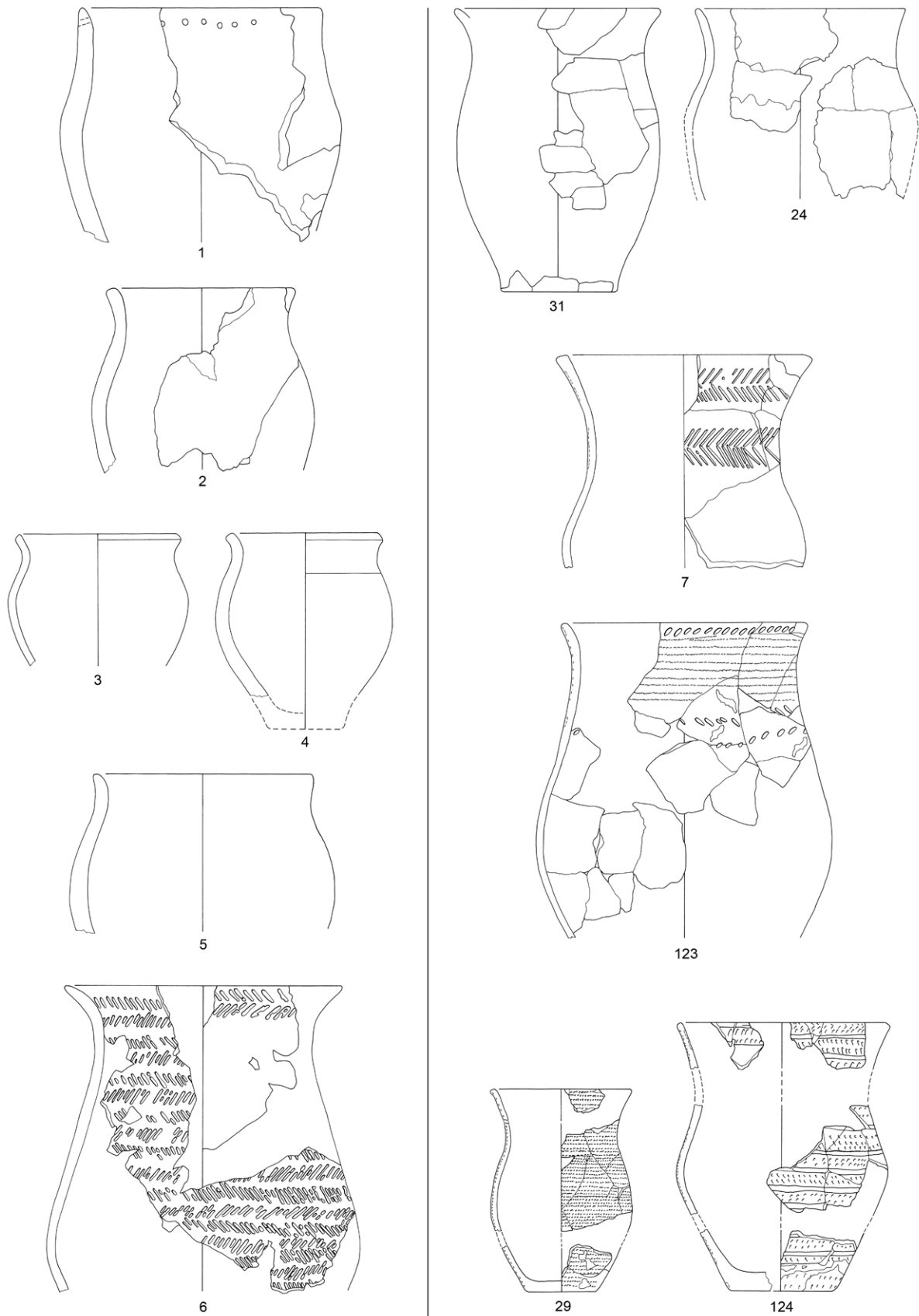


165



28

North enlarged beakers from: 30 Mienakker, 165 & 28 Zeewijk-west southern part



South Vlaardingen beakers Middle phase: 1 Hazendonk b, 2 Hazendonk c, 3 Voorschoten Boschgeest c, 4 Halve Mijl, 5 Vlaardingen c, Vlaardingen Late phase: 6 Hazendonk

Beakers North from: 31 & 24 Mienakker, 7 Aartswoud, 123, 29 & 124 Zeewijk-west southern part

Cord- and spatula-decorated beakers may be restricted to the late Vlaardingen phase, but the beaker shape was already in use in the earlier Vlaardingen phases. The shape of small Vlaardingen group C vessels (rim diameter 7.5–14 cm) of the middle phase often strongly resembles beakers with a pronounced S-shape (figure 3.8). For example, group C vessel H20 from the Hazendonk VL1b phase (figure 3.8) has a shape that compares well to younger (cord- and spatula-decorated) beakers, such as vessels 24 and 31 from Mienakker and vessels 12, 15 and 124 from the southern part of Zeewijk-West (figure 3.8).

Beckerman and Raemaekers (2009) did not take the size of vessels into account and therefore did not notice the similarities in morphological characteristics of small Vlaardingen vessels and beakers. Therefore, a new group division is proposed here to also take the size of the vessel into account. In this study, the distinction between a beaker and an enlarged beaker is made on the basis of the diameter of the rim. The former has a rim diameter of less than 14.5 cm, the later, of more than 14.5 cm (table 2.1). This division into small and large vessels is also proposed for the Vlaardingen vessels (figure 3.4). Small vessels, that is, with a rim diameter of less than 14.5 cm, will henceforth be indicated by a lowercase letter. Two group B and 10 group C vessels have a rim diameter of less than 10 cm and a shape comparable to beakers and will thus be labelled as group b and group c vessels. One of the group E vessels from Hazendonk has rim diameter of 16.2 cm, and this vessels also resembles a beaker in shape (figure 3.7). Of the beakers from the seven sites studied, five are comparable to small specimens of Vlaardingen group c beakers (table vessels). One vessel has a shape comparable to Vlaardingen group A vessels. Small vessels of this group are younger than the very large specimens that are part of group A. Therefore small examples of group A vessels will be dubbed group f—the alphabetic order thus reflects the chronological ordering (figure 3.4). The 69 studied beakers from Corded Ware funerary sites include 38 beakers that fit well into one of the thus defined shape groups: 1 in group b, 1 in group c, 1 in group e and 15 in group f (table 3.2).

Lanting and Van der Waals (1976: p.5) postulated that the shape of the beakers base is a characteristic with chronological significance. The shape of the base is said to change from protruding at the start of the Corded Ware period to flat or slightly hollow at the end of the Corded Ware period (Lanting and Van der Waals, 1976: p.5). The majority of the beakers found on the settlement sites under study show a flat base. However, several examples of protruding feet have been found: in the top layer from Zandwerven (n=1), in the northern part of Zeewijk-West (n=3), at Aartswoud (n=2) and in the southern part of Zeewijk-West (n=2) (table 3.1). At Zeewijk-Oost, Keinsmerbrug, Mienakker and Sijbekarspel-De Veken this type of base has not been found.

The beakers from other, mainly funerary, contexts that have been used for comparison show that there are clear patterns in this type of base and in the type of decoration applied (table 3.2). Type 1a most often has a protruding base (9 out of 11), and this type of base is found as well on type 1b (6 out of 12), type 1d (7 out of 12) and type 1e (7 out of 11) (table 3.2). Type 1c, as well as zigzag and the All Over Ornamented types, do not have protruding bases.

*Figure 3.8 (opposite page)
Comparing beakers with
Vlaardingen beakers, drawings
of Vlaardingen vessels
1-5 after: Beckerman and
Raemaekers, 2009, 6 after:
Louwe Kooijmans, 1976
(scale 1:3.3).*

3.3.1.6 Other forms

Four vessels and four upper parts of vessels have a different, non-beaker form (table 2.5 and 2.6). This group mainly includes vessels that exceed the size of both the beaker and the enlarged beaker shapes. Vessels 1 and 13 from Keinsmerbrug, vessel 25 from the northern part of Zeewijk-West and vessel 34 from Aartswoud are all very large (rim diameters exceeding 22 cm) with an open shape and

an outward-sloping neck (figure 2.12 and 2.13). Vessel 1 from Keinsmerbrug was decorated with a Van der Waals and Glasbergen (1955: p.11-12) type 1d herringbone pattern, whereas vessel 25 from Zeewijk was decorated over the entire neck and the top of the rim with fingertip imprints. Vessels with such wide rim diameters are not frequently found in funerary contexts (table 3.2). Drenth (2005: p.338) states that other pot types of the Corded Ware Culture include amphora, amongst which are *Strichbündel* (*tr.* grouped vertical stripes) amphora; short wave moulded vessels; and proto-pot beakers with imprints over the complete surface applied with a spatula, fingertip or fingernail. It is unclear whether the large vessels from Keinsmerbrug, Zeewijk and Aartswoud can be compared to any of these types. Drenth and Lanting (1991: fig.3) and Drenth (2005: fig.3) depict several specimens of this type. The profiles of the vessels from Keinsmerbrug, Zeewijk and Aartswoud may be comparable to the proto-pot beaker type (Drenth and Lanting, 1991: fig. 3). The profile of vessel 1 from Keinsmerbrug shows a resemblance to the large amphora depicted (Drenth, 2005: fig.3); however, the amphora has a vertical strap handle and an applied cordon, and it was decorated with vertical bundles of spatula decoration (Drenth and Lanting, 1991: fig. 3). The find locations of the amphora and proto-pot beaker are not listed by Drenth and Lanting (1991) or Drenth (2005), and the vessels are therefore not included in the comparison made in table 3.2.

Vessel 14 from the southern part of Zeewijk-West is a very small vessel (figure 2.11). Various graves have similarly yielded small beakers or small vessels, for example, that at Hooghalen and Hijkerveld graf (*tr.* grave) III (table 3.2).

Vessel 6 found at Mienakker also has an uncommon profile, having a closed bi-conical shape. The vessel does not resemble the bi-conical shapes found at Slootdorp-Bouwlust because the neck is much shorter and the rim diameter is smaller (table 2.5 and 2.6). In other contexts, including funerary contexts, no parallels for this type appear to be found (table 3.2).

Vessel 30, found in the southern part of Zeewijk-West, also has a profile that does not resemble that of any other vessels from the studied Noord-Holland sites. The vessel has a long, upright neck, a sharp transition to the shoulder and a thick belly, the dark-coloured outer surface of which is polished (figure 2.11). This vessel and a now missing vessel from the settlement of Mienakker were part of a debate. Drenth and Hogestijn (Drenth and Hogestijn, 2006: 89) saw in these vessels a predecessor for the later Veluwe Bell Beakers. In contrast, Lanting (personal communication) opted for a date in the Iron Age. The encrusted residue on vessel 30 was dated to 4030±40 BP (GrA 56013). This date coincides well with other dates for the Corded Ware settlements (see chapter 4). The date indeed precedes the dates for the Veluwe vessels, and argues against a dating in the Iron Age.

The last vessel with a deviant shape, vessel 46 from the site of Slootdorp-Bouwlust, has a bowl shape and decoration that is not found at any of the other sites (figure 2.4). The bowl was decorated with blocks filled with lines consisting of round imprints. In the highest blocks the lines have a horizontal orientation; underneath these blocks the lines have a vertical orientation. Direct parallels for this decoration are rare; while the motif is common in Funnel Beaker contexts, there the imprints are usually smaller and more regular. The best parallel is perhaps the bucket-like vessel from Beekhuizerzand, decorated with the same blocks filled with lines consisting of irregular oval imprints. Yet this vessel also shows intermediate smaller blocks filled with zigzag lines (Modderman *et al.*, 1976: p.49, fig. 4.1).

3.3.2 Comparing the technological characteristics

On the basis of the tempering, three different groups can be outlined (table 2.2 and 2.3). The first group consists of the sites of Zandwerven (both top and bottom layers), the northern part of Zeewijk-West, Aartswoud and Keinsmerbrug. At these sites the proportion of sherds tempered with stone grit is higher than at the group consisting of Zeewijk-West, Mienakker and Sijbekarspel-De Veken. At Slootdorp-Bouwlust almost all the sherds have stone grit tempering. However, this group differs from the former group in terms of the tempering material added. Almost half of the stone grit-tempered sherds from Slootdorp-Bouwlust were tempered with hornblende. This material is not present in the sherds from the northern part of Zeewijk-West, Aartswoud and Keinsmerbrug. Just one sherd from Zandwerven, the only sherd from layer I of the 1929 campaign, was tempered with hornblende.

The average thickness and the distribution across the three thickness classes also show variation among the sites studied (table 2.2 and 2.3). Two groups can be distinguished. At Mienakker, Sijbekarspel-De Veken and the southern part of Zeewijk-West, thin-walled sherds (5–7.5 mm) are proportionately more common. At Slootdorp-Bouwlust, Zandwerven (top and bottom layers), the northern part of Zeewijk-West, Zeewijk-Oost, Aartswoud and Keinsmerbrug thick-walled sherds are more common (table 2.2). These groupings on the basis of tempering as well as on the basis of thickness largely coincide. Zeewijk-Oost falls between the two groups on the basis of percentage of tempering but can be placed within the group with a higher proportion of thick-walled ware. At all of the sites studied, there is the same relationship between tempering with stone grit and thickness; stone grit is most often added to the medium-thick-walled and thick-walled wares. Slootdorp-Bouwlust again stands apart since at this site sherds of all thicknesses are tempered with stone. Other technological characteristics do not show clear groups (table 2.2 and 2.3).

It is interesting to compare these technological characteristics with those of other Neolithic sites in the coastal zone and in the more upland parts of the Netherlands. For the characteristic tempering agent of the Slootdorp-Bouwlust ceramics, hornblende, no parallels are found. The high amount of stone grit tempering was also found in the Funnel Beaker assemblages from P14 and Beekhuizerzand, yet there it concerns granite and quartz rather than hornblende (Modderman *et al.*, 1976: p.47, Ten Anscher, 2012: p.163). The older early Funnel Beaker sherds at P14 deviate from the Slootdorp-Bouwlust sherds in that they more often contain grog and organic tempering (Ten Anscher, 2012: p.93, fig. 5.4). The average thickness (in mm) of the Slootdorp-Bouwlust sherds is similar to that of the early Funnel Beaker sherds from P14 (Ten Anscher, 2012: p.93).

Little is known about the changes over time in the technological characteristics of Vlaardingen ceramics. The proportion of stone grit temper is said to decrease over time, and the proportion of grog temper is said to increase over time (Glasbergen, *et al.*, 1967: p.10-11, table 1). Furthermore, the proportion of thin-walled ware increases slightly over time (Glasbergen, *et al.*, 1967: p.10-11, table 1). A comparison with the material under study is hampered by the lack of exact numbers and ratios.

The technological characteristics of the Corded Ware material from other contexts are poorly understood. The P14 Corded Ware material shows a decrease in wall thickness over time. Sand and granite are the most frequently used tempering agents at P14 (Ten Anscher, 2012: p.182, fig. 8.11), whereas at Hazerswoude quartz and to a lesser extent grog tempering is most common (Drenth, 2010: appendix 14). At Westbroek vindplaats 3 grog was most frequently used (Ten Anscher and Bosman, 2010: p.177).

There seems to be some overlap in the observed technological patterns and developments on the seven settlement sites in Noord-Holland and the Vlaardingen and Corded Ware sites used for comparison. The trend proposed for both Vlaardingen and Corded Ware settlements is that the amount of thin-walled ware increases over time. This trend may also be observed at the Noord-Holland sites of Zandwerven, Keinsmerbrug, Zeewijk-Oost and the northern part of Zeewijk-West, suggesting that these sites are older than the group comprising the southern part of Zeewijk-West, Mienakker and Sijbekarspel-De Veken (table 2.3).

A second trend, proposed for Vlaardingen settlements only, is that the proportion of stone temper decreases and the amount of grog increases over time. This, too, can also be observed on the seven Noord-Holland sites. This suggests that the (parts of) settlements with high proportions of stone grit tempering (Zandwerven, Keinsmerbrug and the northern part of Zeewijk-West) are older. Conversely, the (parts of) sites with low proportions of stone grit tempering (the southern part of Zeewijk-West, Mienakker and Sijbekarspel-De Veken) may be younger. This ordering of the sites reflects the chronological ordering made on the basis of vessel wall thicknesses. Of course exceptions to the 'rule' exist: at Hazerswoude the amount of quartz is high, and while this tempering agent is found at the Noord-Holland sites as well, it is always of secondary importance there. This may be due to geological differences; quartz is more numerous at Hazerswoude.

3.3.3 Comparing the decoration

3.3.3.1 Perforations under the rim

Perforations under the rim, presumably applied as decorative elements, are only present at the sites of Zandwerven and Slootdorp-Bouwlust. At Zandwerven this decoration is found on vessel 44 (figure 2.10). At Slootdorp this decoration is more often applied. Vessels 45 and 74 are examples that show a row of perforations under the rim (figure 2.4). On vessels 48, 76 and 84 indentations are visible (figure 2.4). Vessel 42 shows one complete and one incomplete perforation (figure 2.4).

A row of perforations under the rim as well as a row of round imprints under the rim is also frequently found on vessels from the early Funnel Beaker assemblage at P14 (Ten Anscher, 2012: p.85-87, fig. 5.1) as well as in the younger Funnel Beaker assemblage of Beekhuizerzand (Modderman *et al.*, 1976: p.51). It is also seen with Vlaardingen ceramics (Glasbergen *et al.*, 1967: p.10, 26).

3.3.3.2 Spatula and cord impressions

There are differences between the ratios of various decorative motifs and techniques used on the different sites. Because of fragmentation, it is not always straightforward to assign decorated sherds to one of the Van der Waals and Glasbergen types. Few vessels have been preserved from rim to base; for many decorated sherds it therefore cannot be established whether they belong to the half decorated type or the All Over Ornamented type. Moreover, several decorative elements, such as oblique impressions, occur with several types. Notwithstanding these difficulties, there are also clear differences in the decorative techniques and motifs between sites (table 3.1).

At four sites, cord decoration is the most common (Sijbekarspel-De Veken, Mienakker, the southern part of Zeewijk-West and Zandwerven 1929 top layer) (table 2.3). At Keinsmerbrug, Aartswoud, the northern part of Zeewijk-West and Zeewijk-Oost, spatula decoration is the most common (table 2.3).²⁷

Certain examples of type 1a decoration were recovered from the top layer at Zandwerven and from Aartswoud and the southern part of Zeewijk-West (table 3.1). Type 1b is only found in the top layer at Zandwerven and at Aartswoud (table 3.1). Herringbone-decorated type 1d beakers were found on almost all of the sites. At Zandwerven, Aartswoud and Keinsmerbrug herringbone patterns occur most frequently (table 3.1). The zigzag type is also found on many sites: this type occurs most frequently at Zeewijk-Oost, Aartswoud and Keinsmerbrug (table 3.1). Type 1e is also found on almost all sites and is most common at Zeewijk-Oost, at the northern and southern parts of Zeewijk-West and at Mienakker (table 3.1).

All Over Ornamented types are most common in the southern part of Zeewijk-West and at Mienakker (table 3.1). The length of the decoration seems to be the main difference between All Over Ornamented beakers and other cord- and spatula-decorated sherds: there are no clear differences in the technological characteristics or in their spatial (discard) patterning. All Over Ornamented type 2IIa and Bell Beaker type 2Ia with decoration applied with a dentated spatula are only found at Sijbekarspel-De Veken (table 3.1). Decoration on the inside of the rim is most frequently found in the southern part of Zeewijk-West and at Mienakker. Zoned decoration is present on sherds from Zeewijk-Oost, Aartswoud and Sijbekarspel-De Veken.

The various beaker types found on the Corded Ware settlement sites in Noord-Holland are also present on other Corded Ware sites in the Netherlands (table 3.2). However, not just the main Van der Waals and Glasbergen (1955) types, but also patterns that differ from the standardised types are found—both in Noord-Holland and on the funerary sites in the eastern part of the Netherlands. Vessel 31 from Aartswoud, for example, shows zones with four cord-impressed lines interspersed with undecorated zones. In the topmost zone a cord has been impressed in a wavy motif (figure 2.12). A parallel for this vessel is found at the funerary site of Uddelermeer (collection National Museum of Antiquities: e1911/9.6). At this site a cord-decorated beaker was found with doubled cord lines, interspersed with undecorated zones, and its topmost zone is also decorated with a wavy cord-impressed line. At Uddelermeer, another beaker was decorated with a motif resembling a flag (collection National Museum of Antiquities: e1929/3.16). This motif is also found on vessel 15 from the southern part of Zeewijk-West.

All of these different decorative motifs and techniques are not just found in funerary contexts, but in settlements as well (table 3.1). The sites of Voorschoten-Boschgeest (Glasbergen *et al.* 1967), Leidschendam (Glasbergen *et al.* 1967), Hazendonk (Louwe Kooijmans, 1974, 1976), Hazerswoude (Drenth, 2010) and P14 (Corded Ware material, Ten Anscher, 2012) have all yielded both cord- and spatula-decorated beakers, by the numbers and ratios are unfortunately unknown.

Both settlements and in funerary contexts have yielded beakers with a more pronounced S-shape, as well as beakers with a more elongated profile. In both contexts there is no correlation between shape and type of decoration. Beakers from funerary contexts with a shoulder height greater than 5.8 cm are of Van der Waals and Glasbergen (1955) types 1a, 1b, 1c, 1d, 1e, zigzag, 2IIb, 2IIc, 2Ia and undecorated. Vessels with a shoulder height of less than 5.8 cm are of Van der

27 These numbers may, especially for the sites of Zandwerven, Mienakker and Aartswoud, be distorted due to missing ceramics.

Waals and Glasbergen (1955) types 1b, 1d, 1c, 1e, 2IIa, 2IIb, 2IIc and undecorated. Note that the first group does not contain type 2IIa beakers and the second group does not contain 2Ia and zigzag beakers. However, this is not unexpected as there are only one 2Ia, one 2IIa beaker and two zigzag beakers in the combined dataset (table 3.2).

3.3.3.3 Fingertip impressions and short wave moulded vessels

Short wave moulded vessels decorated with a wavy band with fingertip or fingernail imprints were only found in the top layers of Zandwerven and Aartswoud (table 3.1). At Aartswoud this type does occur frequently. Vessels decorated with fingertip-impressions but without (wavy) bands were found at Zeewijk-West (northern and southern portions of the site), Zeewijk-Oost, Aartswoud and Keinsmerbrug (table 3.1). At Mienakker and Sijbekarspel-De Veken neither short wave moulded nor fingertip imprinted vessels were found. In the southern part of Zeewijk-West, the number of fingertip-decorated ceramics was very low (table 3.1).

Short wave moulded vessels often have a smitten lower part (Sier, 2001: p.385). This surface treatment is found on sherds at the northern part of Zeewijk-West (n=32), Aartswoud (n=30), Zeewijk-Oost (n=11), and the southern part of Zeewijk-West (n=7). The technological characteristics of short wave moulded vessels and vessels decorated with fingertip and fingernail impressions are comparable to those of other medium- and thick-walled vessels: tempering with stone grit, for example, occurs rather frequently. None of the vessels decorated with short wave moulding or fingertip impressions can be reconstructed from the rim down to the smallest or largest circumference.

Short wave moulded vessels have traditionally been interpreted as typical domestic ware (Floore, 1991: p.55). However, on the Noord-Holland sites the short wave moulded vessels are not the typical domestic ware. The absence of both short wave moulded vessels and fingertip-imprinted vessels on the sites of Mienakker and Sijbekarspel-De Veken and the low numbers of these vessels on the southern part of Zeewijk-West may be a function of chronological differences. The claim made by Floore (1991: p.55) that short wave moulded vessels are found in the highest numbers in the oldest phases of the Corded Ware Culture may be correct. The observed pattern indicates that the same may be true for fingertip-imprinted vessels. In this scenario, medium-thick-walled and thick-walled wares of the late Corded Ware phase may (very often) have been left undecorated. The absence of both fingertip-impressed and short wave moulded vessels at Mienakker and Sijbekarspel-De Veken, together with the low numbers on the southern part of Zeewijk-West, can then be explained by a younger date for these sites. Another option, and one which does not need to rule out the former, is that the short wave moulded vessels had a specific function. A third option is that there are regional differences in the distribution of this type of vessel. These different options will be further discussed in section 3.5.

3.3.4 Use and discard of the ceramics

3.3.4.1 The use of ceramics: Cooking

The analysis of the charred residues and the characteristics of the sherds to which they were attached has yielded very interesting results (table 2.4): thin-walled ware and especially sherds decorated with motifs and techniques described by Van der Waals and Glasbergen (1955) as typical for Corded Ware beakers (impressions with cords and spatulas) often show cooking residues. Of all cord-decorated vessels, the majority have been used for cooking (56%). This number is lower for the spatula-decorated vessels (35%) and the fingertip-decorated vessels (34%) (table 2.4). Of the sherds with residues, 62% are thin-walled and one-third of all thin-walled sherds show cooking residues (table 2.4). Medium-thick-walled (13%) and thick-walled ware (13%) have a significantly lower proportion of residues (table 2.4).

The percentages of sherds with residues differ strongly among the sites. This is very likely due to preservation differences. For example, just 4% of the Slootdorp-Bouwlust sherds that do not originate from features have residues, but 39% of the sherds from Slootdorp-Bouwlust that do originate from features have residues. The residues in the former subsample have likely disappeared due to less favourable preservation conditions.

There are also differences that seem to be caused by deliberate choices made by the owners of the vessels. There are further differences among sites that reflect differences in the characteristics of the vessels that were preferred for preparing cooked meals. During the oldest habitation at Zandwerven, medium-thick-walled and thick-walled vessels show residues more often than at other sites (table 2.4). Further differences are the decoration technique most often found on cooking vessels: at Mienakker, Keinsmerbrug and Aartswoud, spatula-decorated vessels were used more often for cooking than were cord- or fingertip-decorated vessels (table 2.4). At Zeewijk-Oost and the southern part of Zeewijk-West, cord-decorated vessels were used most often for cooking, whereas at the northern part of Zeewijk-West fingertip-decorated vessels were used most frequent for cooking (table 2.4). At Keinsmerbrug, there seems to be more variation in the vessels used for cooking than at the other sites (table 2.4). The above observations contrast with traditional ideas on the use of the beakers, in which beakers are seen as drinking vessels, used especially for drinking alcohol (for a critical discussion, see section 5.3.6).

3.3.4.2 The use of ceramics: Storage and repairs

Vessel functions other than cooking are harder to prove. It seems likely that some of the vessels without residues were also used for cooking but that the residues have disappeared due to weathering. The medium to large vessels that generally do not show residues could have been used as storage vessels. Vessels could also have had more than one function; cooking vessels may have been used as storage vessels as well.

Perforations, interpreted as repair holes, have been found on vessels from all sites except Sijbekarspel-De Veken. At the settlement of Zeewijk, it seems that especially the cooking vessels were repaired. Of the 134 sherds with repair holes, 99 had residues. This relationship is observed for all three areas of the site, the southern part of Zeewijk-West (75%), the northern part of Zeewijk-West (68%) and Zeewijk-Oost (60%). At Mienakker, 31% of the perforated sherds show residues; at Aartswoud this percentage is 40%.

3.3.4.3 Ceramic artefacts

Ceramics artefacts consist of the following: spindle whorls at Zeewijk-West southern part (n=2), Zeewijk-West northern part (n=4), and Zeewijk-Oost (n=1); baking plates at Slootdorp-Bouwlust (possibly n=2), Zandwerven (n=3), Zeewijk-West southern part (n=2), and Zeewijk-Oost (n=1); loom weights at Aartswoud (possibly n=2) and Zeewijk-Oost (possibly n=1); and a perforated clay disc originally smaller in size than the baking plates, at Zeewijk-West southern part (n=1). The possible loom weight from Zeewijk-Oost indicates the secondary use of ceramics; it is a round disc that had been carved from a vessel wall.

Baking plates are round, clay discs that are found on Vlaardingingen, Funnel Beaker and Beaker sites (Glasbergen *et al.*, 1966: p.47, Bakker, 1979: p.57). The function of baking plates is unclear, but may have included usage as a firing plate or vessel lid (Glasbergen *et al.*, 1966: p.47, Bakker, 1979: p.57). One of the baking plates from the southern part of Zeewijk-West yielded charred residue. Analysis

of this residues shows that on this plate the same kind of well-processed meal had been prepared as was prepared in the vessels (Oudemans and Kubiak-Martens, 2014). The spindle whorls and the possible loom weight indicate that spinning and possibly weaving occurred at the sites. It is unclear what material was spun; it may have been wool, but flax also seems to be a possibility (see section 5.2.4).

3.3.4.4 Spatial patterning

For three of the sites under study, Keinsmerbrug, Mienakker and Zeewijk, Nobles (2012, 2013a, 2014) analysed the horizontal and vertical patterning of ceramics. For all three sites it proved impossible to distinguish between phases based on the vertical distribution of the ceramics. It did however prove possible to distinguish among activities and/or phases based on the horizontal spread of the ceramics.

At Keinsmerbrug, the majority of the sherds were dispersed all over the site, and sherds from individual vessels were found on different parts of the site. Vessels 1, 4 and to a lesser extent vessel 12 were, however, found close together inside a house near hearth pits (Beckerman, 2012: p.48, Nobles, 2012: p.187). This area may have been used to prepare food. This conclusion is supported by the presence of residues on vessels 4 and 12 (Beckerman, 2012: p.48).

The distribution of sherds at Mienakker did not show evident distribution patterns, but here again it proved possible to relate several vessels to a structure (Nobles, 2013a). Undecorated beaker-like vessels 26 and 28 and missing vessel g are likely associated with Mienakker house MKII (Beckerman, 2013: p.55, Nobles, 2013a: p.216, 226, table 11.7). Undecorated beaker 24, the type 1e (Van der Waals and Glasbergen, 1955: p.12) wall sherds of vessel X and missing vessels b and j are likely associated with funerary structure MKI (Beckerman, 2013: p.55, Nobles, 2013a: p.226, table 11.7).

At Zeewijk, the ceramics from different parts of the sites showed differences. The excavators had already subdivided the settlement into two parts based on their location on opposite levees of a creek, naming them Zeewijk-West and Zeewijk-Oost (Van Heeringen and Theunissen, 2001: p.66). Nobles (2014) further subdivided Zeewijk-West into two parts based on two clusters of postholes: a northern and a southern part. The assemblages in the three areas show differences in their characteristics, mainly in terms of (1) the amount of stone grit temper, (2) the average thickness of the sherds, and (3) the ratios of various decoration techniques.

At Zandwerven and Aartswoud a stratigraphy was present. There proved to be differences between the lower and the upper layers at Zandwerven. In the lowermost layer the ceramics were more thick-walled; the vessels that could be reconstructed showed a profile and decoration known from the middle phase of the Vlaardingengroup (Beckerman and Raemaekers, 2009: p.73). In the top layers, the sherds were more often thin-walled and decorated with motifs that are comparable to the motifs on the Van der Waals and Glasbergen (1955) Corded Ware beaker types. The analysed material from trench 1 at Aartswoud, originally chosen for its stratigraphy, did not show differences in the assemblages across the different layers.

At Slootdorp-Bouwlust, the material found in features was less weathered than the material recovered from the top soil. The sherds from the features as well as the majority of the sherds from the top soil are uniform in their technological characteristics. However, the top soil yielded a small group of sherds that are different; they are of a higher quality fabric and show neat decoration. These sherds may belong to a different phase, or they may have had a different function or were deposited differently (for a further discussion see section 4.3).

Clear differences in ceramics relatable to differences in function or status of sites (or parts of sites) are thus rare. Spatial differences caused by chronological differences are found at Zeewijk and Zandwerven and possibly at Slootdorp-Bouwlust.

3.4 International comparison

Because the Corded Ware Culture is found over a large area, stretching from Russia to the Netherlands and from Scandinavia to Switzerland, it is relevant to establish to what extent the Corded Ware ceramics from different regions are comparable in order to enhance our understanding of the similarities and differences between Corded Ware regions.

As outlined in section 1.2.2.2, several ceramic types are considered to be part of the international set of the Corded Ware material culture. These include beakers with cord decoration (A-beakers) and *Strichbündel* amphora (Glob, 1945, Struve, 1955). Furholt (2003a: p.118-121) also includes beakers with herringbone decoration (C-beaker) and short wave moulded vessels. These types are seen by Glob (1945), Struve (1955) and Buchvaldek (1997) as belonging to a first unity phase. After this phase, ceramics are said to become more regionally distinct. The idea of a unity phase has, however, been rejected by other scholars, who have argued that these types rarely occur together across the whole region (Malmer, 1962, Neustupný, 1969, Behrens, 1997, Ebbesen, 2006). Other ceramics types that are seen as also having a supra-regional distribution within the Corded Ware area are beakers with triangular decoration, bowls, straight-walled vessels, amphora and short-necked beakers (Furholt, 2014a, fig.2).

The thin-walled ware found on the Noord-Holland settlements shares characteristics with thin-walled ware from other parts of the Corded Ware distribution area. The A-beakers and C-beakers, part of the A-horizon (Glob, 1945, Furholt, 2003a, 2014a), are comparable to Van der Waals and Glasbergen types 1a-1e, found on all Noord-Holland Corded Ware sites studied. The most common patterns, namely, cord imprints in horizontal lines, spatula imprints in horizontal lines, oblique spatula imprints in a single or in alternating directions and spatula imprints in zigzag patterns, are found over large parts of the Corded Ware distribution area (Glob, 1945, Furholt, 2003a, Hübner, 2005, Larsson, 2009). The characteristic slender S-shaped beaker is also common in other Corded Ware regions (Glob, 1945, Furholt, 2003a, 2014a). Decoration patterns on thin-walled ware that are rare, and that occur just once or a limited number of times on the Noord-Holland sites, almost all have counterparts in other regions. For example, vessel 15, from the southern portion of Zeewijk-West, has a pattern with flag-like motifs that has been found just once in Noord-Holland. This pattern is, however, also found on vessels from other parts of the distribution area—for example, on a beaker and two bowls from two graves at Tauberbischofsheim-Impfingen in central Germany (Dresely, 2004: appendix 20.2, 24, 26). Decoration with coupled and zoned cord imprints, as seen on vessel 51 from Zandwerven, vessels 31 and F2 from Aartswoud and vessel S from the southern part of Zeewijk-West, has many counterparts in other regions. On beakers from, for example, graves at Vikletice 1964/58 in Bohemia (Furholt, 2003a: appendix 110) and Flintbek in northern Germany (Furholt, 2003a: appendix 221), similar patterns are found. Decoration with crosses, comparable to that of vessel 13 from Aartswoud, has been found on a beaker from a grave at Hjordkær in southern Denmark (Hübner, 2005: appendix 266.6).

There are also thin-walled ceramic forms and patterns that are commonly found in other parts of the Corded Ware distribution area that are not found in the Netherlands. These include beakers with a straight wall (Glob types L–P) that are very common in south Scandinavia (Glob, 1945, Ebbesen, 2006, Larsson, 2009). The bowls, plates, beakers with a very long neck and beakers with strap handles that are common in different regions of Germany are absent from the Noord-Holland assemblages as well (Loewe, 1959, Hein, 1987). Decoration with vertical patterns of cord and spatula imprints, or triangles made by, and filled in with, cord imprints is found frequently on Corded Ware sites in Germany (Loewe, 1959, Hein, 1987, Dresely, 2004) but is lacking in Noord-Holland.

Whereas counterparts exist in other Corded Ware regions for almost all thin-walled beakers, for the medium-thick-walled and thick-walled ware a completely different picture arises. Amphorae, which are very common in other parts of the Corded Ware distribution area (Glob, 1945, Loewe, 1959, Hein, 1987, Dresely, 2004), are absent from Noord-Holland. The amphorae of the Globular Amphora Culture are seen as direct predecessors of the amphorae of the Corded Ware Culture in the same region (Larsson, 2009: p 61). The *Strichbündel* amphorae have been interpreted as a development of the Złota-group, out of the preceding *Kugel* amphorae (Furholt, 2003b: p.19).

Short wave moulded vessels, also found across large parts of Europe and mainly on settlements, are not very common in Noord-Holland (Becker, 1955). Just as in Sweden (Larsson, 2009: p.145-146), this type is very rare in Noord-Holland. Short wave moulded vessels are only found at Zandwerven and Aartswoud. Other medium-thick-walled and thick-walled vessels are undecorated or decorated with fingertip imprints but lack the distinctive wavy plastic band. The medium-thick-walled and thick-walled vessels share characteristics with those found at so-called Vlaardingen Culture sites. These vessels are not found in other Corded Ware regions.

We can thus conclude that there was, at least in Noord-Holland, no single A-horizon with just A-beakers, C-beakers, *Strichbündel* or F-amphorae and short wave moulded vessels (Glob, 1945, Furholt, 2003a). Although examples of all these types, except amphorae, are found in Noord-Holland, these do not form a single horizon; from the outset there are other types present as well.

This combination of supra-regional comparability of thin-walled ware and region-specific traditions in the making of medium-thick-walled and thick-walled ware, as is observed in Noord-Holland, has also been attested to by others for the Corded Ware Culture and for other cultures (Salanova, 2001, Besse, 2004, Furholt, 2008, Larsson, 2009). Studies of both Baden and Bell Beaker Culture ceramics showed that the thin-walled ware was part of a larger network, whereas the thick-walled ware showed local or regional origins and developments (Salanova, 2001, Besse, 2004, Furholt, 2008). Larsson (2009: p.258) postulates that adhering to ideal types was the norm and that innovation and experimentation were not encouraged. This explanation seems to fit Noord-Holland's thin-walled ware very well. The shared technological characteristics of thin-walled ware and other wares render imports unlikely. Just as has been proposed by Larsson (2009) for the Corded Ware Culture and by Salanova (2001) for the Bell Beaker Culture, it seems likely that the standardisation over large areas is the result of movements of people and contacts between potters. After the transition to the Bell Beaker Culture, the presence of standardised early Bell Beaker types showing strongly comparable technological characteristics to older half decorated and All Over Ornamented Beaker types can also be explained by movements of people and contacts between potters (for a more detailed discussion, see section 5.3.5).

3.5 Concluding remarks

The ceramics from seven settlements and their uses have been analysed and compared with each other and to sites labelled traditionally as Funnel Beaker, Vlaardingen and Corded Ware Culture sites. This comparison has uncovered some interesting patterns. The ceramics from Slootdorp-Bouwlust have much in common with Funnel Beaker ceramics. The material from the bottom layer at Zandwerven shares similarities with Vlaardingen ceramics of Beckerman and Raemaekers' (2009) middle phase. Ceramics from the top layer of Zandwerven, Zeewijk, Aartswoud, Keinsmerbrug, Mienakker and Sijbekarspel-De Veken are similar to those found at other Corded Ware sites, including funerary contexts from the eastern Netherlands. However, the ceramics from these sites also show a strong resemblance to the assemblages on settlements of Beckerman and Raemaekers' (2009) late phase (figure 3.5 and 3.8).

The ceramics from Slootdorp-Bouwlust share characteristics with early Funnel Beaker and Funnel Beaker ceramics found at the settlement sites of P14 (Ten Anscher, 2012) and Beekhuizerzand (Modderman *et al.*, 1976), located to the east of the coastal zone. Slootdorp-Bouwlust likely represents the oldest habitation studied and does not share many characteristics with the other sites studied (figure 3.5). A few comparable characteristics are found in the assemblage from the lowermost layers of the Zandwerven site. These shared characteristics mainly include the decoration with a row of perforations under the rim. One sherd from the lowermost layer of the 1929 excavation campaign at Zandwerven contains flint and hornblende temper, materials that are also found in Slootdorp-Bouwlust sherds but not in sherds from any of the other studied Noord-Holland sites.

The similarities between the Funnel Beaker ceramics from Slootdorp-Bouwlust and those from the other sites are few, while the similarities between Vlaardingen and Corded Ware ceramics from the coastal zone proved to be extensive. This study shows that developments in the ceramics from both the Vlaardingen region (in Zuid-Holland and the rivers area) and the Corded Ware region of Noord-Holland are not dissimilar but comparable. In both the middle and the late phases of the sites labelled Vlaardingen, there is a group of smaller beakers and larger vessels (figure 3.3). The shapes of the vessels become more elongated over time (figure 3.3) (Beckerman and Raemaekers, 2009: p.11). From the present study it is clear that the developments in the ceramics in the 'Vlaardingen area' and the 'Corded Ware area' share similarities (figure 3.3).

Just one site in Noord-Holland dates to the middle phase of the Vlaardingen group, namely, Zandwerven. On this site a layer with S-shaped vessels is present, of which one is similar to medium and large specimen of Vlaardingen group C. This vessel type is the most common vessel type on Vlaardingen sites and is found at Hekelingen I, Hazendonk, Voorschoten-Boschgeest, Halve Mijl, Leidschendam, Haamstede Brabers, Vlaardingen and OZ 35/36 (Beckerman and Raemaekers, 2009: p.6, fig.15) (figure 3.3). The first habitation at Zandwerven likely represents the second phase of habitation of the remaining sites studied.

The top layers of the sites of Zandwerven, Keinsmerbrug, Mienakker, Zeewijk-West southern and northern portions, Zeewijk-Oost and Aartswoud yielded ceramic assemblages very similar to the assemblages found at the late Vlaardingen sites of Voorschoten-Boschgeest, Vlaardingen, Hekelingen I, Leidschendam and Hazendonk. At these Vlaardingen sites, the medium and large vessels change from having a distinct S-shape (during the middle Vlaardingen phase) to being more elongated (late Vlaardingen phase) (Beckerman and Raemaekers, 2009: p.81). During this late phase, beaker-shaped vessels decorated with cord or spatula motifs were also used (figure 3.3).

The developments in the ceramics at the site of Zandwerven are thus similar to those at the Corded Ware settlements from Noord-Holland and at the late Vlaardingen sites of Voorschoten-Boschgeest, Vlaardingen, Hekelingen I, Leidschendam and Hazendonk. The only exception is that Vlaardingen group D vessels have not been found at any of the Corded Ware sites. Although these developments in the ceramics are difficult to quantify because the numbers and ratios of different characteristic on the comparator sites often not known, it now appears that the ceramics from two regions that were previously seen as being very different are, in fact, quite similar.

Traditionally the Vlaardingen Culture and the Corded Ware Culture have been treated as distinct cultures. Drenth (2005: p.335) stated that there was a gradual transition from Vlaardingen to Corded Ware. Louwe Kooijmans (1976: p.289) also postulated that there was a period of 'peaceful coexistence' of the Vlaardingen and Corded Ware pottery traditions, with incidental contacts between the two communities. After that phase an 'assimilation phase' is said to have started (VL2b, Louwe Kooijmans, 1976: p.289). After these two phases the Vlaardingen pottery tradition was completely replaced by the Beaker pottery tradition (Louwe Kooijmans, 1976: p.289). Van Gijn and Bakker (2005: p.304-305) state that in the Funnel Beaker (TRB) area, the transition to Corded Ware was very rapid and took only 50 years. This same transition in the Vlaardingen area is seen as far more gradual (Van Gijn and Bakker, 2005: p.304). Amkreutz (2013: p.43) states that

"In many ways the Single Grave Culture can be seen as pan-European phenomenon, forming a cultural break with the past."

The present study shows that the theories of Louwe Kooijmans (1976: p.289), Van Gijn and Bakker (2005: p.304-305) and Amkreutz (2013: p.43) are incorrect. There are thus significant consequences for the existing chronological models and reconstructions of society—consequences that will be further elaborated upon in chapters 4 and 5.

Previously, it was also postulated that Corded Ware settlements would yield few beakers but more so-called settlements ceramics, including short wave moulded vessels, proto pot-beakers, beaker pots, amphora, *dosen* and bowls (with feet) (Lanting and Van der Waals, 1976: p.71, Floore, 1991: p.55, Drenth, 2005: p.338, Ten Anscher, 2012: p.179-181). This picture also does not seem to be completely correct for the settlements in Noord-Holland. Thin-walled undecorated and decorated sherds with patterns resembling the Van der Waals and Glasbergen (1955) beaker types form the majority of the studied material at the sites of Sijbekarspel-De Veken, Mienakker, Zeewijk (all parts), Keinsmerbrug and Aartswoud and in the top layers of Zandwerven (table 2.3). Of the 16 vessels found at these Corded Ware sites and areas, 8 are beakers. These beakers are similar in both shape and decoration to beakers found in funerary contexts (in mainly the eastern sandy part of the Netherlands) and to beakers found on other Corded Ware settlements (table 3.2).

Short wave moulded vessels, traditionally seen as typical settlement ceramics, were only found at Aartswoud and Zandwerven (see 2.3.3 and 2.3.4). Plastic elements, waving bands and ridges, are lacking from the majority of the settlements. A vessel with an unusual profile from Keinsmerbrug may be an amphora (Drenth, 2005: fig.3). Aartswoud, Zeewijk-Oost, and the northern part of Zeewijk-West and to a lesser extent in the southern part of Zeewijk-West, at Keinsmerbrug and in the top layers from Zandwerven each yielded a group of medium-thick-walled and thick-walled sherds that were decorated with either one or two rows of fingertip imprints or with fingertip imprints all over.

The absence of short wave moulded vessels at the sites studied may be an indication that the theory that this type of vessel represents the typical domestic ware (as proposed by Floore, 1991: p.55) is incorrect. Alternatively, these vessels may (1) date to a specific (older) period not present at the studied sites, (2) have had a specific function, or (3) have been used in a specific region.

At P14, the thick-walled Corded Ware material shows more types and decorations than on the Noord-Holland settlements (Ten Anscher, 2012: p.175-181). At P14, both beaker pots with applied cordons and short wave moulded vessels with straight plastic bands were found (Ten Anscher, 2012: p.175-181, fig. 8.8 and 8.9). This indicates that the medium-thick-walled wares, in contradiction to the thin-walled wares, differ considerably between regions. The medium-thick-walled and thick-walled vessels at the Noord-Holland sites show more resemblance to the so-called Vlaardingen material. In the eastern part of the Netherlands, in contrast, different shapes and decorative motifs are associated with the medium-thick-walled and thick-walled ware. At the site of Hazerswoude—located within the geographic area traditionally seen as the Vlaardingen area—a sherd of an amphora and sherds with straight plastic bands were found (Drenth, 2010: p.137-138).

In conclusion, It is argued here that there are similarities in several types of ceramics among the different Corded Ware regions. Cord- and spatula-decorated beakers are found in the different Corded Ware regions. The medium-thick-walled and thick-walled ware, however, is not comparable and shows regional variation. This pattern is not just observed in the Netherlands, but also in other Corded Ware regions. For example, amphorae are very common in other regions but are lacking in Noord-Holland. These amphorae reflect ongoing older regional traditions (Furholt, 2003a: p.19, Larsson, 2009: p 61). This topic will be further explored in relation to ¹⁴C dates in chapter 4 (section 4.3.3.5) and in relation to supra-regional networks and mobility in chapter 5 (section 5.3.5).

The studied sites that have ceramics comparable to those from late Vlaardingen sites as well as Corded Ware sites can be divided into two groups: group 1 (the top layers from Zandwerven, the site of Zeewijk-Oost, the northern part of Zeewijk-West, and the sites of Aartswoud Keinsmerbrug) and group 2 (the southern part of Zeewijk-West, and the sites of Mienakker and Sijbekarspel-De Veken). Group 1 assemblages have a higher percentage of both stone grit tempering and thick-walled ware. Spatula decoration is most common, but cord and fingertip decoration is present as well (table 2.3). Group 2 assemblages show lower proportions of stone grit tempering and higher proportions of thin-walled ware. On group 2 sites, cord decoration is very common and All Over Ornamented types occur more frequently (table 2.3). The group division likely represents a chronological division. The group 1 assemblages likely represent an early Corded Ware phase, whereas the group 2 assemblages likely represent a later Corded Ware phase. The chronological relevance of these groups, however, needs further testing. This topic will be explored in section 4.3.

Another interesting result from the present study is that the use to which various vessels had been put in the past could be established. A quarter of all sherds showed cooking residues (table 2.4). The majority of these residues (62%) were observed on thin-walled ware. Especially vessels decorated with cord imprints were very often used for cooking (56%). The medium-thick-walled and thick-walled vessels were very likely used for storage. All three areas of the Zeewijk site yielded spindle whorls, indicative of the spinning of either flax or wool. At Zeewijk-Oost and Aartswoud, fragments of possible loom-weights have been found, indicative of weaving. Slootdorp-Bouwlust, Zandwerven, the southern part of Zeewijk-West and Zeewijk-Oost yielded baking plates. A stone tool from Mienakker showed

	Stoortdorp-Bouwlust	Zandwerwen bottom	Zandwerwen top	Zeewijk-west northern part	Zeewijk-oost	Aartswoud	Keinsmerbrug	Zeewijk-west southern part	Mienakker	Sijbekarspel-De Veken
<i>Morphological characteristics</i>										
High upright or inward bending neck										
B										
Pronounced S-shape (medium to large group C)										
D										
Enlarged beaker (medium to large group E)										
Beaker (small group c, e, f)										
<i>Technological characteristics</i>										
Thick-walled ware over 15%										
Stone grit over 20%										
Thin-walled ware over 60%										
Stone grit under 20%										
<i>Decoration</i>										
Tiefstich decoration										
Perforations under the rim	•••••	•••••								
Knobs										
Spatula decoration*										
Cord decoration*										
Fingertip or fingernail imprints										
Short-wave moulding										

*In Glasbergen and Van der Waals (1955) motifs

traces that indicated that the tool was used to smooth the wall of a pot (Garcia-Diaz, 2013: p.85). This indicates that ceramics were produced in this region. Ceramics were re-used and repaired as well. The assemblages; their uses; and the differences in ratios, types and uses can help us to better reconstruct Corded Ware society. The question of how the Corded Ware societies can be reconstructed will be addressed in more detail in chapter 4.

Figure 3.9 (this page and following page) Comparing all sites.

	P14 (early Funnel Beaker)	P14 (Funnel Beaker)	Beekhuizerzand	Voorschoten-Boschgeest (middle)	Hazendonk (middle)	Westroek vindplaats 3	Leidschendam	Hazendonk (late)	Voorschoten-Boschgeest (late)	Hazerswoude	P14 (Corded Ware)
<i>Morphological characteristics</i>											
High upright or inward bending neck											
B											
Pronounced S-shape (medium to large group C)											
D											
Enlarged beaker (medium to large group E)											
Beaker (small group c, e, f)											
<i>Technological characteristics</i>											
Thick-walled ware over 15%											
Stone grit over 20%											
Thin-walled ware over 60%											
Stone grit under 20%											
<i>Decoration</i>											
Tiefstich decoration											
Perforations under the rim											
Knobs											
Spatula decoration*											
Cord decoration*											
Fingertip or fingernail imprints											
Short-wave moulding											

*In Glasbergen and Van der Waals (1955) motifs

The Corded Ware Culture Chronology

4.1 The Corded Ware Culture chronology

The presence of ceramics, and to a lesser extent axes, on almost all Corded Ware Culture sites, coupled with the similarities of many characteristics of these artefacts across large regions and identical changes in these artefacts over time, have led to the establishment of different chronological models based on ceramics, axes or both. For almost all countries or regions where Corded Ware Culture remains have been found, one or more of these chronological models have been compiled (for example, Glob, 1945, Struve, 1955, Malmer, 1962, Buchvaldek, 1976, Lanting and Van der Waals, 1976, Hübner, 2005). Several models have been compiled not for just one country but for a wider region or for the entire Corded Ware distribution area. Furthermore, several debates and ideas on Corded Ware chronology have been formulated that concern the whole Corded Ware area. Those models and ideas that affect larger regions or the whole Corded Ware area are of particular interest here, as they can be compared to the results presented here.

An internationally very influential chronological model is that of Glob (1945). This model, established for Jutland, Denmark, is based on stratified sites. In this model, the Corded Ware Culture is divided into what are termed the undergrave, groundgrave, and uppergrave periods. During these three different periods, different types of axes and ceramics were used as grave goods. Axe types A and B, cord-decorated A-beakers and *Strichbündel* (or F-amphora) were the types used during the earlier part of the undergrave period (Glob, 1945: p.241–258). Axe types C, D and E, as well as C-beakers, were used as grave goods in the later part of this period (Glob, 1945: p.241–258). During the following groundgrave period, axes of types F, G, H—and, during the younger part of this period, type I—were used, as well as beaker types D and E and bowls of type G (Glob, 1945: p.241–258). Axe types K and L and straight-walled beakers of types L–O characterise the uppergrave period (Glob, 1945: p.241–258). This sequence and type division has been adopted by researchers outside Denmark. Drenth and Lanting (1991: p.42), for example, use the hammer typology for their phasing of the Corded Ware Culture in the Netherlands.

Glob postulated that the Corded Ware Culture starts with a unity or A-horizon; during this phase, A-beakers, A-axes and *Strichbündel* amphora (F-amphora) were the only types that occurred across the entire Corded Ware region. This idea of a unity phase has led to heated debates among scholars: the axe and ceramic types related to this phase are indeed found in large part of the Corded Ware distribution area, yet the types are not always found in association and do not always belong to the oldest phase (Malmer, 1962, Neustupný, 1969, Behrens, 1997, Ebbesen, 2006).

Since Glob's 1945 publication, many additional typochronological models, particularly for the beakers found in different regions or countries, have been presented (Fischer, 1956 [Saale, Germany], Hausler, 1955 [Russia], Sangmeister,

1951, Sangmeister and Gerhardt, 1965 [southern Germany], Struve, 1955 [Schleswig-Holstein, Germany], Van der Waals and Glasbergen, 1955 [the Netherlands]).

From the 1950s onward, the typochronologies have been tested and backed up by ^{14}C dates and, especially in Switzerland, dendrochronological dates. Several chronological models are based on ^{14}C dates. For example, Lanting and Van der Waals (1976) used ^{14}C dates to argue that in the Netherlands there was a continuous development from the Corded Ware Culture to the Bell Beaker Culture. This influential model, as well as the extent to which ^{14}C dates are useful for establishing a fine-scaled chronology, are criticised here. ^{14}C dates suffer from numerous problems, including broad plateaus in the calibration curve, uncertainty of association, problems with the dated sample(s), the age of the dated material being older than the layer it was found in (the 'old wood effect'), calibration problems and limited stratigraphic evidence (Sørensen, 1997, Furholt, 2003a, Włodarczak, 2009). These problems hamper the establishment of fine-scaled chronologies and limit the usefulness of ^{14}C dates in debates on migration or diffusion and the origin spread and end of the Corded Ware Culture. Furholt (2003a) reanalysed all Corded Ware dates from Central Europe and southern Scandinavia, using the plateaus in the calibration curve, letter coded A–H, to compare dates and regions (figure 4.1).

Recent studies focus not only on the ceramic types (and the dates for the types), but also on the size of the distribution area in which the types are found (Furholt, 2003, 2014a, Larsson, 2009). In addition, there has also been an increase in the study of technological aspects of Corded Ware ceramics. Larsson (2009), for example, concluded that several Corded Ware types that are common in some parts of the distribution area, are not found or are rare in Sweden: amphorae are absent, short wave moulding is almost completely absent and A-beakers rarely have a 'fringe' of vertical strokes or impressions (Larsson, 2009: p.256). Present in Sweden—but not outside of Scandinavia—are globular-shaped beakers, base decoration, a single wavy cord line below the horizontal lines of cord, and double-dotted cordons on the coarse ware (Larsson, 2009: p.256). On the basis of her technical analysis of the Corded Ware ceramics, Larsson (2009: p.409-410) concludes that early beakers were made following an operational sequence completely different to that of the preceding period. She therefore concludes that the Corded Ware potters moved to Sweden, presumably from Finland, to marry partners who wanted to become part of the Corded Ware network (Larsson, 2009: p.409-410). Other scholars did the same type of research on the technological aspects of ceramics and concluded that, for different cultures, including the Baden and the Bell Beaker Culture, thin-walled ware is often similar over large regions, whereas thick-walled ware shows more regional traditions (Salanova, 2001, Besse, 2004, Furholt, 2008). For the Corded Ware Culture, research by Furholt has shown that there are several connecting elements or similar ceramic types, but also ample regional variation (Furholt, 2003a-b). According to Furholt (2003b: p.120) not just the A-beaker, *Strichbündel* or F-amphorae, but also beakers with herringbone patterns (C-beakers) and short wave moulded vessels are part of the A-horizon. This horizon is not so much a typological horizon as a period during which large areas have the same pottery types, supplemented by regional types (Furholt, 2003a: p.120).

On the basis of ceramic analysis undertaken within the Odyssee research project, new ideas on the Corded Ware chronology will be formulated. These include the start of the Corded Ware Culture, the developments during this period and the transition to the Bell Beaker Culture in the Noord-Holland region. Furthermore, these new data and new ideas will be used to test the

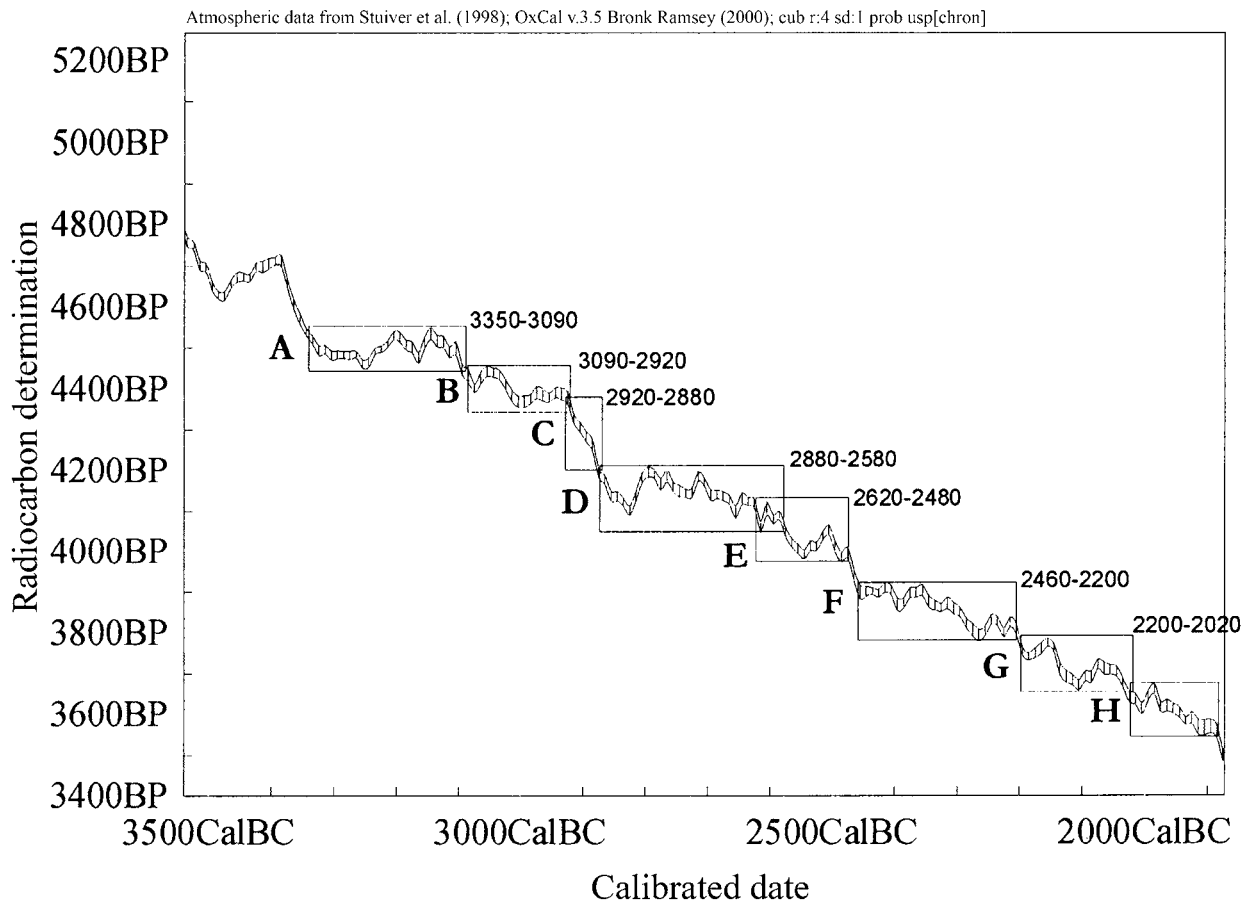


Figure 4.1 Furholt (2003a) plateaus.

chronological models currently in use and to discuss the validity and implications of the new chronological ideas, for the coastal zone, the Netherlands and the whole of the Corded Ware distribution area. The analysis presented here includes the technological, morphological and decorative characteristics of the ceramics. The presence and age of the types supposedly present in the whole Corded Ware area will be tested for Noord-Holland. These universal types include A-beakers, C-beakers (Van der Waals and Glasbergen, 1955, types 1a and 1c-d), F-amphorae and short wave moulded vessels. The letter codes used by Furholt (2003a) for the plateaus in the calibration curve will be used to review the ^{14}C dates (figure 4.1).

4.2 The Dutch Corded Ware Culture chronology re-examined²⁸

4.2.1 Introduction

Currently, there are two models in use for the chronological development of the Corded Ware Culture and the Bell Beaker Culture in the Netherlands. These models are mutually exclusive, since they propose different cultural developments. The first model envisages a unilinear development from the Corded Ware Culture to the Bell Beaker Culture, with consecutive beaker types as the products of a continuous development. The other model sees two tracks in the development of these cultures and postulates that from the late Corded Ware Culture onwards there is a group of half-decorated Beakers and a group of fully-decorated Beakers. To allow a proper study of the chronology of the ceramics from the Corded Ware

28 Based on Beckerman 2012.

settlement sites in Noord-Holland, it must be established whether one model or parts of both chronological models are indeed correct and useful for analyzing and classifying the ceramics. In this paper the different arguments in favour of the two models will therefore be tested.

4.2.2 *The two models*

4.2.2.1 The unilinear model

The key proposition of the unilinear model is that the development from Protruding Foot Beakers via All Over Ornamented Beakers and subsequent Maritime Bell Beakers to Bell Beakers of the Veluwe type was a continuous one. There is, however, not just a single unilinear model but there are several versions, largely based on the same type divisions but with different adjustments and propositions (Van der Waals and Glasbergen, 1955, Lanting, 1973, Drenth and Lanting, 1991, Lanting and Van der Plicht, 1999-2000, and Lanting, 2007-08). An outline of the differing versions will be given below.

4.2.2.2 Van der Waals and Glasbergen, 1955

A first typological and chronological seriation of Protruding Foot Beakers, All Over Ornamented Beakers and Bell Beakers was presented in 1955 by Van der Waals and Glasbergen (figure 2.1). These scholars presented a scheme in which the ceramics, on the basis of their morphological characteristics and decoration, were divided into Protruding Foot types, Bell Beaker types and All Over Ornamented types, although the designation All Over Ornamented was then not used (Van der Waals and Glasbergen, 1955).

The beakers with a protruding foot are divided into six sub-types, 1a-1f (Van der Waals and Glasbergen, 1955: p.7-18). Types 1a-1e are distinguished on the basis of their decoration and the alphabetical order was thought to reflect the chronological order (Van der Waals and Glasbergen, 1955: p.8-17). Type 1f is undecorated, but a plastic band or a cordon may occur below the rim (Van der Waals and Glasbergen, 1955: p.12). This type was present throughout the whole sequence (Van der Waals and Glasbergen, 1955: p.12). Beakers with a zig-zag design were not designated as a sub-type but did get special mention (Van der Waals and Glasbergen, 1955: fig. 3 and p.16).

Van der Waals and Glasbergen interpreted All Over Ornamented Beakers (1955: p.27) as a hybrid group of beakers, combining characteristics of both groups. The All Over Ornamented Beakers do not represent a phase, but are said to occur alongside both Protruding Foot beakers and Bell Beakers (Van der Waals and Glasbergen, 1955: p.30-31). On the basis of their decoration, three different types were distinguished; 2IIa-2IIc (Van der Waals and Glasbergen, 1955: p.27-33).

The earliest Bell Beakers are so-called Maritime beakers, which are subdivided into types, 2Ia-2Ic (Van der Waals and Glasbergen, 1955: p.19-24). This subdivision was based on the zonation of the decoration. Type 2Ia has zoned decoration, on type 2Ib incipient zone contraction is visible and on type 2Ic the zones are fully contracted (Van der Waals and Glasbergen, 1955: p.19-24). The group of Maritime Beakers also included beakers with paired – alternating decorated and undecorated – zones (Van der Waals and Glasbergen, 1955: p.19-24).

The successors of the Maritime Beakers, the so-called Veluwe Beakers, were divided into three types, 2Id-2If (Van der Waals and Glasbergen, 1955: p.24-27). In this classification the ratio between height and width of the vessel is particularly significant. Type 2Id is higher than broad, type 2Ie is as high as it is broad and

in type 2If the height exceeds the width (Van der Waals and Glasbergen, 1955: p.24–27). The variation in decorative arrangements and elements is considerable (Van der Waals and Glasbergen, 1955: p.24–27). A new decorative element on Veluwe Beakers consists of zones filled with decoration with a vertical orientation (Van der Waals and Glasbergen, 1955: p.25). These zones were used as a frieze in which different motifs were applied in triangular boxes, or which were divided into metopes. The undecorated strips between the decorated zones are presumed to show chronological developments; on examples of type 2Ie Beakers these strips stand out in relief, and on some of the type 2If these bands become raised ridges; in the final stage the decoration between the ridges may disappear completely (Van der Waals and Glasbergen, 1955: p.25–26). Furthermore, Van der Waals and Glasbergen (Van der Waals and Glasbergen, 1955: p.25–26) state that the decoration on type 2Id was applied in a regular and clear manner, whereas younger vessels show more carelessly made decoration.

4.2.2.3 Lanting, 1973; Lanting and Van der Waals, 1976

In 1973 Lanting and in 1976 Lanting and Van der Waals presented what later came to be known as the ‘Dutch model’. They argued that the development from Protruding Foot beakers to All Over Ornamented to Bell Beakers was continuous and a product of local developments rather than large-scale migrations (figure 4.2).

Lanting and Van der Waals (1976: p.5) recognised three main trends in the development of the Protruding Foot Beakers. These trends relate to: 1. the shape of the vessel base; 2. the techniques of decoration; and 3. the decorative motifs. The earliest Beakers have a clearly pinched-out foot (Van der Waals and Glasbergen, 1955: p.5). Later Beakers have a flat or hollow base. The decoration changes from solely consisting of parallel lines of cord-impressions to one with grooved lines and lines made with a plain spatula (Van der Waals and Glasbergen, 1955: p.5). The oldest decoration, both with cord-impressed and grooved lines, consists of horizontal lines. The motifs first change into herringbone design and later into horizontal rows of diagonal impressions in one direction. According to Lanting and Van der Waals (1976: p.5), type 1a is the oldest and type 1e is the youngest, in line with the initial publication by Van der Waals and Glasbergen (1955: p.7–18). Lanting and Van der Waals (1976:p.5) do, however, regard the chronological order of types 1b, c and d as unclear, and a considerable temporal overlap must be taken into account. Zigzag Beakers were seen as not fitting into this sequence, yet are considered to be closely related to type 1d (Van der Waals and Glasbergen, 1955: p.5).

All Over Ornamented Beakers are, in the unilinear model of Lanting and Van der Waals (1976: p.3, 5, 13–15) not a hybrid group of Beakers, as was suggested by Van der Waals and Glasbergen (1955: p.27), but a link in the development from Protruding Foot beakers to Bell Beakers (figure 4.2). Radiocarbon dates suggest a chronological overlap between Protruding Foot beakers and All Over Ornamented Beakers (Lanting and Van der Waals, 1976: p.3). An argument for the close relationship between Protruding Foot beakers and All Over Ornamented Beakers is that they are found together in graves and settlement pits (Lanting and Van der Waals, 1976: table 1). Moreover, two beakers, one from Merksplas (Belgium) and one from Ulenburg (Germany) combine features of Protruding Foot beakers and All Over Ornamented Beakers (Lanting and Van der Waals, 1976: p.8). Typical of many All Over Ornamented Beakers is decoration on the inside of the rim. This kind of decoration is also found on Late Protruding Foot beakers and on Bell Beakers of the Maritime type, and continues into stamp-decorated Barbed-Wire pottery (Lanting and Van der Waals, 1976: p.6). All Over

Ornamented types 2IIa and 2IIc are sometimes decorated with diagonal notches on the rim. Such decoration is also found on type-1d Protruding Foot beakers and Maritime Beakers (type 2Ia). The occurrence of these two decorative patterns on the different beaker groups is regarded as another argument for continuous, unilinear, development (Lanting and Van der Waals, 1976: p.6).

The All Over Ornamented Beakers are said to differ from Protruding Foot beakers in three respects (Lanting and Van der Waals, 1976: p.5–9). First, the outer surface of the All Over Ornamented Beakers, as their name reveals, is fully decorated, whereas Protruding Foot beakers have an undecorated lower part. Second, the protruding foot has almost completely disappeared on All Over Ornamented Beakers. The third difference is that grooved lines are absent on All Over Ornamented Beakers. All the other decorative motifs and techniques known from Protruding Foot beakers are also present on All Over Ornamented Beakers. Lanting and Van der Waals consider types 2IIb en 2IIc (1976: p.6) to be the oldest All Over Ornamented types, because they display traits with a close resemblance to Protruding Foot beakers. Type 2IIb is decorated with parallel lines of cord-impressions; type 2IIc is decorated with either herringbone motifs or horizontal rows of oblique or vertical spatula-impressions (Lanting and Van der Waals, 1976: p.5). Type 2IIa is thought to be the youngest All Over Ornamented type; Lanting and Van der Waals (1976: p.6) see it as the direct predecessor of the Bell Beakers of the Maritime type. These vessels are decorated with more-or-less contiguous horizontal zones with diagonally placed dentated spatula-impressions. The zones are delimited by a cord-line. The direction of the diagonal impressions alternates by zone. Sometimes a narrow undecorated zone appears between two decorated ones. The last type, 2IIc, is placed chronologically between the other types (Lanting and Van der Waals, 1976: p.6). This type closely resembles type 2IIa, but the impressions are made with a plain spatula and the direction of the decoration does not always alternate by zone (Lanting and Van der Waals, 1976: p.37).

Concerning the chronology of the Maritime Beakers, Lanting and Van der Waals (1976: p.9) state that type 2Ia is the oldest, and All Over Ornamented type 2IIa is considered the direct predecessor of this type. The 2Ia Beakers are decorated with zones filled with impressions made with a dentated spatula. They regard the development from 2IIa to 2Ic Beakers as a gradual one. Maritime Beakers with dentated spatula lines delimiting the zones are considered to be younger (Lanting and Van der Waals, 1976: p.9). After this, a new development occurred: the zones started to contract. Beakers with incipient zone contraction are labelled type 2Ib (Lanting and Van der Waals, 1976: p.8). Lanting and Van der Waals (1976: p.8) argue that the pairing of zones is not the same as zone contraction. The alternation of decorated and undecorated zones of roughly equal width is seen as a basic Maritime-style element. Therefore, the Beakers with paired zones are placed with type 2Ia (Lanting and Van der Waals, 1976: p.9). After the incipient zone contraction, zone contraction 'proper' is claimed to form the link between the Maritime Beakers and the Beakers of the Veluwe types (2Id-2If). Lanting and Van der Waals (1976: p.9) see the type with contracted zones, 2Ic, as essential to comprehending the origins of the Veluwe types. A problematic point, however, is that this type comprises only a few specimens. Lanting and Van der Waals (1976: p.9) furthermore stress that the evolution of the Veluwe types out of the Maritime types as described by Van der Waals and Glasbergen (1955) was a phenomenon taking place in the central part of the Netherlands.

The chronology of the Danish Corded Ware Culture is used by Lanting and Van der Waals (1976: p.12) to validate their model. Parallel beaker types, and especially battle-axes, daggers of Grand Pressigny flint and daggers of Scandinavian types are said to confirm the established Dutch chronology. The Protruding Foot

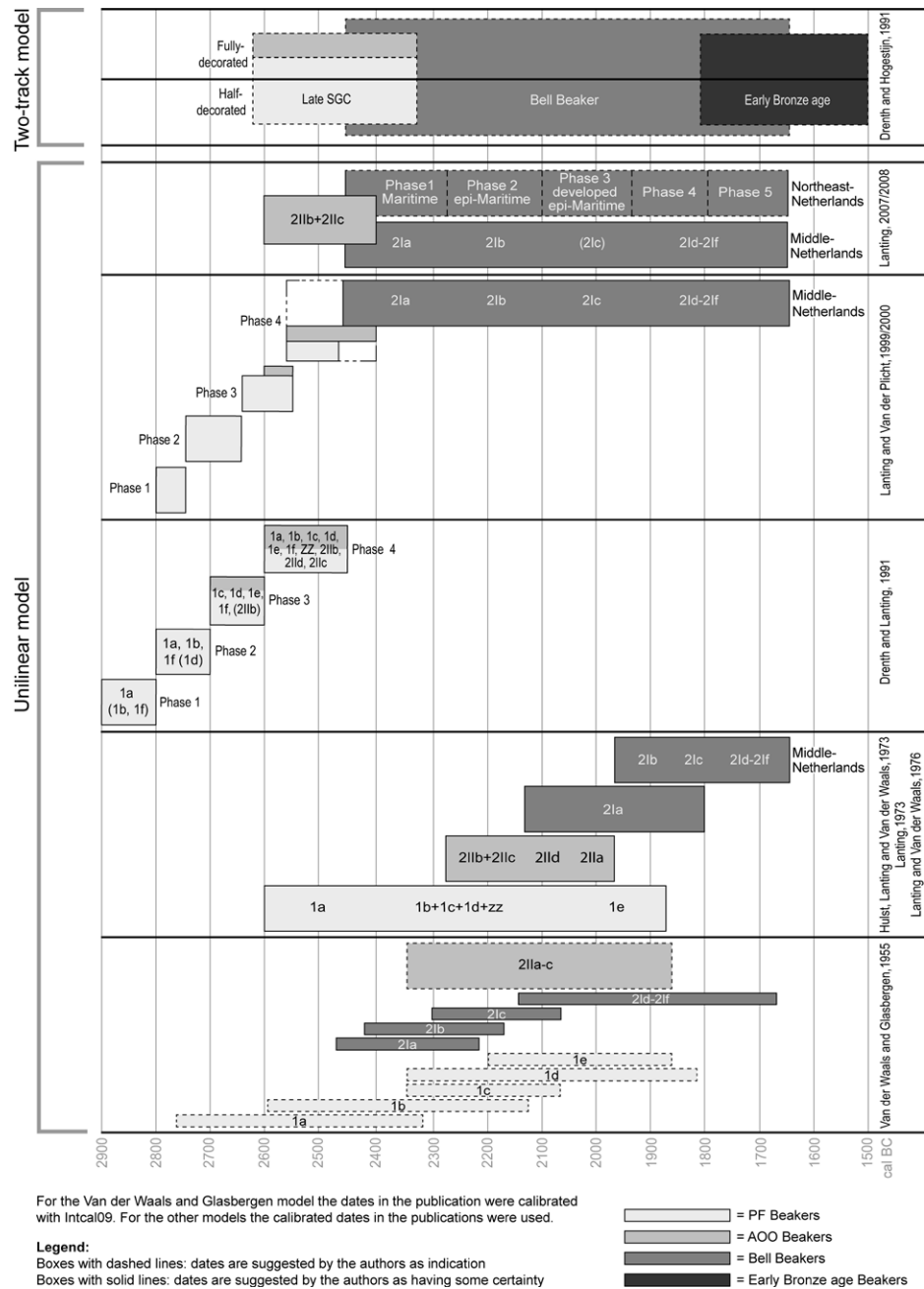


Figure 4.2 The different chronological models.

beakers group is seen as contemporaneous with the Danish Undergrave and Groundgrave Periods, the All Over Ornamented group with the Groundgrave Period, the beginning of the Bell Beaker Culture coincides with an advanced phase of this period, and the Late Bell Beakers coincide with the Uppergrave Period and possibly the start of Late Neolithic B (Lanting and Van der Waals, 1976: p.12–15).

In order to test their relative chronology based on the variations in the ceramics, Lanting and Van der Waals (1976: 36–67, table III) presented a diagram in which they placed all ¹⁴C dates associated with ceramics in the same order as their proposed type seriation. These ¹⁴C dates were said to largely support the ordering of Protruding Foot beakers as the oldest, All Over Ornamented Beakers as their immediate successors and Bell Beakers as their ultimate successors (Lanting and Van der Waals, 1976: p.37). The ¹⁴C dates seem to indicate that Protruding Foot beakers and All Over Ornamented Beakers co-existed for about two centuries.

Not just the ordering of the groups, but also the ordering of the various types appears to be supported by the ¹⁴C dates (Lanting and Van der Waals, 1976: p.37).

4.2.2.4 Drenth and Lanting, 1991

Drenth and Lanting (1991) spotted a number of problems with the chronology of the Corded Ware Culture. First, there are only three stratified sites that may yield information on type sequencing. Second, there are no dendrochronological dates. Third, ¹⁴C dates, after calibration, rarely are unequivocal and can be used only as a *terminus post quem* (Drenth and Lanting, 1991: p.42). Drenth and Lanting (1991) therefore propose a revised chronology based on hammer-axe types (fig. 1). These can be related to hammer axes from Jutland, for which a more firmly based chronology is available. Drenth and Lanting (1991: p.42–43) divided the Corded Ware Culture into four phases: phase 1, 2900/2850-2800 BC; phase 2, 2800-2700 BC; phase 3, 2700-2600 BC; and phase 4, 2600-2450 BC. The authors warn that their scheme is in part highly hypothetical, because some hammer-axe types are represented by just one specimen (Drenth and Lanting, 1991: p.46).

4.2.2.5 Lanting and Van der Plicht, 1999-2000

Lanting and Van der Plicht (1999-2000) published an extensive overview of the ¹⁴C chronology of the Neolithic. For the Corded Ware Culture they follow the division into phases by Drenth and Lanting (1991), but they date phase 1 between 2800 and 2750 BC; phase 2, 2750-2650 BC; phase 3, 2650-2550 BC; and phase 4, 2550-2400 BC (Lanting and Van der Plicht, 1999-2000: p.35 and 74–9, fig. 1). The All Over Ornamented Beakers are dated to 2600-2400 BC; the two-century overlap with the Corded Ware Culture is thus maintained (Lanting and Van der Plicht, 1999-2000: p.35, 79–81). The Bell Beaker Culture then starts around 2500 or 2540 BC (Lanting and Van der Plicht, 1999-2000: p.36–42 and 81–95).

Lanting and Van der Plicht (1999-2000) highlight three main problems affecting the reliability of the ¹⁴C dates. First, they mention that old-wood effect affected many of the datings. Therefore dendrochronological dates from Switzerland and France are used to establish a starting date for the Bell Beaker Culture (Lanting and Van der Plicht, 1999-2000: p.36). Second, insufficient cleaning of the samples may reduce the reliability of dates. Third, many of the dates can only be used as a *terminus post quem*.

4.2.2.6 Lanting, 2007/2008

Lanting (2007-08: p.13–47) claims that there were two Bell Beaker groups: one group in the central Netherlands and another group in the northeastern Netherlands and northwestern Germany (fig. 1). The developments in the central Netherlands, with some small adjustments, remained as outlined in earlier editions of the unilinear model. But for the northeastern Netherlands and northwestern Germany, Lanting proposed a new phase division (Lanting, 2007-08).

The adjustments that Lanting (2007-08) presents for the central Netherlands primarily concern the All Over Ornamented Beakers. Lanting (2007-08: p.17) states that the morphological characteristics seem to have no chronological significance. He interprets the All Over Ornamented (Lanting, 2007-08: p.16) Beakers as the products of a group of people within the late Single-Grave society, distinguishing themselves by their different ceramics and a different grave orientation. Lanting (2007-08: p.35) continues to provide examples illustrating the transition from All Over Ornamented to Maritime Beakers. The beakers found at Helden-

Koningslust and the large beaker found at Hoenderloo are examples of true 2IIa Beakers (according to Lanting, 2007-08: p.35). Succeeding these, true type-2IIa Beakers are beakers with narrow undecorated zones between the decorated ones. These beakers must in their turn have given rise to Maritime Beakers with cord-impressions delimiting the decorated zones, and with decorated and undecorated zones of equal width. Lanting (2007-08: p.35) regards the beakers found at Mol (Belgium), Buinerveld and two at Uddelermeer as examples of beakers with cord-delimited decorated zones of about equal width. Later the cord-impressions seem to disappear (Lanting, 2007-08: p.35).

In earlier versions of the unilinear model, type 2Ic was said to form the bridge in the development from type 2Ia to the Veluwe types (Lanting and Van der Waals, 1976: p.9). However, not many examples of beaker type 2Ic have been found (Lanting, 2007-08: p.9). Lanting (2007-08: p.49) therefore believes that there should be other Beakers that represent the transition from types 2Ia and 2Ib to 2Id, e and f. In his opinion, it is most likely that, given their profile and decorative scheme, the Beakers found at the sites Ede-De Kwekerij, Uddelermeer-ontginning, Westerbeek-van Eersten, Elspeetse Heide and Lisse constitute this link (Lanting, 2007-08: p.49).

Lanting (2007-08: p.49) lists the main characteristics of the Veluwe Beakers from the central Netherlands. The decoration is, as a rule, made with a dentated spatula, sometimes with a plain spatula, or as thin grooved lines. Pots with the typical Veluwe shape but with random fingernail impressions or plastic knobs also occur. Lanting (2007-08: p.49) considers it plausible, but hard to prove, that type 2Id is the first type to occur and 2If the last, with a chronological overlap of the different types.

Lanting (2007-08: p.55–58) subdivides the Bell Beaker group in the northeastern Netherlands and northwestern into five phases. The first phase is the Maritime phase. The second phase is early epi-Maritime and comparable to type 2Ib of the central Netherlands. This phase also saw handles on some beakers. This is followed by a developed epi-Maritime phase, which has no counterpart in the central Netherlands. The last two phases were not labelled. The fourth phase is exemplified by, among others, the vessels found in Emmen and Oudemolentumulus 13, which Van der Waals and Glasbergen knew as type 2Ic. The Beakers of the fifth phase are the direct predecessors of the stamp-decorated early Barbed-Wire Beakers. Lanting (2007-08: p.57) remarks that not all Beakers found in this area can be placed in one of the phases. Some Beakers are related to the Veluwe types of the central Netherlands. There are five ¹⁴C dates that can be linked to ceramics. According to the author (Lanting, 2007-08: p.59), these dates do not argue against the outlined typological development.

4.2.3 *The two-track model*

In 1999 Drenth and Hogestijn proposed a different sequencing of the Beaker cultures. Their model too is based on continuous development, yet these developments run not on one, but on two tracks (fig. 1). They postulate that in the late phase of the Corded Ware Culture and in the Barbed-Wire tradition there is a class of fully-decorated and a class of half-decorated vessels (Drenth and Hogestijn, 1999: p.107–112). The authors (Drenth and Hogestijn, 1999: p.110) suggest that the same division may be applicable to the Bell Beaker Culture. Thus, the starting point for this model is the late phase of the Corded Ware Culture, when both the half-decorated late Protruding Foot beakers and the fully-decorated All Over Ornamented Beakers were in use. Not just the All Over Ornamented Beakers, as proposed in the unilinear model, led to the development

of Bell Beakers, but pots of both types did (Drenth and Hogestijn, 1999: p.108). The half-decorated and fully-decorated Bell Beakers in their turn are seen as the ancestors of the half- and fully-decorated Barbed-Wire stamped pottery. Drenth and Hogestijn do not agree with the centre-periphery hypothesis put forward by Lanting and Van der Waals (1976) and especially Lanting (2007-08), and see a nationwide validation for their model involving regional groups.

Drenth and Hogestijn (1999) not just present a chronological overview of the developments according to their model, but also criticise the propositions underlying the unilinear model. Much attention is given to three aspects of the unilinear model: the existence of a Maritime phase, the zone-contraction hypothesis and the genesis of the Veluwe Beakers. For the sake of clarity, the same sequence will be followed here.

4.2.3.1 Maritime Beakers and a Maritime phase?

Drenth and Hogestijn (1999: p.103–7) state that a Maritime phase did not occur, since such a phase would have produced a dramatic change in the number of different decorated Beaker types. Moreover, such a Maritime phase should be visible in the funerary ritual (Drenth and Hogestijn, 1999: p.103–4). Beakers of the Maritime type are never associated with high-status grave goods. So if there indeed was a Maritime phase, this would, according to Drenth and Hogestijn (1999: p.103–4), have meant a gap in the long-term tradition of prestige grave goods and high social status. A third argument against a Maritime phase is that such a phase would make it impossible to identify regional groups for that particular epoch (Drenth and Hogestijn, 1999: p.104). Regional phenomena are visible in both the Corded Ware Culture and the later Bell Beaker Culture (Drenth and Hogestijn, 1999: 104). At the Bell Beaker site of Vlaardingen only Beakers of the Maritime type occur. Drenth and Hogestijn (1999: p.105) argue that this site must have had a special function, or the ceramics must have belonged to a specific social group. They stress (Drenth and Hogestijn, 1999: p.106) that quantitative differences of ceramic types at settlement sites reflect not only chronological differences but also social differences and different functions of the sites.

In the unilinear model, Maritime Beakers developed out of All Over Ornamented Beakers, particularly type 2IIa (Lanting and Van der Waals, 1976: p.6). During this process, the decoration scheme changed from all-over to zoned. Drenth and Hogestijn (1999: p.109) argue that this zoning of the decoration occurred not only on fully-decorated beakers but also on half-decorated beakers. The beakers from the sites Zuid-Esmarke, Ede-De Kweekerij, Anloo-tumulus II and Holten are seen as examples of half-decorated Beakers with zone contraction (Drenth and Hogestijn, 1999: p.109). These Bell Beakers are thought of as the direct offspring of the half-decorated late Protruding Foot beakers rather than derivatives of Maritime Beakers (Drenth and Hogestijn, 1999: p.109). Drenth (in prep.) moreover argues that zoned decoration already occurred on ceramics from the Corded Ware Culture. Sherds with zoned decoration were found at the settlement sites of Aartswoud and Zeewijk. Pots from Swalmen-tumulus 8, Noordbarge-Hoge Loo and Eext-Bergakkers are additional examples (Drenth and Hogestijn, 1999: p.112). Not only ceramics from late Corded Ware Culture contexts have zoned decoration; even older types show this too (Drenth, in prep.). According to Drenth and Hogestijn (1999: p.110), not only the location of the decoration, but also the decorative motifs themselves reveal a two-track development. A significant difference between half-decorated late Protruding Foot beakers and half-decorated Bell Beakers lies in the extent of the decoration (Drenth, in prep.). On the Protruding Foot beakers it stops just above or on the

point of greatest girth (Drenth and Hogestijn, 1999), whereas on Bell Beakers it extends below the point of greatest girth.

Beakers of the Maritime type are said to occur together with late Protruding Foot beakers and All Over Ornamented Beakers (Drenth and Hogestijn, 1999: p.105). Examples of this are found at the settlement site of Sijbekarspel-De Veken. Furthermore, the tumulus of Hoenderloo-Schenkenhul yielded a beaker that, on the basis of its decoration, is to be placed between the All Over Ornamented and Maritime Beakers (Drenth and Hogestijn, 1999: 105). These authors believe it highly likely that Maritime Beakers and other Bell Beaker types occurred together, although no clear-cut examples of this are found (Drenth and Hogestijn, 1999: 106). The site of Oostwoud, which Van Giffen (1961) and Lanting and Mook (1977: p.90) considered an example of the co-existence of the different types, is not seen as such by Drenth (in prep.).

4.2.3.2 The zone-contraction hypothesis

According to Lanting and Van der Waals (1976: p.9), the beakers changed in two respects after the Maritime phase. On the one hand, the profile of the pots became S-shaped (type 2Ib) and subsequently more squat (type 2Ic). On the other, the decorated zones on the former pot type started to contract, whereas the latter pot type has contracted decorated zones on the neck, its greatest belly circumference and near the foot. Drenth and Hogestijn (1999: p.110) state that the zone-contraction hypothesis needs more evidence. According to Drenth (in prep.), the very low numbers of beakers on which the theory is based are a weak point. Rather than seeing them as derived from the Maritime Beakers, Drenth and Hogestijn (1999) regard the 2Ib Beakers as derived from Protruding Foot beakers with or without zoned decoration. Drenth and Hogestijn (1999) have difficulty categorizing the type-2Ic Beakers. This type can be classified as an exponent of All Over Ornamented Beakers, as a variant of Veluwe beakers, or as a hybrid form. Drenth (in prep.) does not favour any particular option but instead argues that the overall picture does not alter if these type-2Ic vessels are not taken into account, since this group comprises only 35 specimens.

4.2.3.3 Veluwe Beakers

In the two-track model, the Veluwe Beakers have a genesis different from that in the unilinear model (Drenth, in prep.). Various settlement sites in the province of Noord-Holland (Mienakker, Zeewijk-West and Aartswoud) and one site in the province of Zuid-Holland (Puttershoek-De Grienden) have yielded undecorated pots with profiles comparable to those of Veluwe Beakers (Drenth and Hogestijn, 2006: 89). The vessels have a cylindrical shape and an abrupt transition from neck to belly. Also, many of the decorative techniques and motifs found on Veluwe Beakers have counterparts at Corded Ware Culture sites (Drenth, in prep.). The origin of vertical decoration need not be sought in Bohemia, as Van der Waals and Glasbergen (1955) suggested, but was already present on Beakers of the Corded Ware Culture. As examples, Drenth (in prep.) mentions Beakers from the sites of Zeewijk, Emmen-Angelslo, Elspeet and Ede-Ginkelse Heide. Although Drenth (in prep.) points to the Corded Ware Culture for the origin of (characteristics of) the Veluwe Beaker, he also stresses that the latter is not a direct descendant. There are intermediate forms, an example of which was found at Nijmegen, where a Protruding Foot beakers with cross-hatching was found, a decoration motif frequently occurring on Veluwe Beakers (Drenth, in prep.). The exact moment when Veluwe Beakers appeared is not clear; Drenth (in prep.) believes a start in

the early Bell Beaker Culture is likely. The Veluwe types probably existed up until the end of this culture. Furthermore, there are no potent arguments for assuming chronological differences between the Veluwe types (Drenth, in prep.).

4.2.3.4 Hybrid beakers

The division into half-decorated and fully-decorated pots, the two tracks of this model, is not as clear-cut for the Bell Beaker types as it is for the Early Bronze Age ceramics (Drenth and Hogestijn, 1999: p.110). Notable examples are those Veluwe Beakers that have uninterrupted decoration on the neck and belly, followed by an undecorated zone and another decorated zone near the foot. These beakers, for example the one found at Voorthuizen, have characteristics of both half-decorated and fully-decorated beakers (Drenth, in prep.). To resolve this problem with the two-track model, Drenth and Hogestijn propose the possibility of a hybrid beaker form (Drenth and Hogestijn, 1999: p.110), which could have arisen from one form being influenced by the other.

4.2.3.5 Radiocarbon dates and relative chronology

Drenth and Hogestijn do not present a different ^{14}C chronology for the Corded Ware Culture and Bell Beaker Culture. They (1999: p.101) quote the critique of Kinnes *et al.* (1991) who doubted the possibility of establishing a chronology for the Late Neolithic in the Netherlands on the basis of ^{14}C dates, because most datings are of charcoal, which could have been from old wood, and the association of the dated material with the finds is not always clear. To what extent the authors acknowledge this criticism is not quite clear; they do mention that some reliable material was dated: burnt twigs (Drenth and Hogestijn, 1999: p.101). Yet Drenth (in prep.) also mentions that by the ^{14}C method alone one cannot establish a precise chronology. Drenth and Hogestijn (1999: p.101–102) do list new ^{14}C dates for the Corded Ware Culture in the northwestern coastal area (table 2) and some probable Bell Beaker Culture dates (table 1).

4.2.4 *The Radiocarbon dates*

4.2.4.1 Earlier critiques

In the past, several authors have criticized the dates and chronology put forward by Lanting and Van der Waals (1976) and Lanting and Van der Plicht (1999–2000). Both the quality and the quantity of the dates have been criticised. The British Museum ran a large-scale programme for dating Beakers: twenty samples of human bone were dated. One of the main conclusions was that the ^{14}C dates failed to confirm the sequence of styles that were believed to represent chronological phases in Britain (Kinnes *et al.* 1991: p.39). The researchers also assessed the Dutch dates and the unilinear model. Kinnes *et al.* (1991: p.36) classify the association between much of the dated material and the finds as weak. They state that only seven of the 28 Bell Beaker dates provide a robust association, four of which date a single house (Vlaardingen). All of these datings were performed on charcoal, a material rejected in the British Museum dating programme because of the risk of dating wood that is considerably older than the associated Bell Beaker (Kinnes *et al.* 1991: p.36).

Lanting and Van der Waals (1991) wrote a response to the critiques by Kinnes *et al.* (1991). In defence of the Dutch model, they argue that the aim of their 1976 publication was to demonstrate the cultural continuity from Protruding Foot beakers to All Over Ornamented and Bell Beakers. In their opinion, Kinnes

et al. (1991) neglect this point by not taking the Protruding Foot beakers and All Over Ornamented Beaker dates into account. Furthermore, they point out that in the Netherlands, where many funerary sites are found on sandy soils, charcoal is the only datable material available, since bones will decay. Charcoal was used with full awareness of the problems that may arise from the old-wood effect and from uncertain associations (Lanting and Van der Waals, 1991). Though even when used consciously, the problem itself persists.

A second researcher who criticised the Dutch model was Salanova (1998). She performed a technological study of 750 Bell Beakers from France, which made it possible to assign sets of vessels to individual potters (Salanova, 1998). One of her conclusions was that for chronology, motifs are not significant (Salanova, 1998: p.4). With regard to the chronology in the Netherlands, Salanova states that the Dutch Model shows inconsistencies (1998: p.1–2); when the dates used by Lanting and Van der Waals are calibrated they do not demonstrate the proposed sequence. In addition, she sees no evidence for a Maritime phase. Salanova (1998: p.5) expresses her view on how to establish a new chronology for the Bell Beaker period. Radiocarbon dates should not be used, since they are, in this period, too imprecise. Stratified settlement sites will, according to Salanova, not offer a solution either, because they represent a local situation. Associated items from closed assemblages (cemeteries) must be the key to the solution (Salanova, 1998: p.5). Large-scale technological studies, comparing styles as well as technological characteristics of the production process, may also enhance our understanding of the people behind the vessels.

As a final argument, Furholt (2003a) reassessed all ¹⁴C dates available for the different branches of the Corded Ware Culture in Central Europe and southern Scandinavia. The ‘stages’ that Furholt (2003a: 15) defines are based on the wiggles in the (INTCAL 98) calibration curve. The Netherlands and northwestern Germany were treated as one Corded Ware branch, with a total of thirty dates, of which twenty from the Netherlands were assessed. Furholt (2003a: p.91) too considers problematical the high percentage of charcoal dates, which may suffer severely from the old-wood effect. The Dutch Corded Ware Culture is dated to Furholt’s stages D to F (2900/2600–2400/2300 BC). A start before wiggle D is thought to be unlikely, as most of the earliest dates (Hijken-I and -II, Noordbarge, Silvolde and Vlaardingen) are of doubtful quality: the link between the charcoal and beaker is often uncertain and such dates must therefore be seen as a terminus post quem. The date for Anlo-grave E is the exception, but if an old-wood effect of 100 years is taken into account this date too can be placed in stage D (Furholt, 2003a: p.91). In Furholt’s opinion, the early phase (D) of the Dutch Corded Ware Culture saw types 1a and All Over Ornamented 2IIb, while the late phase produced types 1b, 1d and 1e; and datings with a lower reliability also date types 1b, 1d, 1e and All Over Ornamented 2IIb (Furholt, 2003a: p.97). Since wiggle D is very broad and there are many problems with the Dutch dates, it seems impossible to seriate types 1a to 1f. Type 1a can be seen as the start of a development, but fully-decorated beakers occur even in the early phase. Type 1e cannot be a late type only (Furholt, 2003a: p.97). An important conclusion is that if the wiggles of the calibration curve are taken into account there is no reason to assume that All Over Ornamented Beakers occurred any longer than did Protruding Foot beakers. Indeed there are reliably dated examples of Protruding Foot beakers (De Eese) that are younger than any of the All Over Ornamented Beakers. However, Furholt does see younger All Over Ornamented Beakers (stage F) as a possibility, although there are many problems and uncertainties about the dates that can be placed in this wiggle. Furholt (2003a: p.98) concludes that Protruding Foot beakers and All Over Ornamented Beakers are parallel developments. Regarding the possibility of

continuous development from Protruding Foot beakers to All Over Ornamented to Bell Beakers, Furholt (2003a: 98) decides that it is unlikely that Bell Beakers developed out of All Over Ornamented and Protruding Foot beakers, as there are no high-quality Dutch Bell Beaker dates that can be placed before wiggle F. If all dates are taken into account, the Dutch Bell Beakers must be dated to wiggles F and partly G (Furholt, 2003a: 98). The Bell Beakers could have replaced the Protruding Foot beakers and All Over Ornamented Beakers, but a chronological overlap still remains a possibility. In France, older Bell Beakers have been found (at Tremery-Flevy, Lorraine) (Furholt, 2003a: p.98). The Dutch Bell Beakers can therefore not be regarded as the progenitors of the Europe-wide development (Furholt, 2003a: p.98).

4.2.4.2 Problems with ^{14}C dates

The problems occurring with ^{14}C dates can be divided into two groups: a technical and an archaeological one. Technical problems occurring in this dataset are: poor quality of the sample, reservoir effect, inadequate sample preparation and contamination of the sample. Archaeological problems may be: old-wood effect and lack of a certain association with the cultural material. In addition, there are problems arising from the calibration curve.

- Quality and preparation of the sample: Both the quality of the sample and the preparation of the sample can affect the outcome of the dating. For the assessment of the quality of the sample there are different methods for the various materials to be dated (DeNiro *et al.*, 1985; Lanting and Van der Plicht, 1998; Mook and Streurman, 1983). The way a sample was prepared affects the reliability of the date; charcoal samples should ideally be pre-treated with AAA and unburnt bone needs to get the 'Longin' treatment (Mook and Streurman, 1983; Lanting *et al.*, 2001);
- Reservoir effect: The absorption of ^{14}C differs for terrestrial, marine and freshwater environments. This causes a marine and freshwater reservoir effect (Brindley, 2007: 20). For marine samples from the northern Atlantic and North Sea the effect can be corrected, for freshwater samples this is impossible (Lanting and Van der Plicht, 1995-96). Dates on (human) bones from individuals with a diet largely based on marine or freshwater (shell) fish will be too old. The same goes for dates of residues on sherds if the vessel was used to prepare (shell) fish. For dates on bone, also the isotopic fractionation, the change in the $^{14}\text{C}/^{13}\text{C}$ ratio needs to be taken into account. This is standard procedure nowadays, but in early years radiocarbon laboratories did not reckon this in. Therefore, old bone dates are problematic, since again there is no standard correction if the diet was based on marine or freshwater (shell) fish (Brindley, 2007: 20);
- Old wood effect: This is an archaeological problem frequently encountered when charcoal samples are used for ^{14}C dates. If the wood has a considerable age of its own, the dated archaeological material gets a date that is too old (Waterbolk, 1971; Lanting and Van der Plicht, 1993-94);
- No or uncertain association: The association between the sample and the archaeological material to be dated needs to be secure to obtain a sound date. Waterbolk (1971) developed an A-B-C-D scale to denote the certainty of association. Furthermore, there are dates that can only be seen as a terminus post quem (*t.p.q.*) or a terminus ante quem (*t.a.q.*). Our dataset has yet another problem, which is that the association between the dated material

and the supposedly dated artefact is not always expressed. This especially goes for the datings of the settlements, the finds from which have been only sparsely published;

- Calibration curve: Another problem affecting the dataset under study is that of the calibration curve; the structure of the curve for this period has some broad plateaus or wiggles (Reimer *et al.*, 2009). Therefore, many dates end up in the same plateau, making it hard or impossible to confirm or reject competing typochronological claims (Furholt, 2003a).

4.2.4.3 Assessing the dates

The technical and archaeological problems described above reduce the reliability of the dates. The quality of the dates for the dataset under investigation was established on the basis of literature study, examination of the ^{14}C forms at the Centre for Isotope Research (CIO) of Groningen University and analysis of the dates themselves. For the various problems, one and two minus rankings were given. Dates being assigned two or more minuses were completely suppressed. Dates with a one-minus ranking were used in the analysis but were given less weight than those unaffected by these problems. The following strategy was adopted for ranking the dates:

- Quality and preparation of the sample: Samples that had a quality unsuitable for dating or that were inadequately prepared were assigned two minuses and hence were suppressed. Dates taken from charcoal samples that were only cleaned with acid and did not get the preferred AAA treatment, were assigned one minus;
- Reservoir effect: A marine diet may cause huge errors, but dates on, for example, residues from vessels in which freshwater fish was prepared may suffer from a smaller reservoir effect. Therefore, a two-scale strategy was used. All the bone and residue dates that were complete outliers (older than 4400 BC for the Corded Ware Culture and older than 4000 for the Bell Beaker Culture) were excluded from further analysis. Bone and residue dates that were not complete outliers but still older than any of the dates related to the same vessel type were assigned one minus. For example, the residue date for the Veluwe-type sherds from Barendrecht 2 (GrN-25917, 3870 ± 50) is older than any other date for this type of vessel, but is not a complete outlier. This date therefore was assigned one minus;
- Old-wood effect: This effect may hugely affect the date; however, establishing whether it occurred or not is not a straightforward matter. Some authors have suggested that dates from charcoal should not be used at all (see Kinnes *et al.*, 1991). Lanting and Van der Plicht (1999-2000) use a one-scale strategy and reject complete outliers as well as any dates that are older than other dates related to the same type of vessel. A system in which complete outliers are assigned two minuses and early dates on charcoal that may – but do not necessarily – suffer from this effect are assigned one minus seems to be more appropriate. Rejecting dates that can be placed in the ^{14}C range for this period but are older than dates for the same type can produce circular reasoning. The dates confirming typological arguments are in that case rejected on the basis of technical arguments;

In this study, the dates that were complete outliers (older than 4400 BC for the Corded Ware Culture and older than 4000 for the Bell Beaker Culture) were assigned two minuses and were rejected for further analysis. The datings

performed on charcoal that are the oldest dates for the types of vessel they relate to but that were not complete outliers, were assigned one minus. Thus, they were classed as less reliable but still were taken into account in the further analysis. For example, while the date for the type-1e Beaker and the ZZ Beaker from Annen-Holtkampen (GrN-11918, 4165±30 BP) fits into the range of dates for the Corded Ware Culture, this date is older than any other date for these types. It was therefore accorded one minus;

- No or uncertain association: In this study, all dates that were not related to ceramics were suppressed. The samples whose relation with the dated vessel was very uncertain were assigned two minuses and were suppressed as well. A rating of one minus was dealt to four groups of dates. All *t.p.q.* and *t.a.q.* dates were assigned one minus. Dates with a C rating in the Lanting and Van der Waals study (1976; sequence by Waterbolk, 1971: p.16) indicating that the relation was probable but not certain, were assigned one minus. One minus was also assigned also went to a large group of settlement dates for which the relation between the dated sample and the cultural material had not been published.

Abnormal dates: A final category of dates to be excluded were the abnormal dates. These dates are complete outliers, while the exact cause of this is unclear. This applies to dates older than 4400 BC for the Corded Ware Culture and older than 4000 BC for the Bell Beaker Culture, or younger than 3800 BC for the Corded Ware Culture and younger than 3400 BC for the Bell Beaker Culture.

4.2.4.4 Technical problems

Two dates were excluded from the analysis because of the poor quality of the sample (compare Lanting and Van der Plicht, 1999-2000: 77 and 79, appendix 4.1). Four dates were rejected because the bone or residue sample may have contained an amount of (marine or freshwater) fish. All of these six dates were also rejected by Lanting and Van der Plicht (1999-2000). Two other dates from residues on sherds were assigned one minus; these are the above-mentioned date for Barendrecht 2 and a date for a sherd from Zandwerven (appendix 4.1). This last date (GrN-116, 4320±60) is problematic. The type of sherd to which the residue was attached was not published; therefore, either the date may suffer from a reservoir effect or the actual sherd may be older. A total of six dates were assigned two minuses because the samples were very probably contaminated. Sixteen datings performed on charcoal received a one-minus rating because the sample was only cleaned with acid and did not get the AAA treatment (appendix 4.1). The first dates were suppressed also by Lanting and Van der Plicht (1999-2000), while mention was made of the less suitable cleansing of the group of sixteen samples, but their dates were not completely suppressed. Four further dates must be rejected because they are abnormal (appendix 4.1).

4.2.4.5 Archaeological problems

In this study, a total of five dates have two minuses in the old-wood effect category, nine dates were assigned one minus, in contrast to Lanting and Van der Plicht (1999-2000) who listed twelve instances in which an old-wood effect had occurred. Next to complete outliers, almost all the datings performed on charcoal that were the oldest date for the type of ceramics that they relate to, were rejected. This, however, was not done to the dates on the oldest beaker with Veluwe-style decoration (Epe-Klokbekerweg, GrN-13714) and the second oldest ZZ beaker (Eext-tumulus Visplas 1937, GrN-6727) which in years BP is just 20 years

younger than the oldest date on this type of vessel, rejected for old-wood effect. These dates, Epe-Klokbekerweg and Eext-tumulus Visplas 1937, were assigned one minus as well. There are 53 dates that were completely unrelated to ceramics; these were assigned two minuses (appendix 4.1). Three more dates were rejected because the association of the dated sample with the ceramics was too uncertain. For another seventeen dates the association was questionable but not completely uncertain, and they therefore were assigned one minus.

Regarding the dates from some sites, the various authors discussing the ^{14}C dates are unanimous. This especially applies to the eight dates from the site Oostwoud-De Tuithoorn. This site and its dates have been discussed in many publications (Van Giffen, 1962, Dekker and De Weerd, 1975, Drenth and Hogestijn, 2006, Louwe Kooijmans, 1985, De Weerd, 1967, Lanting, 1979, Lanting and Van der Plicht, 1999-2000, Runia, 1987). Lanting and Van der Plicht (1999-2000: p.86–7) provide a detailed reconstruction of the various excavations that took place. In their opinion, the oldest sherds from within and beneath the mound may date from the time when a flat grave was constructed, and the youngest sherd may date from when the site was used as a field. According to Drenth and Hogestijn (2006: p.74), it is impossible to tell whether the Maritime and ‘proper’ Bell Beaker sherds did or did not belong to the same, closed assemblage. In the present re-examination it was decided to assign two minuses to seven of the dates, since the association with the ceramics cannot be established, and one minus to the date (GrN-6650C) with at any rate a probable association with the sherds decorated in Maritime style (appendix 4.1).

The date from De Eese-tumulus 1918-IV (GrN-6127) is employed in two different ways by Lanting and Van der Plicht (1999-2000: p.76 and 83) and Lanting and Van der Waals (1976: p.40–1). The date can be linked to a shallow and findless ‘beehive grave’ or can be regarded as a *t.p.q.* for the Bell Beaker with Maritime-like decoration but without cord impressions delimiting the zones – a beaker placed in the mound secondarily. In the present study, the dating was assigned two minuses for both options: no association with ceramics (two minuses); or an uncertain association (one minus) plus a *t.p.q.* date (one minus), respectively (appendix 4.1).

Furthermore, seven dates can only function as a *t.a.q.* and nine as a *t.p.q.* The subdivision in the publications by Lanting and Van der Waals (1976) and Lanting and Van der Plicht (1999-2000) was not always followed. The date for the type-2Ib beaker from Ede-Ginkelse Heide was suppressed in this re-examination, as it was assigned three minuses. Lanting and Van der Waals (1976: p.41) see this date as a *t.p.q.* for the grave, Lanting and Van der Plicht (1999-2000: p.83) state that the charcoal may have been brought in from elsewhere with the sods and hence has no direct association with the grave and the grave goods.

About one third (54 of the total of 157) datings were performed on material from settlement contexts; of 22 samples the contexts had not been published. This problem is relevant for the Corded Ware settlement sites in Noord-Holland (eighteen dates), which play a key part in the two-track model, and for the site of Voorschoten-De Donk (one date) and partly for the site of Hazendonk (three dates) (appendix 4.1).

The dates and the ceramics from the Noord-Holland Corded Ware settlement sites are discussed in several publications, but the exact association of the dated material with the ceramics remains unclear (Hogestijn, 1997, Van Ginkel and Hogestijn, 1997, Drenth and Hogestijn, 1999 and 2006, Sier, 2001). Drenth and Hogestijn (1999: 102) present a table (table 2) in which they list the kinds of ceramics found at the various sites. They state that both Protruding Foot beakers and All Over Ornamented Beakers have been found at the settlement sites of

Zeewijk-West, Mienakker, Molenkolk-1 and -2, Maantjesland and Portelwoid. At the sites of Zandwerven and Zeewijk-Oost only Protruding Foot beakers were present. All Over Ornamented Beakers and sherds of probably Maritime or epi-Maritime beakers were found at the site of Sijbekarspel-De Veken. As regards the date of the Zeewijk-Oost house (GrN-18488), Hogestijn (1997: p.40–41) states that no cultural material was found at this house.

For the two stratified sites of Aartswoud and Zandwerven more information on the types of recovered ceramics is available. The Aartswoud settlement was published by Iterson Scholten and De Vries-Metz in 1981; at that time there were no ¹⁴C datings. Two of the Aartswoud dates came from material that was found beneath the cultural layer (GrN-12013 and GrN-12014). It seems probable that these should be treated as *t.p.q.* dates or as the earliest stage. In trench 1, spit V contained the types 1b, 1d and ZZ and decorated and undecorated ceramics that cannot be placed typologically (Iterson Scholten *et al.*, 1981: table IIa). In trench 2 the cultural layer is less thick; here the deepest spit, IV, only contained one vessel of type 1d (Iterson Scholten *et al.*, 1981: table IIb). It seems the most likely that the dates came from material from trench 1, since here the cultural layer is indeed 1 m thick. However, this association is rather a guess based on combining publications than a certainty. The third Aartswoud date (GrN-12015) comes from halfway down the 1-m-thick cultural layer (Lanting and Van der Plicht, 1999-2000: p.78). Since the exact spit remains unclear, it is also unclear which phase of occupation the date represents. In trench 1 the various spits contain the following types; IV: 1b, 1d, ZZ; III: 1a, 1b, 1c/d, ZZ, 1a/2IIb; II: 1a, 1d, 1e, ZZ, 2IIb; and I: 1d, 1e, ZZ, 2IIb, 1a/2IIb (Iterson Scholten *et al.*, 1981: tables IIa and b, figs. 6, 14–19).

Van der Waals and Glasbergen (1956) give a description of the Protruding Foot beakers found in the earliest excavation campaign in 1929 at the site of Zandwerven: types 1a and 1b. Van Regteren Altena and Bakker (1966) list the finds from Van Giffen's excavation in 1929 as well as those from the campaigns in 1957-1958. During these latter excavations the number of Protruding Foot beakers grew to 15-20 vessels; one of them of type 1c, the others belonging to types 1a and 1b (Van Regteren Altena and Bakker, 1966: p.37). The ¹⁴C dates are not mentioned in any of these three publications. In the Van Regteren Altena *et al.* publication of 1962, the date of GrN-2221 is listed as well as a description of the ceramics. The dated material is said to come from a refuse pit containing only

Type	Total number of dates	No problems	1 minus	Rejected (2 minuses or more)	Dates ranging between (in BP)
1a	9	3	1	5	(4270±70)4165±55-3955±50 BP
1b	2	1	1	x	(3970±35)3945±40 BP
1c	1	1	x	x	3955±50 BP
1d	8	2	2	4	(4065±55)3940±90-3935±35 BP
1e	5	1	4	x	(4160±30)4065±45 BP
ZZ	4	x	4	x	(4165±30)-(3880±50) BP
2IIa	x	x	x	x	x
2IIb	3	2	1	x	4140±70-4005±30(3965±50) BP
2IIc	1	1	x	x	4035±55 BP
2IId	x	x	x	x	x
2Ia	6	2	2	2	(3910±30)3910±100-3860±110(3850±50) BP
2Ib	1	x	x	1	x
2Ic	x	x	x	x	x
epi-maritime	2	2	x	x	3880±50-3840±50 BO
Veluwe (2IId-2If)	17	9	4	4	(3870±50)3850±40-3665±40(3635±35) BP
Veluwe and Barbwire	4	3	x	1	3630±35-3460±40 BP
Bell Beaker and Barbwire	2	x	2	x	(3865±30)-(3710±50) BP
(Neck) Potbeaker	5	2	1	2	(3915±45)3830±20-3685±37 BP
Bell Beaker and neckpot	1	x	1	x	(3685±40)
no type	8	4	4	x	(3945±55)3915±50-3725±35 BP
Settlement	33	3	22	8	(4320±60)3980±60-3939±50(3890±70) BP

Table 4.1 Dates per type.

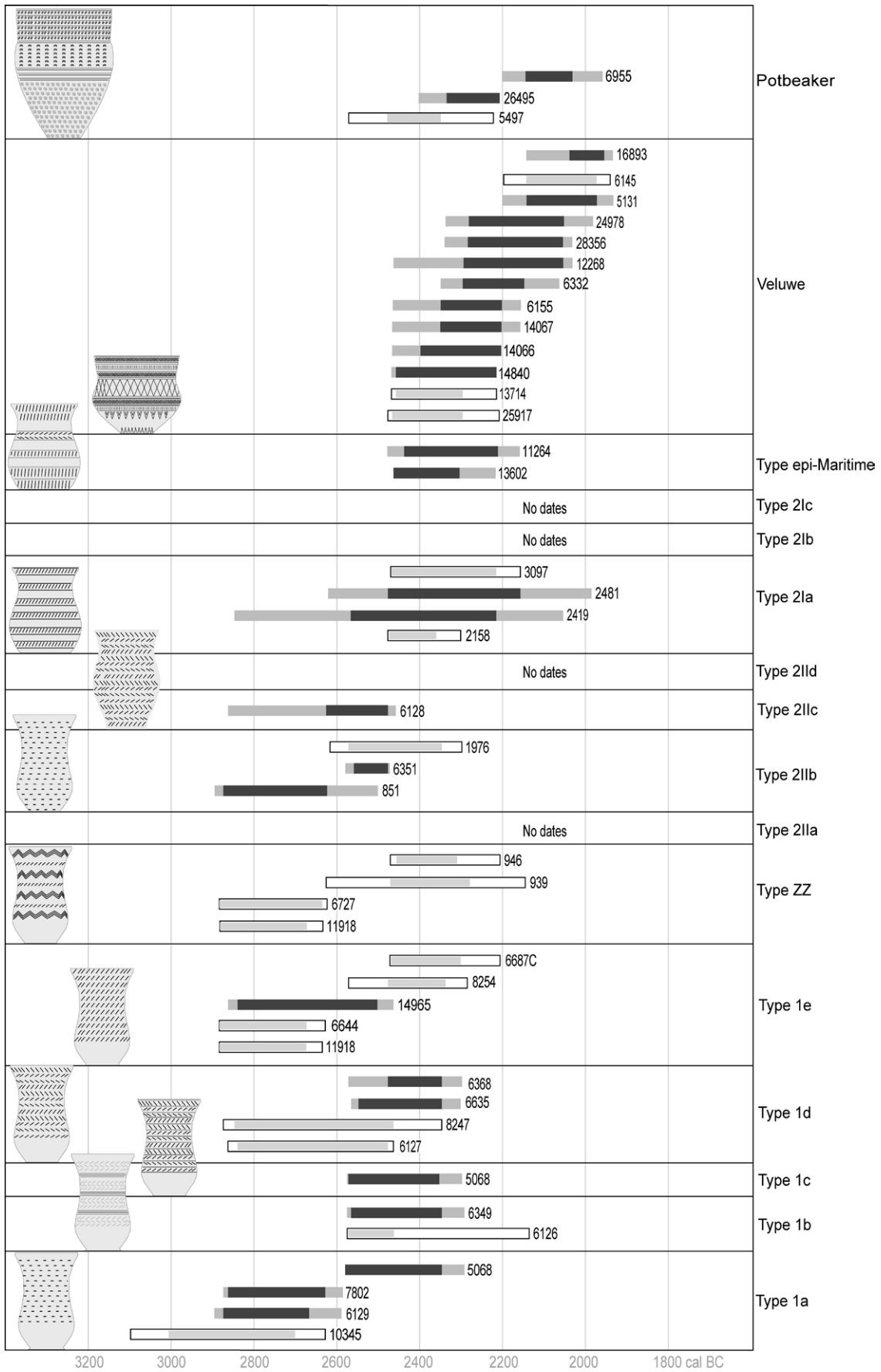


Figure 4.3 Dates per type.

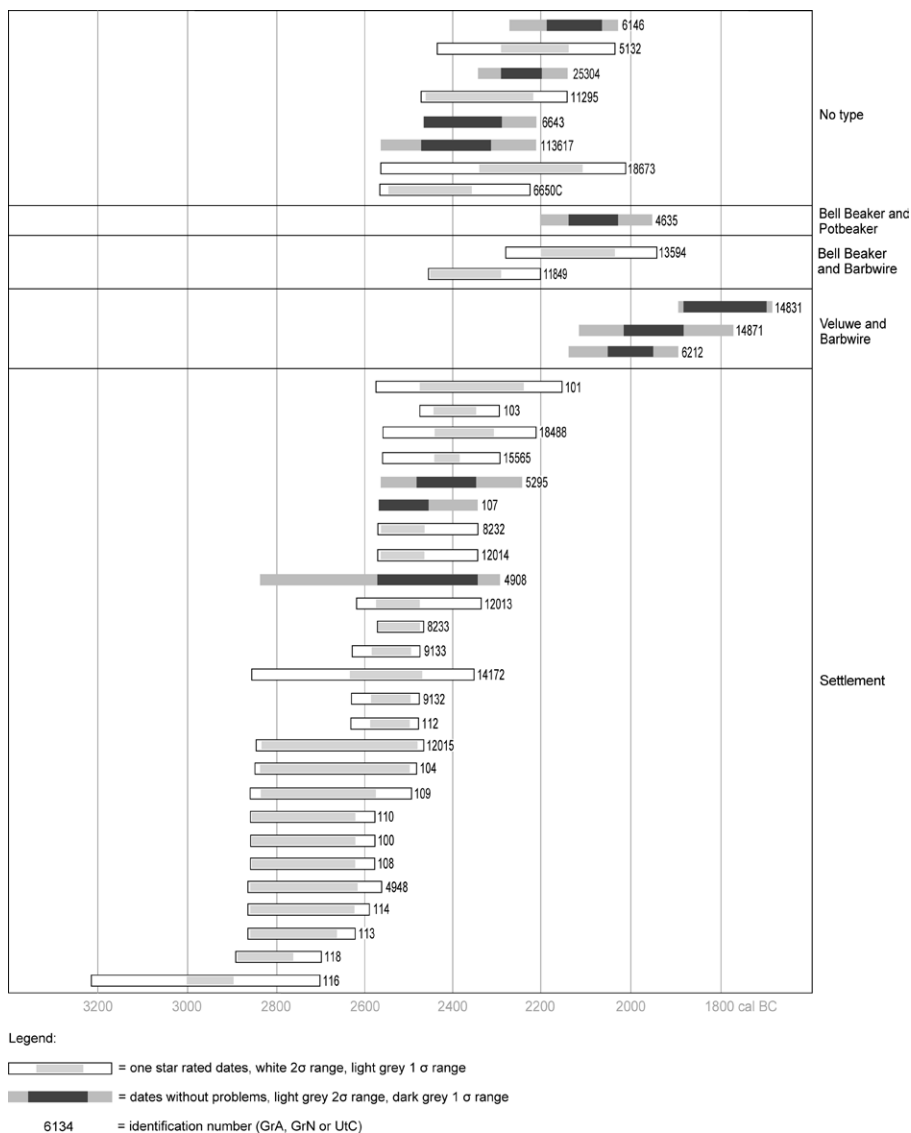


Figure 4.3 (continued) Dates per type.

Vlaardingen ware and no Corded Ware Culture ceramics (Van Regteren Altena *et al.*, 1962: p.9–10). Contrary to the Van Regteren Altena and Bakker (1966) publication, Van Regteren Altena *et al.* (1962: p.224) identifies not only types 1a, 1b and 1c, but also type 1f and possibly type 1d among the ceramic finds.

After assessing the dates and their quality, the conclusion must be drawn that almost half of the dates (73, 46%) for this period are too problematic to use (a score of two or more minuses). Another 50 dates (32%) were not problem-free either and were assigned one minus. Just 35 (22%) of the dates seem unaffected by any technical or archaeological problems (appendix 4.1). In order to analyse and test the chronological models, a diagram was made plotting the dates per type in chronological order (table 4.1 and figure 4.3). Figure 4.3 on the left illustrates examples of the dated types, and on the right shows the different dates per type. Here also the one-minus-rated dates were taken into account to analyse whether any trends may emerge. It is striking that for three types (2IIa, 2IIc and 2Ic) no dates at all are available. For type 2IIb, the only available date was suppressed. Furthermore, all or most of the available dates for some of the types are burdened with one minus.

4.2.5 Testing the models

4.2.5.1 The unilinear model

In the various editions of the unilinear model, different claims were made concerning: 1. the chronology of the continuous development from Protruding Foot beakers to All Over Ornamented Beakers and then Bell Beakers, and specifically the placing and start of the All Over Ornamented Beakers; 2. the ordering of the different types; 3. trends visible in the Protruding Foot beakers; 4. the phases in the Corded Ware Culture; 5. a Maritime phase; and 6. the phases in the northwestern Netherlands and northwestern Germany during the Bell Beaker period. Here these claims will be tested.

On the chronology, Lanting and Van der Waals (1976) state that it was their aim to demonstrate the continuity from Protruding Foot beakers to All Over Ornamented and to Bell Beakers. The ¹⁴C dates do indeed indicate that All Over Ornamented Beakers need to be placed before, or partly alongside the Bell Beakers, and should not be seen as hybrid forms of Protruding Foot beakers and Bell Beakers as was proposed in the initial (1955) publication by Van der Waals and Glasbergen. Lanting regarded the All Over Ornamented Beakers as a product of the late Corded Ware society (2007-08: p.35). This conclusion seems to be correct; there is an overlap in time between Protruding Foot beakers and All Over Ornamented Beakers.

Furholt (2003a) postulated that at the very start of the Corded Ware Culture there were also All Over Ornamented Beakers. This, however, seems to be incorrect. At the early Corded Ware Culture site of Zandwerven, for instance, only Protruding Foot beakers were found. Although the oldest date was taken from a residue on a sherd (GrA-116 4320±60 BP), and may be too old owing to the reservoir effect for which it was awarded one minus, there are no such arguments against the dating performed on charred twigs (GrA-118 4220±30 BP, a date without minuses). Still, the contexts of these dates were not published, and the site may in fact represent a local situation. The hypothesis of an early start of the All Over Ornamented Beakers in the early phase of the Corded Ware Culture can therefore not be tested. Furholt's hypothesis (2003a) should therefore be put aside.

From the ¹⁴C dates it seems that the Protruding Foot beakers outlived the All Over Ornamented Beakers. The youngest dated Protruding Foot beakers of type 1e from De Eese-mound 1918 V dates to GrN-6687C 3870±35 BP; however, this date has one minus. Whereas the youngest All Over Ornamented Beakers, from Ermelose Heide tumulus 1 (two pots of type 2IIb, no minuses), date to GrN-6351 4005±30 and the 2IIb beaker from Anlo-veekraal grave C has a *t.a.q.* date (one minus) of GrN-1976 3965±50 BP. After calibration, the type-1e beaker dates to the wiggle between 2460 and 2200 BC, and the All Over Ornamented 2IIb Beakers to the wiggle between 2620-2480 BC. The date for the type-1e beaker however was assigned one minus since the association is not quite certain (see appendix 4.1). The only certain conclusion is that there is a considerable overlap in time between Protruding Foot beakers and All Over Ornamented Beakers, as is confirmed by the co-occurrence of both types in settlement contexts.

The overlap in time is also confirmed by the co-occurrence of Protruding Foot beakers and All Over Ornamented Beakers in graves and settlement contexts. There are four (undated) funerary contexts in which Protruding Foot beakers and All Over Ornamented Beakers occur together, though in two cases the association is only 'probable'. Types 1d and 2IIc occur together at Soesterberg and Aalten, types 1d and 2IIb at Swalmen and types 1e and 2IIb at Emst-Hanendorp (Lanting and Van der Waals, 1976: table 1). Different All Over Ornamented types also

occur together; twice a 2IIb and a 2IIa beaker were found together (Elsloo and Hoenderlo); and a 2IIb and a 2IIc beaker probably came from the same grave at Mallem. At the settlement sites in Noord-Holland Protruding Foot beakers and All Over Ornamented types are said to occur together more frequently; but these sites have been just minimally published. The occurrence of the same traits on beakers from the different groups is another argument for continuity. Diagonal notches on the rim and decoration on the inside of the rim occur on (late) Protruding Foot beakers, All Over Ornamented and Bell Beakers, and according to Lanting and Van der Waals (1976: 6) thus are another argument for continuous development. This trend can also not be confirmed with ¹⁴C dates, but may indeed be a distinctive feature that may be studied further.

On the ordering of the different types, Lanting and Van der Waals (1976) concluded that the ¹⁴C dates were in line with their seriation of these types, and they also noted a number of trends in the development of the beakers. This ordering and the different trends are even harder to confirm with ¹⁴C dates, especially when calibrated dates are used. For the Protruding Foot beakers, Lanting and Van Der Waals (1976: 5) describe three trends: 1. the earliest beakers have a clearly pinched-out foot, while later beakers have a flatter or even a concave base; 2. the decoration changes from one of impressed-cord lines to one of grooved lines and lines made with a plain spatula; and 3. the earliest decoration consists of horizontal lines; the motifs first change into a herringbone design and later into horizontal rows of diagonal impressions in one direction.

At the start of the Corded Ware Culture most of the beakers have a protruding foot and in the later phase more beakers have a flat foot, but an overlap is present. The oldest beaker with a flat foot comes from Ede-Hotel Bosbeek and dates to GrN-6129 4165±55 BP. The youngest beakers with a protruding foot are the type-1d beakers found at Eext-Galgwanderingveen in tumulus 3 (GrN-6635, GrN-6368 3940±40 or 3935±35 BP). The type-1e beaker from Eext-Galgwanderingveen tumulus 1 has a small pinched-out foot and has a *t.p.q.* date of GrN-8254 3930±45. The second trend seems to be correct: the oldest beakers are indeed cord-decorated and the youngest decorated with grooved lines and lines made with a plain spatula. Here again an overlap is visible; from the ¹⁴C dates it is not even certain that there was a gap between the cord-decorated Protruding Foot beaker type 1a and the cord-decorated All Over Ornamented type 2IIb (appendix 2). The youngest two type-1a beakers date to GrN-7802 4140±50 BP and GrN-5068 3955±50 (Maarn-De Halm and Odoorn-Eeserveld, respectively). The oldest type-2IIb beaker dates to GrN-851 4140±70 BP (Anlo-veekraal grave B). For the third, the decorative motifs change from horizontal lines to herringbones and then to lines of oblique impressions in one direction; again, overlap in the dates is visible; type-1e beakers with oblique spatula-impressions in one direction are the most long-lived. But the youngest dated type-1b beaker, from Eext-Bergakkers, is decorated with horizontal lines and dates to GrN-6349 3945±40 BP. The youngest beaker with herringbone decoration is just slightly older, and dates to GrN-6635 3940±40 BP and GrN-6368 3935±35 BP (Eext-Galgwanderingveen, tumulus 3).

According to Lanting and Van der Waals (1976), the full seriation of the Protruding Foot beaker types cannot be established, but type 1a is the oldest and type 1e is the youngest. This is indeed supported by the ¹⁴C dates. Regarding the order of the All Over Ornamented types, Lanting and Van der Waals state that types 2IIc and 2IIb must be the oldest and 2IIa the youngest. Since there are no dates for either type 2IIa or type 2IIc, this cannot be tested. This also goes for the Bell Beaker types 2Ia, 2Ib and 2Ic. Lanting and Van der Waals (1974) propose this chronological order, but since type 2Ib only had one rejected date and no beakers of type 2Ic were dated, this cannot be confirmed. An overlap is visible between

dates for the Maritime beakers of type 2Ia and the Protruding Foot beakers and All Over Ornamented beakers. Again, the dates are not very certain: the date for the Buinen type-2Ia beaker was assigned two minuses, and two of the four dates for the Vlaardingen 2Ia beaker were awarded one minus rating.

For the Veluwe types, Lanting (2007-08: p.49) considers it plausible, but difficult to prove, that type 2Id was the first type to occur and type 2If the last, with a chronological overlap of the different types. The ¹⁴C dates again fail to resolve this problem, indeed there is a type-2If vessel that appears to be older than any of the type-2Id vessels. This date, GrA-14840 3850±40 BP, relates to a vessel from Nijmegen. The oldest date for a type-2Id vessel, from Lunteren, is GrN-6332 3790±35 BP. When calibrated, the first date ends up in the wiggle between 2460 and 2200 BC, and the second date in either the same wiggle or that between 2200 and 2020 BC.

The four-phase division defined by Drenth and Lanting (1991) and redefined by Lanting and Van der Plicht (1999-2000) cannot be confirmed by calibrated ¹⁴C dates either. Three of the four phases (phases 1, 2 and 3) turn up on the plateau between 2880 and 2580. Phase 4 may be placed on two plateaus: that between 2620 and 2480 BC and that between 2460 and 2200 BC. The authors were aware of this problem and sought parallels for hammer-axe types that occur both here and in stratified contexts in Jutland, and employed Danish ¹⁴C dates for hammer-axe graves. Lanting and Van der Plicht (1999-2000) also use dendrochronological dates from Switzerland and France to confirm their phases. Although this helps to construct phases, it still remains impossible to confirm the chronology of beaker types.

Drenth and Hogestijn argue that there could not have been a Maritime phase as was suggested in the unilinear model by Lanting and Van der Waals (1976) and Lanting and Van der Plicht (1999-2000). Given the ¹⁴C dates, this notion seems to be correct. The four most reliable dates for type 2Ia, ranging between 3910±30 and 3850±50 BP, all point toward overlaps with Protruding Foot beaker type 1e, All Over Ornamented types 2IIb and 2IIc and the oldest Veluwe Beakers. The co-occurrence of Maritime sherds with other types in settlement contexts is hard to test, owing to the minimal publication of these sites.

For the five phases of the northeastern Netherlands and northwestern Germany as proposed by Lanting 2008/09, there are five dates. The first date, for Loon-hunebed D-15 GrA-15641 4480±60 BP, is rejected because the dated cremation and the two beakers clearly did not belong together. Two of the dates are from Oudemolen, the first of which dates stage 3 (GrN-25303 3740±25 BP), but this grave did not contain any ceramics. The second dates stage 4, GrN-25304 3800±30 BP (figure 4.3 'no type'). The final two datings are from Rolde-Volmachtenlaan A and B and are both supposed to date phase 3 (figure 4.3, 'epi-Maritime'): GrA-13602 3880±50 and GrA-11264 3840±50. A total of five dates of which one is rejected and one is unrelated to ceramics is clearly inadequate for firmly dating five phases.

4.2.5.2 The two-track model

The two-track model devised by Drenth and Hogestijn (1999 and 2006) is based on the notion that both in the later phase of the Corded Ware Culture and the Early Bronze Age there is a class of fully-decorated and a class of half-decorated beakers. They assume that both these classes must therefore also have been present during the Bell Beaker period. In their 2006 publication they present a series of three graphs (Corded Ware Culture, Bell Beaker Culture and Early Bronze Age), in which the vertical extent of the decoration is expressed in percentages against the number of beakers.

The graphs that express the extent of decoration for the Corded Ware Culture and the Early Bronze Age clearly show two groups of beakers. With respect to the graph on the Bell Beaker period, the outcomes are less clear: over 70% of the beakers are fully decorated, only a small class of around 13% of the beakers are less than 75% decorated, and the other beakers are between 76% and 95% decorated.

It is hard to find out from the publication of Drenth and Hogestijn exactly on which beakers these graphs are based. In footnote 50, Drenth and Hogestijn (2006: p.55–56) supply each graph with a list of the heights that were measured and a list of publications. The names of the sites, however, were not published. Moreover, there is no link between the measured heights and the sites and/or the beakers from those sites. In all, 140 Corded Ware Culture beakers were measured, 120 Bell Beakers and just 19 Early Bronze Age beakers.

In order to test the two-track model for all the beakers with ¹⁴C dates that scored one minus or none, the length of the decoration was measured (table 4.2). Plotting these measurements in bar charts produces the same picture as that published by Drenth and Hogestijn (2006: figs. 8 and 9), based on far fewer vessels. But if the heights of the decoration are compared with the dates, a completely different picture arises (figure 4.4). It shows that at the start of the Corded Ware Culture the vessels had short decoration. In the period when Protruding Foot beakers and All Over Ornamented Beakers occur together, there are two classes of decoration and during the BB period all vessels are almost fully decorated. Drenth and Hogestijn (1999: 110) already admitted that it is hard to find examples of half-decorated beakers from the BB period. There are no examples of such beakers with secure dates. Hybrid beakers, combining features of both half-decorated and fully-decorated beakers, also seem to be absent among the well-dated beakers.

The zone-contraction hypothesis is criticised by Drenth and Hogestijn (1999: p.110). Type 2Ib is not seen as a derivative of the Maritime Beakers, but as a derivative of Protruding Foot beakers with or without zoned decoration. Drenth and Hogestijn (1999) have problems categorizing the type-2Ic beakers. This is hard to test with ¹⁴C dates: type 2Ib only has one rejected date and type 2Ic was not dated at all.

Drenth and Hogestijn (1999) state that the Corded Ware settlement sites in Noord-Holland yielded valuable finds for understanding the origin of different types. Zeewijk-West and Aartswoud are, according to Drenth and Hogestijn (2006: p.79), very important for understanding the beginning of Bell Beakers, because, next to Corded Ware beakers and All Over Ornamented types, also

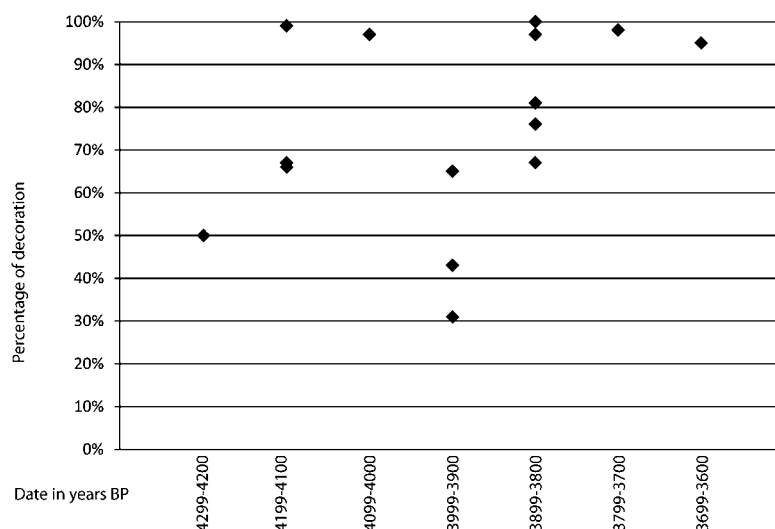


Figure 4.4 Percentages of decoration over time (based on the same vessels as table 4.2).

Vessel	Minuses	Type	Decoration	Date
Silvolde	1	1a	50%	4270±70 BP
Ede-Hotel Bosbeek	0	1a	66%	4165±55 BP
Eext-tumulus visplas	1	ZZ	67%	4145±30 BP
Anlo-veekraal grave B	0	2Iib	99%	4140±70 BP
Witrijt	0	2Iic	97%	4035±55 BP
Hijkerveld-grave V	1	1b	65%	3970±35 BP
Odoorn-Esserveld	0	1a	31%	3955±50 BP
Eext-Bergakkers	0	1b	43%	3945±40 BP
Rolde-Volmachtenlaan A	0	epi-Maritime	100%	3880±50 BP
Annertol-tumulus III	0	no type	67%	3870±35 BP
Nijmegen	0	2If	97%	3850±40 BP
Rolde-Volmachtenlaan B	0	epi-Maritime	100%	3840±50 BP
Bennekom	0	2Ie	76%	3820±35 BP
Bennekom	0	2Ie	81%	3820±35 BP
Oudemolen-tumulus 13 period 1	0	no type	100%	3800±30 BP 3725±35 BP
Lunteren	0	2Id	98%	3790±35 BP
Beuningen-Hogewald	0	Veluwe	98%	3765±45 BP
Molenaarsgraaf	0	2If	95%	3665±40 BP

Table 4.2 Vessels and percentage of decoration.

1 minus

sherds with zoned decoration were found there. The site of Sijbekarspel-De Veken yielded All Over Ornamented Beakers and sherds of probably Maritime or epi-Maritime Beakers (Drenth and Hogestijn, 1999: p.103). Drenth and Hogestijn (2006: p.73) also especially mention the site of Molenkolk-1, since at this site two sherds of Bell Beaker ceramics were found with zoned decoration consisting of coupled half herringbones, applied with a notched or ridged spatula (Drenth and Hogestijn, 2006: p.73). The sherds are related to the Maritime decoration style but both the extent of the decorated and undecorated zones and the incipient zone contraction makes them no 'pure' representatives of this style. These sherds were surface finds. Furthermore, the sites of Mienakker, Zeewijk-West and Aartswoud yielded plain pots that resemble Veluwe shapes (Drenth and Hogestijn, 2006: p.89). However, all these sites are insufficiently published and the relation of the dated samples to the ceramics is not made explicit.

Vessels are illustrated in the following publications: Silvolde: Bantelmann *et al.*, 1979-80; Ede-Hotel Bosbeek: Modderman, 1954; Eext-tumulus visplas: Furholt, 2003a; Anlo-veekraal grave B: Waterbolk, 1960; Witrijt: Beex, 1957; Hijkerveld-grave V: Furholt, 2003a; Odoorn-Esserveld: Archive BAI; Eext-Bergakkers: Jager, 1985; Rolde-Volmachtenlaan A: Lanting, 2007-08; Annertol-tumulus III: Butler, Lanting and Van der Waals, 1972; Nijmegen: Drenth and Hogestijn, 2006; Rolde-Volmachtenlaan B: Van Giffen, 1954; Bennekom: Clarke, 1970; Oudemolen-tumulus 13 period 1: Butler and Van der Waals, 1966; Beuningen-Hogewald: Ufkes, 2006; Molenaarsgraaf: Louwe Kooijmans, 1974.

The associated dates are discussed in: Lanting and Van der Plicht, 1999-2000; Lanting and Van der Waals, 1976; Drenth and Hogestijn, 2006; Lanting, 2007-08.

4.2.5.3 Further research

The question whether either of the two chronological models was correct, was raised at the start of a new study of the ceramics from Corded Ware settlement sites in Noord-Holland. The current study demonstrates that with the knowledge of today it is impossible to decide whether either of the models is indeed correct. However, it has also become clear that the settlement sites in Noord-Holland can indeed be the basis of enhanced understanding of the chronology and the different contexts in which these ceramics occur. At a number of these sites Protruding Foot beakers and All Over Ornamented Beakers occur together and possibly even early Bell Beakers or Bell Beaker traits are encountered (Drenth and Hogestijn, 2006).

Of special interest are the sites of Zandwerven and Aartswoud. The stratified site of Zandwerven seems to represent one of the oldest Corded Ware Culture habitations known (Van Giffen, 1930; Van der Waals and Glasbergen, 1956; Van Regteren Altena and Bakker, 1966 and figure 4.3). In some spits at the stratified site of Aartswoud only Protruding Foot beakers were found, while in some higher-up spits Protruding Foot beakers and All Over Ornamented beakers occurred together (Van Regteren Altena and Bakker, 1966; Iterson Scholten and De Vries-Metz, 1981). This site may therefore contribute to our understanding of the advent of the All Over Ornamented beakers. To further our understanding of both, we can analyse the chronology and the life of the Corded Ware Culture people on these sites when studying larger as well as smaller settlements, such as the larger Zeewijk-West site and the smaller sites of Mienakker and Sijbekarspel-De Veken.

Besides the decoration and morphological characteristics, also the technological features need to be studied. Attention should be given to finding (chronological) trends that also can be identified at the level of the individual sherd. These characteristics may make it possible to find new chronologically relevant traits, as well as to interpret and date sites that yield only small fragments.

4.2.6 Conclusion

After testing the different propositions on which the competing chronological models are based, we must conclude that it is impossible to prove whether either of these models is indeed fully correct. Due to the reliance on funerary contexts, co-occurrences of different vessel types can be rarely used. It must also be concluded that for this period ^{14}C dates cannot be used to confirm the relative chronology. The ^{14}C dates may suffer from old-wood effect, reservoir effect, poor sample quality, inadequate sample preparation, and no or uncertain relations of the dated to the archaeological material. Almost half (73) of the dates had to be rejected and another 50 dates suffered to a lesser extent from problems of reliability. Only 35 unaffected dates are available for these periods (appendix 4.1). But since the calibration curve for these periods shows broad wiggles, calibrated dates show huge overlaps in time (INTCAL09; Furholt, 2003a: p.15).

The main proposition of the two-track model, that both in the (late) Corded Ware Culture and the Bell Beaker Culture there is a class of half-decorated and a class of fully-decorated beakers, is not supported by the reliable subset of ^{14}C dates. In the late Corded Ware Culture these two classes are in evidence, but for the Bell Beaker period this could not be proved. A co-occurrence of Maritime Beakers and other beaker types in settlement contexts is hard to confirm, owing to sparse publication. Two other aspects of the two-track model, viz. the zone-contraction hypothesis and the notion that the genesis of Veluwe beakers can be sought on Corded Ware settlement sites could not be tested either.

The ^{14}C dates are in line with the proposed chronological development from Protruding Foot beakers to All Over Ornamented to Bell Beakers. However, the position of All Over Ornamented Beakers remains unclear. Furholt (2003a) concluded that such vessels were already present in the earliest phase of the Corded Ware Culture. This does not seem likely, since the early Zandwerven site yielded only Protruding Foot beakers and at the site of Aartswoud one of the layers contained none but Protruding Foot beakers, whereas a higher spit contained beakers of both groups (Van Regteren Altena and Bakker, 1966; Iterson Scholten and De Vries-Metz, 1981). Co-occurrence of Protruding Foot beakers and All Over Ornamented types in graves (Lanting and Van der Waals, 1976: table 1) and in settlements (Drenth and Hogestijn, 2006) also indicates an overlap

in time. On the basis of one ^{14}C date, the Protruding Foot beakers seem even to outlive the All Over Ornamented Beakers; this dating, however, does carry one minus. The start of the Bell Beakers too is unclear; the ^{14}C dates point towards an overlap of the Maritime types and Protruding Foot beakers and All Over Ornamented Beakers. A Maritime phase with just Maritime Beakers is indeed unlikely, judging by the ^{14}C dates that show an overlap with Protruding Foot beakers and All Over Ornamented Beakers as well as Veluwe types. The ordering of the various Protruding Foot beakers, All Over Ornamented and Bell Beaker types and the different proposed trends governing their development cannot be tested with the ^{14}C dates either. Some types that are crucial to this ordering (2IIa, 2IIId, 2Ib and 2Ic) are not reliably dated at all. In some instances, the available dates are in contradiction with the proposed ordering.

The research currently conducted at the group of settlement sites in Noord-Holland sites may offer a solution to the described problems with the chronology of the Corded Ware Culture and Bell Beaker Culture: at these sites more types may appear in association, and two sites, Zandwerven and Aartswoud, offer the prospect of stratified finds.

4.3 New ideas on the chronological development of the Corded Ware Culture

4.3.1 Absolute dates for the Corded Ware Culture in Noord-Holland

For the seven studied settlements in Noord-Holland, 29 ^{14}C dates are available that correlate to cultural material (table 4.3); 10 of these, from the sites of Zeewijk (2), Mienakker (2) and Keinsmerbrug (6), were dated recently as part of the “Unlocking Noord-Holland’s Late Neolithic Treasure Chest” project. Three dates for Slootdorp-Bouwlust were obtained as part of this PhD research. The other 16 ^{14}C dates were obtained during prior research and are also part of the re-analysis of the Corded Ware Culture chronology presented in section 4.2.²⁹

4.3.1.1 Problems

The Noord-Holland ^{14}C dates suffer from several problems. The majority of the dates do not have a strong contextual association with the ceramics. For four dates (GrA 107 Sijbekarspel-De Veken, GrA 116 and GrA 118 Zandwerven and GrN 15565 Zeewijk-West) the exact locations from which the dated material originated are unknown (table 4.3). For four more dates (GrN 12013, GrN 12014 and GrN 12015 Aartswoud, GrN 2221 Zandwerven), a general description of the sample context is available, but the exact location and the association to the ceramics is unknown (table 4.3). Date GrA 102 has been associated with two adjacent sites, Kreukelhof and Slootdorp-Bouwlust.

Van Heeringen and Theunissen (2001: p.258) state that the date concerns charred reed from a pit at Slootdorp-Bouwlust. The application form at the ^{14}C laboratory of the university of Groningen, however, states that the submitted material is charred reed from Kreukelhof. Hogestijn and Drenth (2000–2001: p.44) and Lanting and Van der Plicht (1999–2000: p.67) also associate this date with Kreukelhof. It seems most likely that the dated material indeed stems from Kreukelhof.

29 Because this article focused on the Beaker chronology, the (Funnel Beaker) date GrA 102 for Kreukelhof (or Slootdorp-Bouwlust) was not taken into account.

Group	Made for this new research/older	Furholt (2003) plateau (on 16)	Date	Calibrated 16 (68.1%)	Calibrated 26 (95.4%)	Δ13C	Lab id	Site	Dated material	Location	Associated ceramics	Problems
1	Old	F	3910±50	2470-2309	2565-2208	-27.09	GrN 18488	Zeewijk-oost	Wooden post, outermost 4-6 rings	Large house.	No direct association.	Association
	Old	F	3925±40	2474-2346	2564-2290	-20.85	GrN 15565	Zeewijk-west	Bone	Unknown	Unknown	Association
2	Old	E	3960±30	2566-2459	2571-2347	x	GrA 107	Sijbekarspel De Veken	Charred hazelnutt shells	Unknown	Types 21a and 21a.	Association
1	New	E/F	3965±40	2570-2410	2577-2344	-28.56	GrA 47382	Keinsmerbrug	Grain	Square 287, area 6, southern structure.	No ceramics found in this square.	Association
1	Old	E	3970±35	2566-2464	2577-2348	x	GrN 12014	Aartswoud	Hazelnutt shells	Under 1m settlement material, trench 7	Unknown	Association
1	New	E	3970±40	2570-2461	2579-2345	-24.63	GrA 47377	Keinsmerbrug	Mixed botanical	Square 82, trample zone, northern structure.	No ceramics found in this square.	Association
2	New	E	3975±40	2568-2464	2580-2346	-23.32	GrA 56044	Mienakker	Grain	Feature 120, concentration of grain.	No ceramics found in this square.	Association
1	Old	E	3990±40	2568-2471	2621-2350	x	GrN 12013	Aartswoud	Grain	Under 1m settlement material, trench 5?	Unknown	Association
1	New	E	3995±40	2569-2472	2624-2351	-26.17	GrA 47381	Keinsmerbrug	Grain	Square 178, possible domestic activities, associated with plant processing	No ceramics found in this square.	Association
1	New	E	4000±40	2569-2474	2831-2356	-23.9	GrA 47380	Keinsmerbrug	Mixed botanical	Square 127, hearth area.	One rim sherd, vessel 11, undecorated quartz and grog tempered.	
1	Old	D/E/F	4000±65	2829-2411	2853-2300	x	GrN 2221	Zandwerven	Charcoal	Pit on basis of cultural layer.	Unknown	Association
2	New	E	4010±50	2578-2471	2840-2348	-18.35	GrA 15698	Mienakker	Bone, rib (ΔN15: 15.5)	Burial, feature 54.	No ceramics in direct association.	Association
1	New	E	4025±40	2578-2482	2834-2466	-25.31	GrA 47383	Keinsmerbrug	Grain	Square 416, far north, area possible associated with cereal threshing.	One sherd, thick-walled tempered with red granite and grog.	
2	Old	E	4030±30	2578-2490	2623-2472	-23.36	GrA 112	Zeewijk-west southern part top layers	Charred reed	Square 14333, layer 3	In this square different vessels are found, Vessel 15 (ZZ, layer 1 and 5), vessel 87, (undecorated, layer 6 and 7), vessel 123 (1a, layer 4), vessel C (perforated, layer 5), vessel VIII (undecorated foot, layer 6). Relation with dated reed?	Association
2	New	E	4030±40	2580-2481	2836-2467	-26.15	GrA 56013	Zeewijk-west southern part	Charred residue	Sherds of this vessel have been found in squares 1305, 1309, 1311, 1369, 1374, 1474, 1629, 1753, 1882.	Vessel 30, early Veluwe shape?	
1	Old	D/E	4055±40	2832-2492	2852-2474	x	GrN 12015	Aartswoud	Charcoal	Halfway down 1m settlement material, trench 5?	Unknown	Association
2	Old	D	4100±30	2840-2578	2863-2502	-23.08	GrA 109	Mienakker	Charred reed	Square 1632, feature 110	In square only grit	Association
2	New	D	4100±40	2850-2578	2871-2498	-26.04	GrA 56014	Zeewijk-west southern part	Charred residue	Sherds of this vessel have been found in squares 1557, 1757, 1816, 1821, 1824.	Vessel 13 herringbone decoration.	
2	Old	D	4120±30	2856-2623	2866-2578	-22.73	GrA 110	Mienakker	Charred reed	Square 1632, feature 110.	In square only grit.	Association
2	Old	D	4130±40	2862-2624	2872-2580	-25.36	GrA 108	Mienakker	Charred reed	Square 1632, feature 35.	In square only grit.	Association
1	New	D	4130±60	2866-2620	2884-2500	x	GrA 48396	Keinsmerbrug	Mixed botanical	Feature 1003, possible well.	None	Association
1	Old	D	4140±40	2866-2632	2876-2584	-24.49	GrA 114	Zeewijk-west (north, top layers)	Charred twigs	Square 23982, creek filling, highest layer	Vessel 157 (1a, layer 1), vessel 54 (Short wave moulded like, layer 1, 2) vessel T4 (1a/21b, layer 2) in lower layers other vessels and types are found.	Association
2	Old	D	4150±30	2868-2670	2876-2626	-24.97	GrA 113	Zeewijk-west southern part lowest layers	Charred reed	Square 14333, layer 7	In this square different vessels are found, Vessel 15 (ZZ, layer 1 and 5), vessel 87, (undecorated, layer 6 and 7), vessel 123 (1a, layer 4), vessel C (perforated, layer 5), vessel VIII (undecorated foot, layer 6). Association with dated reed?	Association
1	Old	D	4220±30	2894-2762	2905-2696		GrA 118	Zandwerven	Charred twigs	Unknown	Unknown	Association
1	Old	B/C	4320±60	3013-2891	3264-2707	-23.83	GrA 116	Zandwerven	Residue on sherd	Unknown	Unknown	Association
0	New	A	4480±35	3331-3096	3342-3029	x	GrN 59612	Slootdorp-Bouwlust	One charred seed	Findnumber 2422, feature 25 top part of the cultural layer.	Two wall sherds tempered with granite and sand.	
0	New	A	4500±35	3336-3105	3355-3091	x	GrN 59613	Slootdorp-Bouwlust	One charred seed	Findnumber 2437, feature 36, layer 2a	This feature yielded many ceramics including vessels 40, 41, 42, 45, 73, D, E, F, J, K, L, II and V. These are often tempered with hornblende and sand. The vessels have a profile with a high upright or inward bending neck. Strap handles are common. Decoration consists of rows of perforations or impressions under the rim. None of the sherds are labeled as stemming from layer 2a.	
0	New	A	455±40	3368-3119	3489-3101	x	GrN 59614	Slootdorp-Bouwlust	One charred seed	Findnumber 2514, feature 36, layer 2b	Same feature as date GrN 59614, one layer lower. This layer contained vessel 45 with a very high straight neck and perforations under the rim.	
0	Old	A	4570±30	3370-3136	3494-3109	x	GrA 102	Kreukelhof (or Slootdorp-Bouwlust)	Charred reed	The from from the 14C lab of the university of Groningen as well as Hogestijn and Drenth, 2000/01: p.44 and Lanting and Van der Plicht, 1999/2000: p.67 assign this date to Kreukelhof. However, Van Heeringen and Theunissen, 2001: p.258 associate this date to Slootdorp Bouwlust.	Unknown	Association

Good association

Furholt plateau (16)

- A 3350-3090 BC
- B 3090-2920 BC
- C 2920-2880 BC
- D 2880-2580 BC
- E 2620-2480 BC
- F 2460-2200 BC

Table 4.3 ¹⁴C dates from the analysed sites.

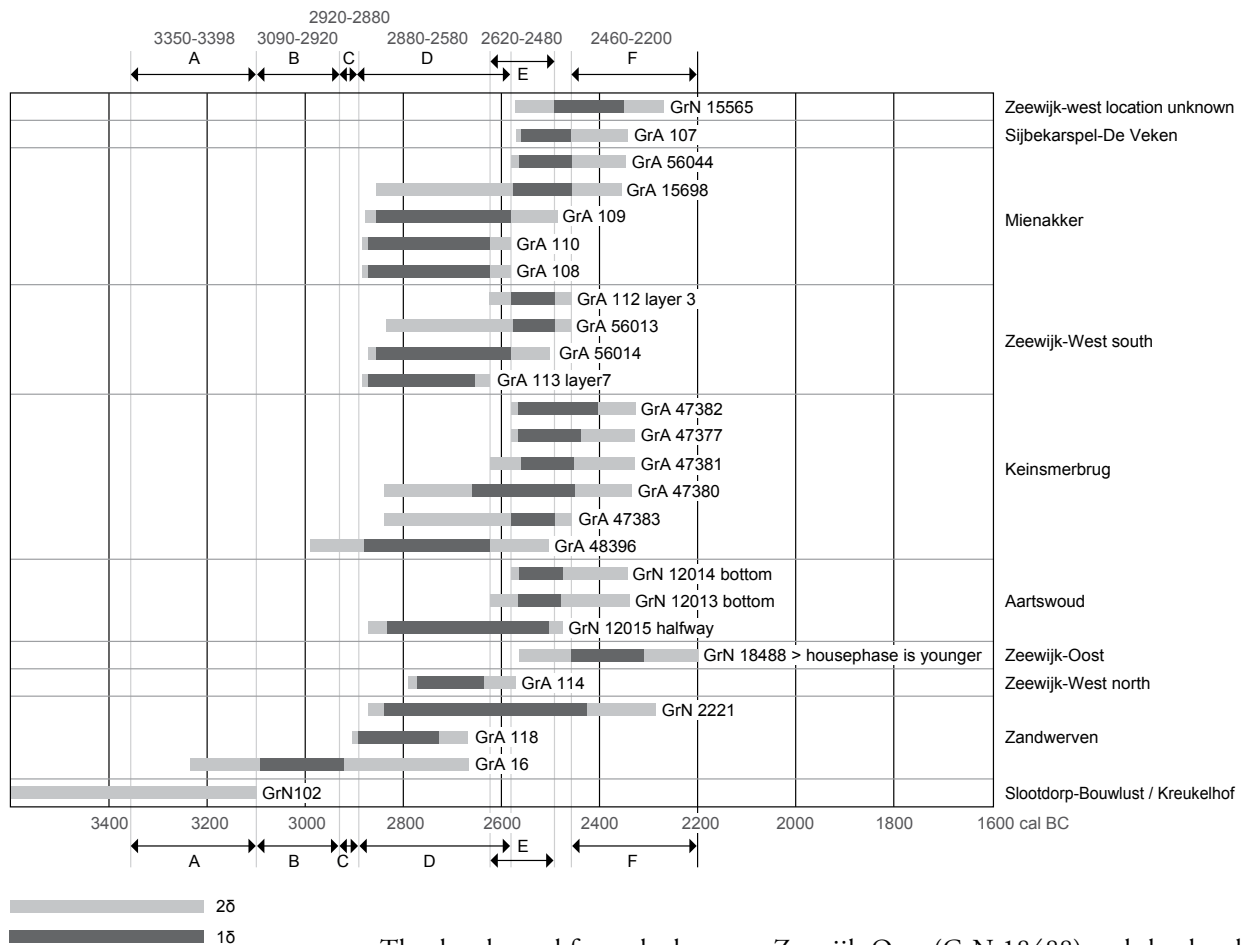


Figure 4.5 ¹⁴C dates from the analysed sites.

The dated wood from the house at Zeewijk-Oost (GrN 18488) and the dated bone from the burial at Mienakker (GrA 15698) have no direct association to ceramics (table 4.3). Seven dates (GrA 108, GrA 109, GrA 110 and GrA 56044 Mienakker, GrA 47377, GrA 47381, GrA 47382 and GrA 48396 Keinsmerbrug) concern squares in which ceramics were not present, or where only very small unanalysable sherds were found (table 4.3). For three dates from Zeewijk (GrA 112, GrA 113 and GrA 114) the location is known—and there are ceramics found in those squares—but the squares were excavated in layers and the exact layer numbers for the ceramics and the dated samples are unknown (table 4.3). To sum up, only 7 of the 29 dates show a direct association with ceramics (table 4.3).

In addition to the problem of association presented above, there is the problem of broad plateaus in the calibration curve. The majority of the dates fall within Furholt (2003a) plateau D (2880–2580 BC) and/or plateau E (2620–2480 BC) (table 4.3). Due to these plateaus, dates can span long periods. For example, date GrA 47380 can, with 95.4% confidence (2σ), be dated to 2831–2356 BC, a span of 475 years. Date GrA 56014 can, with 95.4% confidence (2σ), be dated to 2871–2498 BC, a span of 273 years. This problem affects all dates (table 4.3). Due to broad wiggles in the calibration curve it is generally impossible to establish a fine chronology in which sites and pottery characteristics can be dated to a specific, short time period.

In addition to the problems of association and plateaus in the calibration curve, there is a third problem, relating to the ‘old wood effect’. Two dates on charcoal (GrN 2221 Zandwerven, GrN 12015 Aartswoud) may concern wood that already had a considerable age before it was burned, thus yielding a date that is too old for the associated cultural material (Kinnes *et. al.*, 1991, Lanting and Van der Plicht, 1999–2000).

4.3.2 The start of the Corded Ware Culture in Noord-Holland

Notwithstanding the difficulties mentioned above, the ^{14}C dates can be used to enhance our understanding of different aspects of the Corded Ware chronology. This section aims to enhance our understanding of the start of the Corded Ware Culture habitation in Noord-Holland. It is therefore imperative to study the (oldest) Corded Ware sites in the region as well as sites from the preceding cultures. The site of Slootdorp-Bouwlust (2.3.1) has yielded Funnel Beaker remains (Van Heeringen and Theunissen, 2001: p.257–274, Hogestijn and Drenth, 2010: p.45). On the settlement site of Zandwerven (2.3.2), material similar to that of the middle Vlaardingen phase was found in one of the lower spits, while the ceramics from a higher spit are similar to Corded Ware and late Vlaardingen assemblages (Van der Waals and Glasbergen, 1956: p.100–101, Beckerman and Raemaekers, 2009: p.81).

Salanova (2001), Besse (2004) and Larsson (2009) all hypothesise that strong differences in the technology of the ceramics, in particular, may indicate discontinuity, whereas similarities in the technology may indicate local developments. On the basis of the analysis of the technological and morphological characteristics and the decoration of ceramic assemblages from Noord-Holland, it was concluded (section 2.3.1) that the Slootdorp-Bouwlust ceramics share similarities with those from Funnel Beaker sites but do not show many similarities with the younger sites in Noord-Holland. The ceramics show strong technological, morphological and decorative differences compared with the ceramics of the other studied sites from Noord-Holland (table 2.3). The most common tempering material at Slootdorp-Bouwlust, hornblende, has not been found at any of the other sites except for the only sherd found in the spit under the ‘Vlaardingen’ spit at Zandwerven. Furthermore, the most common vessel shape at Slootdorp-Bouwlust are vessels with a very high upward or slightly inward-sloping neck, a type not been found on any of the younger sites. The most common decorative motifs of the Slootdorp-Bouwlust vessels, namely, perforations and impressions under the rim and *tiefstich* decoration, have, with one exception, not been found on the younger Noord-Holland sites. Perforations under the rim have also been found on the ceramics from the low spit at Zandwerven. Since there are very large differences between the material from Slootdorp-Bouwlust and the other sites, it is likely that the ceramics from Slootdorp-Bouwlust are not the (direct) predecessor of the ceramics on the other (younger) sites.

The ^{14}C dates confirm that the Slootdorp-Bouwlust ceramics are the oldest ceramics of those studied. Three samples of charred seeds all date to 3355–3029 BC (2 δ); thus all can be placed within Furholt’s (2003a) plateau A (3350–3090 BC) (table 4.3, figure 4.5). As noted above, the sample location of one date, GrA 102, is uncertain; it may relate to Slootdorp-Bouwlust or to Kreukelhof, although the later seems more likely (table 4.3). This date is the oldest date and can also be placed within Furholt’s (2003a) plateau A (table 4.3, figure 4.5). A geological date (GrN 5904, 4480 \pm 45 BP) is a *terminus ante quem* for the creek system on which both the site of Slootdorp-Bouwlust and that of Kreukelhof are situated. This Furholt (2003a) plateau A date dates the end of the creek system to before 3352–3023 BC (2 δ).

During my re-analysis it became clear that there are remarkable similarities between the material labelled as Vlaardingen from the lowest spits at Zandwerven and the younger material labelled as Corded Ware. These similarities led to the conclusion that this material can be seen as the direct predecessor of the other sites (section 2.3.2, table 2.2 and 2.3).

The sherds are often medium-thick-walled or thick-walled; granite was frequently used as a tempering agent, but grog, plant materials and quartz have been used as well. At the other sites, the same tempering agents were used (table 2.2). The three most complete vessels have a pronounced S-shape. This shape is not found at the other sites, but it can be seen as precursor of the more elongated S-shapes found at the other sites.

The settlement of Zandwerven has yielded three ^{14}C dates. Unfortunately it is unclear to which spits these dates relate (table 4.3). One date, GrA 116, 4320 ± 60 BP, can, at 1δ , be placed within Furholt's (2003a) plateaus B and C (3013–2891 BC), but the 2δ range (3264–2707 BC) extends into plateaus A and D as well (figure 4.5). Date GrA 118 at 1δ (2894–2762 BC) falls within Furholt's (2003a) plateau C; the 2δ date (2905–2696 BC), however, extends into plateau D (figure 4.5). The last date (GrN 2221), on charcoal from a pit that supposedly stems from the oldest phase of occupation is, however, the youngest. At both the 1δ (2569–2474 BC) and 2δ (2831–2356 BC) intervals, this date falls within Furholt's (2003a) plateaus D, E and F (table 4.3).

The ^{14}C dates from Zandwerven are problematic but seem to support the typological ordering of the Slootdorp-Bouwlust (older) and Zandwerven (younger) sites. Although the ^{14}C dates do not allow me to postulate a gap or overlap in habitation at the two sites, the material culture is clearly different, and a close synchronic or cultural relationship between the two sites is unlikely.

The observed patterns can be used to postulate a new phasing for the habitation history in the area and to test current ideas on the origins of the Corded Ware habitation. The clear dichotomy in the ceramic traditions between the Funnel Beaker period at Slootdorp-Bouwlust, on the one hand, and the middle Vlaardingen ceramics from the low spits at Zandwerven, on the other hand, seems to indicate that the remains found at these sites belong to groups that are not related. In contrast, shared technical and morphological characteristics of the ceramics from the low Zandwerven spit and the other Corded Ware sites do suggest a relationship. It seems likely that there was a continuous local development and that the material from Zandwerven represents the direct predecessor of the later Corded Ware remains. These hypotheses will be further tested by including other sites from the coastal zone (section 4.4.1) and, at a larger scale, the whole of the Netherlands (section 4.4.2).

4.3.2.1 Testing existing ideas on the start of the Corded Ware Culture

Three different kinds of explanations have been postulated for the start of the Corded Ware Culture (section 1.2.2.1). The first kind involves the occurrence of large-scale migrations (amongst others, Buchvaldek, 1967, Glob, 1969, Gimbutas, 1979, Kristiansen, 1989, Brodie, 2001). The second kind relies on diffusion—that is, new ideas and material culture spreading through large-scale communication networks (e.g. Malmer, 1962, Neustupný 1969, Lanting and Van der Waals, 1976, Larsson, 1989, Damm, 1991, Larsson, 1991, Ebbesen, 1997, Lang, 1998, Hübner, 2005, Ebbesen, 2006, Włodarczak, 2009). The third kind involves a combination of both (e.g. Thomas, 1991, Kosko, 1997, Larsson, 2006).

For the Netherlands, in particular, several explanations for the transition to the Corded Ware Culture have been proposed. Before the occurrence of the Corded Ware Culture in the Netherlands, there were regional differences in material culture and presumably also in subsistence. The Funnel Beaker Culture (TRB) is found in large parts of the Netherlands, including the sandy soils of the northern and eastern Netherlands (Bakker, 1979, Brindley, 1986). The culture is dated

to 3500/3400–2750 BC (Lanting and Van der Plicht, 1999–2000: p.63–68). Remains of the Vlaardingen Culture or Vlaardingen Group have been found in the coastal zone, the rivers area and on the margins of the sandy soils (Drenth, 2005: p.273). The Vlaardingen Culture has been dated to 3400–2500 BC (Lanting and Van der Plicht, 1999–2000: p.68–72). There is thus a considerable overlap with the Corded Ware Culture, which has been dated to 2900/2850–2450 BC (Drenth and Lanting, 1991: p.42–43) or 2800–2400 BC (Lanting and Van der Plicht, 1999–2000: p.35–36, 79).

The transition from Vlaardingen to the Corded Ware Culture has been interpreted as gradual, involving a period of coexistence with some contacts (Louwe Kooijmans, 1976: p.289, Van Gijn and Bakker, 2005: p.304, Drenth, 2005: p.335). This initial phase was followed by an assimilation phase (Louwe Kooijmans, 1976: p.289). During this phase, known as VL2b, Vlaardingen and Corded Ware ceramics, including All Over Ornamented Beakers, were used together (Glasbergen *et al.*, 1967: p.26). Fokkens (2012: p.23) also supports the presented view and states that

“while in the uplands the Single Grave Culture developed, in the Lower-Rhine delta ‘nothing’ happened”.

Although he states that ‘nothing happened’, Fokkens nevertheless argues that the introduction of All Over Ornamented Beakers in Vlaardingen contexts should be included in the models of the transition to the Bell Beaker Culture. Amkreutz (2013: p.43) argues that there are large differences between the Corded Ware Culture and preceding cultures and that the Corded Ware Culture can thus be seen as a cultural break with the past.

The results of my analysis show that the chronological and cultural developments are different than previously thought. During the Funnel Beaker period, the coastal zone was used by a group of people using ceramics that do not show many resemblances to the ceramics of later inhabitants; it seems therefore likely that these people are not closely related culturally. Ceramics with several elements characteristic of the Noord-Holland Corded Ware assemblages were, however, already present in the older habitation phase at Zandwerven. These include technological characteristics (mainly tempering) as well as the S-shape, which later would become more elongated. From the characteristics of the ceramics from the oldest assemblage at Zandwerven we can conclude that the start of the Corded Ware Culture was probably not caused by migration and complete replacement of the previous culture. But the Corded Ware ceramics in Noord-Holland also display characteristics that were not present earlier. These include the beaker shape and, especially, decoration with spatula imprints and cord imprints in horizontal lines or patterns consisting of oblique impressions and zigzags. The analysis of the vessels with these new characteristics will be used to determine whether these new introductions were the result of diffusion or of small-scale migrations (sections 4.3.3 and 4.4).

4.3.3 Chronological developments within the Corded Ware Culture in Noord-Holland

The ceramics from Zandwerven (top layers), Zeewijk, Keinsmerbrug, Mienakker and Sijbekarspel-De Veken, the assemblages show ample similarities. All of these sites yielded beakers decorated with techniques and motifs similar to both the Protruding Foot Beaker types and the All Over Ornamented Beaker types of Van der Waals and Glasbergen (1955) and to larger vessels. However, several important differences between the sites were observed as well, which are here

interpreted as chronological differences (section 3.3). The ceramic assemblages show differences in their technological and morphological characteristics as well as their decorations. Interpretation of these differences led to the proposal of the following two groups.

Group 1 consists of the following sites and areas: the top layers at Zandwerven, Zeewijk-Oost, the northern part of Zeewijk-West, Aartswoud and Keinsmerbrug. Group 2 consists of the southern part of Zeewijk-West, Mienakker and Sijbekarspel-De Veken (figure 4.6). The ceramics from group 1 are often tempered with stone grit (20% or more stone grit) and more often thick-walled (15% or more 9–10.5 mm). The decoration often consists of spatula motifs but cord decoration and fingertip decoration are also present (figure 4.6). On group 2 sites, stone grit tempering is less common (less than 15% of the sherds) and thin-walled ware occurs more frequently (60% or more 5–7.5 mm). The decoration is often applied with cords. All Over Ornamented Beakers are most frequently found on sites belonging to group 2, specifically the southern part of Zeewijk-West and Mienakker. At Sijbekarspel-De Veken a sherd of a type 21a Bell Beaker has been found. Fingertip impressions are not present on ceramics from Mienakker and Sijbekarspel-De Veken and are infrequent on ceramics from the southern part of Zeewijk-West (figure 4.6).

The differences between the sites may be the result of chronological differences. Group 1 may reflect an early Corded Ware phase, whereas group 2 may reflect a late Corded Ware phase. However, the majority of the calibrated dates from these sites fall within the same Furholt (2003a) plateaus in the intcal09 calibration curve, namely, plateaus D, E and F, dating between 2880–2200 BC. The proposed ordering and two groups thus are not apparent from the calibrated dates (figure 4.5). The dates for group 1 sites fall within Furholt's (2003a) plateaus A to F (plateau A: 1 date, B 2 dates, C 3 dates, D 9 dates, E 12 dates, F 8 dates) at 2 δ (table 4.3). The group 2 sites show dates falling within Furholt's (2003a) plateaus D to F (plateau D: 7 dates, plateau E: 10 dates, plateau F: 4 dates) on 2 δ (table dates). Group 1 does indeed contain the oldest dates (Zandwerven and the northern part of Zeewijk-West) and is likely to have started earlier than group 2. Conversely, group 2 indeed contains one of the youngest dates (Sijbekarspel-De Veken) and thus seems to end the latest. However, the majority of the dates from both groups fall within the same plateaus in the calibration curve. The ¹⁴C dates thus do not allow me to clearly separate the two groups chronologically. This seems the result of the broad wiggles in the calibration curve and other problems with the dates, including the uncertainty of association of most of the dated samples and the ceramics. Although the ¹⁴C dates do not reflect the subdivision into two groups, it seems plausible on the basis of the ceramic analysis that the observed differences between the sites are chronological.

In addition to the option that group 1 and group 2 reflect two subsequent Corded Ware phases, there are three other options. These are (1) another chronological ordering, (2) the differences being caused by differences in function and (3) the differences being caused by social differences.

Option 1 is not an acceptable alternative because another chronological ordering of the sites based on the ¹⁴C dates is problematic to impossible. For Slootdorp-Bouwlust, Zandwerven, the northern part of Zeewijk-West and Sijbekarspel-De Veken, the ¹⁴C dates are in line with the typo-chronological ordering proposed on the basis of ceramic analysis (figure 4.5). Zeewijk-Oost is the only site that is clearly not in agreement with the proposed chronological ordering. The ceramics of Zeewijk-Oost strongly resemble those from the northern part of Zeewijk-West. Therefore a date within Furholt's (2003a) plateau D or possibly E was anticipated. However, the only date from Zeewijk-Oost (GrN 18488) dates the area to

Furholt's (2003a) plateaus E and F (2δ) (figure 4.5). Nobles (2014) postulates that the long house of Zeewijk-Oost represents the last phase of activity at the site. It is therefore possible that the date and the ceramics are not associated. The ceramics may predate the ¹⁴C date, while the ¹⁴C date is related to the long house. The other sites and areas— Aartswoud, Keinsmerbrug, the southern part of Zeewijk-West and Mienakker—all have yielded several dates that indicate a long possible timespan to which the site can be dated. For Keinsmerbrug and Mienakker, particularly, a long period of use does not seem likely from the small assemblages. For Aartswoud, a longer period of use is more likely, but here the oldest date, paradoxically, stems from the youngest spit (see section 4.3.3.1). The site of Zeewijk was likely in use for a long period or during several periods of time. The material from the southern part of Zeewijk-West seems to resemble one of these periods or a specific part of this long period. The proposed chronological ordering on the basis of the ceramics is thus not refuted by the dates, except for Zeewijk-Oost, but the dates show long possible time spans and possible overlap of many dates.

If another chronological ordering of the sites were to be chosen, for example, if Keinsmerbrug and Aartswoud were seen as belonging to a young phase and Mienakker as belonging to an older phase, this would lead to strange patterns in the chronological developments of the ceramics (section 2.3) (table 2.2, 2.3 and 3.1). For example, the amount of stone grit tempering would change from 44–63% at Zandwerven to 0% at Mienakker, and back to 25% at Aartswoud and 22% at Keinsmerbrug. The average thickness would change from 8.2/8.5 at Zandwerven to 6.9 at Mienakker and back to 7.8 at Aartswoud and 7.5 at Keinsmerbrug. The percentages of cord decoration would change from 58% at Mienakker to 6% at Aartswoud and 2% at Keinsmerbrug, and then back to 70% at Sijbekarspel-De Veken.

The second option, that the observed differences between the sites are not chronological but mainly functional, is also not likely. There are indeed differences between the sites that have been interpreted as functional differences. Keinsmerbrug, for example, was interpreted as a site where people from various settlements gathered in summer to hunt ducks and other species and to graze cattle

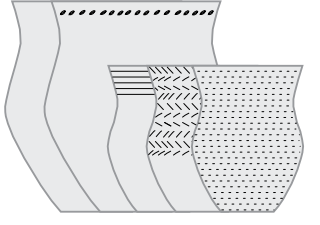
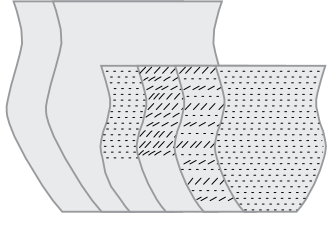
		
Shape	Group 1, Early Corded Ware	Group 2, Late Corded Ware
Sites	Zandwerven (top), northern part of Zeewijk-west, Zeewijk-oost, Aartswoud, Keinsmerbrug	Southern part of Zeewijk-west, Mienakker, Sijbekarspel-De Veken
Technological characteristics	20% or more stone grit tempering, 15% or more 9-10.5 mm, less than 60% 5-7.5 mm average thickness 7.5-8.5 mm	Less than 20% stone grit tempering, less than 15% 9-10.5 mm, 60% or more 5-7.5 mm, average thickness 6.8-6.9 mm
Decoration	Spatula decoration most common	Cord decoration most common
Types	1a, 1b, 1d, 1e, zigzag, 1a/2IIb, 2IIb, 2II d 1b just group 1, 2II d mainly group 1	1a, 1d, 1e, zigzag, 1a/2IIb, 2II d, 2IIa, 2Ia, AOO more common in group 2, 2IIa and 2Ia just in group 2
Medium thick-walled and thick-walled shapes	Enlarged beakers, short wave moulded vessels just in this group, fingertip decoration	Enlarged beakers, fingertip decoration (less common)

Figure 4.6 Characteristics of group 1 and group 2 ceramics.

(Kleijne *et al.*, in prep.). Other sites, such as Mienakker, have been interpreted as having been used year-round for different activities, including hunting, fishing, gathering foods and craft production (Kleijne *et al.*, 2013). These differences in function are indeed visible in the ceramics. For example, at Keinsmerbrug, different types of vessels have been used to prepare one type of meal, whereas at Mienakker, a more uniform set of vessels was used to prepare a broad spectrum of meals (Beckerman, 2012 and 2013, Oudemans and Kubiak-Martens 2012 and 2013). However such differences in function of the sites are unlikely to have caused the differences that were used to define the groups, such as the amount of stone grit tempering, the thicknesses, the ratios between spatula decoration, fingertip decoration and cord decoration and the amount of All Over Ornamented Beakers. All the assemblages consist of both smaller and larger vessels (chapter 2). On all sites there are indications that the vessels were used for both cooking and storage (section 3.3.4). Ceramic artefacts were found at all three Zeewijk areas, as well as at Zandwerven and Aartswoud (chapter 2). If the observed differences, for example, tempering with stone, have a functional background (if, for example, stone grit-tempered vessels were used for cooking and grog-tempered vessels were used for storage), there would have been clear (and greater) difference in the patterns of function and use.

A third alternative option considered is that social differences caused differences in the ceramic assemblages. In that case the two groups would not represent differences in time but differences between groups or differences in social background, affiliations or status. Thus, for example, an assemblage with more stone grit tempering and fingertip decoration would reflect a specific social group rather than a chronological period. This may be true. However, there are also strong arguments that the different sites were inhabited by a closely related group of people often working together (Smit *et al.*, 2012, Kleijne *et al.*, 2013, Theunissen *et al.*, 2014, see chapter 5). In conclusion, chronological difference are the most likely cause for the observed differences between the assemblages of the (groups of) sites.

4.3.3.1 Chronological ordering of characteristics of the ceramics and observed trends

Inter- and intra-site differences in the ceramic assemblages may reflect trends in the technological characteristics, trends in the morphological characteristics or trends in the decoration of ceramics (section 3.3). Whether these differences indeed reflect chronological trends will be tested in this section.

The first trend concerns the average thickness of the sherds and the ratios between thin-walled, medium-thick-walled and thick-walled wares. On the group 2 sites, the class of thin-walled ware (5–7.5 mm) is the largest, whereas on the group 1 sites the class of thick-walled ware (9–10.5 mm) is the largest (table 2.3). The average thickness ranges from 8.2–8.5 mm, in the top layers at Zandwerven, to 6.8 mm, at Sijbekarspel-De Veken. The dates for sites where the class of thin-walled ware comprises over 60% fall within Furholt's (2003a) plateaus D, E and F. The dates for sites with over 15% thick-walled ware date to Furholt's (2003a) plateaus A to F or B to F (table 4.4). The sites that are the oldest based on the ¹⁴C dates, namely, Zandwerven (top) and the northern part of Zeewijk-West, are indeed part of the typological group with over 15% of thick-walled ware that are seen here as early Corded Ware. Conversely, the site that is the youngest based on the ¹⁴C dates, namely, Sijbekarspel-De Veken, is indeed part of the group of sites with many thin-walled sherds, here claimed to be a young development.

Characteristics/Number of ¹⁴ C dates falling on plateau on 1δ (after: Furholt, 2003a)	Sites	A (3+1?)	B (1)	C (1)	D (10)	E (14)	F (3)
Thick-walled over 15%	Slootdorp Bouwlust, Zandwerven all, Zeewijk-west northern part, Zeewijk-oost, Aartswoud, Keinsmerbrug	3+1?	1	1	5	9	2
Thin-walled over 60%	Zeewijk-west southern part, Mienakker, Sijbekarspel-De Veken				4	5	1
Stone grit tempering over 20%	Slootdorp Bouwlust, Zandwerven all, Zeewijk-west northern part, Aartswoud, Keinsmerbrug	3+1?	1	1	5	9	2
Stone grit tempering under 20%	Zeewijk-west southern part, Zeewijk-oost, Mienakker, Sijbekarspel-De Veken				5	5	2
High upright or inward bending neck	Slootdorp Bouwlust	3+1?					
Pronounced S-shape	Zandwerven		1	1	2	1	1
Enlarged beaker	Zeewijk-west southern part, Zeewijk-oost, Mienakker, Aartswoud, Keinsmerbrug				7	12	3
Beaker	Zandwerven, Zeewijk-west southern part, Zeewijk-oost, Aartswoud, Keinsmerbrug, Mienakker		1	1	9	11	4
High shoulder	Zeewijk-west south				2	2	
Low shoulder	All sites with beakers		1	1	9	11	4
Perforations under the rim used most	Slootdorp Bouwlust	3+1?					
Fingertip decoration most used	Zeewijk-west north				1		
Spatula decoration used most	Zeewijk-west northern part, Zeewijk-oost, Aartswoud, Keinsmerbrug				2	8	2
Cord decoration used most	Zeewijk-west southern part, Mienakker, Sijbekarspel-De Veken				5	5	1

Table 4.4 Characteristics and ¹⁴C dates by plateau. In this table, the 1δ interval is used to clarify that, due to plateaus in the calibration curve, characteristics most often have a long possible lifespan. Note that if the more precise 2δ interval were to be used, this lifespan would most often be even longer.

A second trend in the technology is the decline of the percentage of stone grit tempering over time (table 2.3). On late Corded Ware sites the percentage of stone grit tempering is less than 20%; these sites date to Furholt's (2003a) plateaus D, E and F. The site with the youngest ¹⁴C date, Sijbekarspel-De Veken, indeed has a low percentage of stone grit tempering (17%). Early Corded Ware sites have ceramic assemblages with over 20% stone grit tempering. These sites can be dated to plateaus A or B to F (table 4.4). The sites with the oldest ¹⁴C dates, Zandwerven and the northern part of Zeewijk-West, belong to this group.

The shapes of the vessels have changed over time. From old to young, the following changes can be identified: Slootdorp-Bouwlust yielded vessels with a high upright or inward-sloping neck, vessels in the low layers at Zandwerven vessels had a pronounced S-shape, and both early and late Corded Ware sites yield beakers and enlarged beakers. The beaker shape dates to Furholt's (2003a) plateaus B to F; the enlarged beaker shape, to D to F (table 4.4). Beakers with a high shoulder, found in the southern part of Zeewijk-West, date to plateaus D and E; the specimen with a low shoulder, to plateau B to F.

Other trends observed concern the decoration of the ceramics. On the different sites decoration was applied with either spatulas, cords or fingertips. The ratios among the three change over time. The percentage of cord decoration is shown to increase over time, whereas the percentage of fingertip decoration decreases dramatically over time (table 2.3). Spatula decoration was used on all sites, but the percentage slightly decreases over time (table 2.3). The ¹⁴C dates show that the site on which fingertip decoration is the most frequently used decorative technique (the northern part of Zeewijk-West) dates to Furholt plateau D (1δ) or plateaus D and E (2δ) (table 4.4). Both the sites on which spatula decoration was used most frequently and the sites on which cord decoration was used most frequently are dated to Furholt's (2003a) plateaus D, E and F (table 2.3 and 4.4). The site that is presumed to be the youngest based on the ¹⁴C dates, Sijbekarspel-De Veken, indeed has a high percentage of cord-decorated sherds, a characteristic was also seen as young.

Table 4.5 Existing typochronological ideas and ¹⁴C dates by plateau. In this table, the 1δ interval is used to clarify that, due to plateaus in the calibration curve, characteristics most often have a long possible lifespan. Note that if the more precise 2δ interval were to be used, this lifespan would most often be even longer.

Characteristics/Number of ¹⁴ C dates falling on plateau on 1δ (after: Furholt, 2003a)	Sites	A (17)	B (1)	C (1)	D (10)	E (14)	F (3)
Fingertip impressions	Zeewijk all three areas, Aartswoud, Keinsmerbrug				4	10	2
Short wave moulded vessels	Zandwerven top and Aartswoud		1	1	3	4	1
PF types	All		1	1	10	14	3
AOO types	All but Keinsmerbrug		1	1	9	9	2
Bell Beaker type						1	
1a	Zandwerven top, Aartswoud, Zeewijk-west southern part		1	1	5	6	1
1b	Zandwerven top, Aartswoud		1	1	3	4	1
1c	None						
1d	Zandwerven top, Zeewijk all areas, Aartswoud, Keinsmerbrug, Mienakker		1	1	10	13	3
1e	Zeewijk all areas, Aartswoud, Keinsmerbrug, Mienakker				8	12	2
ZigZag	Zeewijk all areas, Aartswoud, Keinsmerbrug				5	10	2
2I1b	Zeewijk-west northern and southern part, Mienakker				6	5	
2I1d	Zandwerven, Zeewijk all areas		1	1	8	6	3
2I1f	Zeewijk-west south				2	2	
2I1a	Sijbekarspel-De Veken					1	
2I1a	Sijbekarspel-De Veken					1	
Protruding foot	Zandwerven top, Zeewijk-west northern and southern part, Aartswoud		1	1	6	6	1
Flat or hollow base	All		1	1	10	14	3
Decoration inside of the rim	Zeewijk-oost and Zeewijk-west southern part, Keinsmerbrug, Mienakker				6	1	1
Zoned decoration	Zeewijk-oost, Aartswoud, Sijbekarspel-De Veken				1	4	1
Vlaardingen group C	Zandwerven low, Zeewijk-oost and Zeewijk-west southern part, Mienakker, Keinsmerbrug		1	1	8	10	3
Vlaardingen group D	None						
Vlaardingen group E	Zeewijk-west southern part, Mienakker				5	4	
Predecessor of Veluwe shape	Zeewijk-west southern part, Mienakker				2	2	

In addition to variability in ratios of decorative techniques, there variability in the motifs applied and in the presence of All Over Ornamented Beakers. The other trends in decoration and other typochronological ideas proposed by others—for example, the ordering of the Van der Waals and Glasbergen (1955) types—will be presented and discussed below.

4.3.3.2 Testing existing ideas on the chronology of the Corded Ware Culture: Protruding Foot Beakers

In chapter 3, the characteristics of the ceramics on the different sites were compared with each other and with those from Vlaardingen and other Corded Ware sites (table 3.1). In this section, the existing typochronological ideas will be tested further.

Van der Waals and Glasbergen presented the first typochronology of Protruding Foot Beakers in 1955. They subdivided Protruding Foot Beakers into types 1a–1e and the Zigzag type on the basis of their decoration. Undecorated beakers were labelled 1f. The ordering of the types was said to be chronological (Van der Waals and Glasbergen, 1955: p.8–17). Van der Waals and Glasbergen (1955) types 1a, 1d, 1e and the Zigzag type are found on both sites that are seen as early Corded Ware (group 1) and sites that were seen as late Corded Ware (group 2) (table 4.5). Clear examples of type 1c have not been found on the Noord-Holland Corded Ware sites. Type 1b has only been found at the group 1 sites of Zandwerven and Aartswoud (table 4.5). Type 1b, and especially decoration with just horizontal grooved lines, can be seen as being restricted to the old phase. The other types show overlap. The chronological sequence of 1a to 1e is therefore not likely.

Lanting and Van der Waals (1976: p.5) also suggested that several of the Van der Waals and Glasbergen (1955) types overlap. They saw type 1a as the oldest and type 1e as the youngest, the order of types 1b, 1c and 1d being unclear. They viewed the zigzag type as being connected to type 1d (Lanting and Van der Waals, 1976: p.5). This overlap of the types is indeed observed here, and type 1e did indeed not occur on the oldest sites (table 4.5). Since types 1a, 1b, 1d and 2II d are all found on the site with the oldest date, Zandwerven, it cannot be confirmed that type 1a is the single oldest type.

Lanting and Van der Waals (1976: p.5) propose three chronological trends in the development of Protruding Foot Beakers: (1) the base changes from protruding to flat or hollow, (2) the decoration changes from cord impressions to grooved lines and decoration impressed with a plain spatula, and (3) the decoration changes from consisting solely of horizontal lines to herringbone patterns and ultimately to a decoration consisting of horizontal rows of oblique impressions in one direction only.

At both sites that belong to early Corded Ware group 1 and at sites that belong to Late Corded Ware group 2 sites, protruding and flat bases are found (table 4.5). However, because protruding bases are not found at Sijbekarspel-De Veken (conforming to Lanting and Van der Waals [1976: p.5] trend 1), it may indeed be true that protruding bases disappear during the late Corded Ware period.

The changes in the decoration techniques, trend 2 as described by Lanting and Van der Waals (1976), cannot be observed at the studied sites either. Cord impressions, grooved lines and impressions with a plain spatula are present at all sites. The absence of type 1e and the presence of type 1b at the early site of Zandwerven confirms to some extent trend 3 described by Lanting and Van der Waals (1976: p.5), that oblique impressions in one direction are a later development. However, at the other sites both herringbone patterns and oblique impressions in one direction occur (table 4.5).

To sum up, two of the three chronological trends postulated by Lanting and Van der Waals (1976: p.5) indeed have some chronological value. However, considering that many of the characteristics that are seen as stages in the development occur together on all Corded Ware sites studied, the three trends do not allow for a phasing of these sites. The trends therefore cannot serve as a tool to describe the developments at the Noord-Holland sites in chronological detail.

Drenth and Lanting (1991: p.42–43) subdivide the Corded Ware period into four phases. They propose that type 1a is present in all four phases, type 1b in phases 2 to 4 and possibly phase 1, type 1d in phases 2 to 4, types 1c and 1e in phases 3 and 4 and the zigzag type just in phase 4 (Drenth and Lanting, 1991: p.42–43).

In their terminology, all sites in the current study except for Zandwerven belong to phase 4 because they have yielded various types including the Zigzag type. Zandwerven may belong to phase 3 or 4 (sections 2.3 and 3.3). Thus, although differences were observed among the sites, the Drenth and Lanting (1991) phases do not allow for a chronological ordering of the Noord-Holland sites studied. Moreover, Drenth and Lanting (1991) also proposed very specific dates for their phases (phase 1: 2900/2850–2800 BC, phase 2: 2800–2700 BC, phase 3: 2700–2600 BC and phase 4: 2600–2450 BC). Given the large plateaus in the calibration curve, it is impossible to determine whether this can be proven as correct. The Noord-Holland sites that, on the basis of the decoration types of the ceramics, date to phase 4 show calibrated dates that range between 2884–2208 BC at the 2 σ interval, thus spanning all four proposed phases (table 4.3).

On the basis of the ¹⁴C dates, Furholt (2003a: p.100) postulated that type 1a is the oldest and that types 1b–1e occur in both the oldest (plateau D) and the youngest (plateau E) phase, although in the youngest phase there was a higher proportion of beakers with herringbone and oblique spatula imprints. This study confirms that types 1b–1e indeed date to plateaus D and E. The conclusion that type 1a is the oldest cannot be supported. That the youngest phase (Furholt, 2003a), plateau E, yields more beakers with herringbone and oblique spatula imprints is to some extent supported. However, in this study it was concluded that in the youngest phase cord decoration was used most often (figure 4.6). Dates from sites with many cord-decorated sherds fall within Furholt's (2003a) plateaus D, E and F (table 4.4).

The typonchronological ordering by Van der Waals and Glasbergen (1955), the ordering of types and trends by Lanting and Van der Waals (1976), the subdivision into four periods by Drenth and Lanting (1991), and the propositions on the oldest and youngest types and trends by Furholt (2003a) all have inaccuracies and therefore cannot be used to describe the Corded Ware chronology. However, several elements of the different models may have some chronological value. The trends proposed by Lanting and Van der Waals (1976: p.5), that protruding feet became more uncommon over time and that decoration with oblique impressions in one direction were a younger development, may indeed be correct. However, this study shows that different types of beakers as well as different decoration techniques and motifs often occur together (table 4.5). A chronological subdivision based on ratios between types and characteristics, as proposed in this study, is therefore far more accurate.

4.3.3.3 Testing existing ideas on the chronology of the Corded Ware Culture: All Over Ornamented Beakers

Van der Waals and Glasbergen (1955: p.28–31) interpreted All Over Ornamented Beakers as a hybrid group of beakers combining characteristics of both Protruding Foot Beakers and Bell Beakers. The All Over Ornamented Beakers are said to occur alongside both groups (Van der Waals and Glasbergen, 1955: p.27, 30–31). Three types were recognised, types 2IIa–c, with the letters representing the proposed chronological ordering. In the unilinear model of Lanting and Van der Waals (1976: 3, 5, 13–15), All Over Ornamented Beakers form a link in the development from Protruding Foot Beakers to Bell Beakers. They argue that the development from Protruding Foot Beakers to All Over Ornamented Beakers was continuous and a product of local developments rather than of large-scale migrations (Lanting and Van der Waals, 1976: p.3). They assume an overlap between Protruding Foot Beakers and All Over Ornamented Beakers (Lanting and Van der Waals, 1967: p.3). Types 2IIb and 2IIc are considered to be the oldest types; type 2IIa is the youngest, with type 2IIc placed in between (Lanting and Van der Waals, 1976: p.6). Both All Over Ornamented Beakers and young Protruding Foot Beakers are said to have been decorated on the inside of the rim (Lanting and Van der Waals, 1976: p.6). Furholt (2003a: p.100) states that the (often problematic) ¹⁴C dates do not show an earlier start for Protruding Foot Beakers than for All Over Ornamented Beakers.

Just like Protruding Foot Beakers, All Over Ornamented Beakers are found on all studied sites, and the proposed overlap of Protruding Foot Beakers and All Over Ornamented Beakers is thus reinstated (table 3.1). The All Over Ornamented types that are present on the different sites, however, differ. Type 2IIc has only been found on three group 1 sites (Zandwerven, the northern part of Zeewijk-West, and Zeewijk-Oost) and one group 2 site (the southern part of Zeewijk-

West) (table 3.1, figure 4.6). This type dates to Furholt's (2003a) plateaus A to F (2δ) (table 4.5). Conversely, type 2IIa has only been found on one group 2 site, Sijbekarspel-De Veken (table 3.1, figure 4.7). This type dates to Furholt's (2003a) plateau E (2δ). The exclusively cord-decorated type 2IIb can only be distinguished from the cord-decorated Protruding Foot beaker type if the lowermost part of the beaker is present. Clear examples of type 2IIb have been found on the northern and southern parts of Zeewijk-West and at Mienakker (table 3.1). This type dates to Furholt's (2003a) plateaus D and E (2δ) (table 4.5).

From this reanalysis it is clear that 2IIc and possibly 2IIb are the oldest and that both, yet especially 2IIb, have a long period of occurrence. Type 2IIa is only present at Sijbekarspel-De Veken, which both the typochronological analysis and the ¹⁴C dates indicate is the youngest site. All Over Ornamented Beakers are more common on the late Corded Ware (group 2) sites, namely, the southern part of Zeewijk-West and Mienakker (table 3.1, figure 4.6).

The proposition by Van der Waals and Glasbergen (1955: p.28–31) that the letters indicate the chronological order is here refuted. The proposed ordering by Lanting and Van der Waals (1976) is supported for the most part; 2IIb is indeed one of the oldest types and 2IIa the youngest. However, type 2IIc is present at the oldest sites studied, and clear examples of the supposedly old 2IIc type have not been found. Because All Over Ornamented Beakers are already present at the oldest sites, either an older phase with exclusively Protruding Foot Beakers is missing from this dataset, or All Over Ornamented Beakers were indeed present from the onset of the Corded Ware Culture in the Netherlands. The latter explanation is most likely as radiocarbon dates for both the Noord-Holland settlements and the funerary contexts in other parts of the Netherlands give no indications that All Over Ornamented Beakers are a younger development (Arnoldussen, 2008: p.377–379, fig. 7.4). Decoration with a dentated spatula is a younger development, which was only observed at Sijbekarspel-De Veken. The possible meaning of All Over Ornamented Beakers will be further discussed in chapter 5.

4.3.3.4 Testing existing ideas on the chronology of the Corded Ware Culture: Two-track model

With their 'two-track model', Drenth and Hogestijn (1999) proposed that in the Corded Ware Culture, the Bell Beaker Culture, and the Early Bronze Age, there was a group of half-decorated and a group of fully decorated ceramics. This notion seems to be correct for the Corded Ware period in Noord-Holland because half-decorated Protruding Foot Beakers as well as completely decorated All Over Ornamented Beakers are found at the different studied sites. The subsequent periods were not part of this study and the validity of the two-track model in younger periods can therefore not be tested.

Drenth and Hogestijn (1999) made several other chronological claims and critiqued the unilinear model. One claim concerns the decoration. Lanting and Van der Waals (1976: p.6) proposed that Maritime or type 2Ia Bell Beakers developed out of All Over Ornamented Beakers and that the decoration changed from all over to zoned. Drenth and Hogestijn (1999: p.109) argue that zoning of the decoration not only occurred on completely decorated All Over Ornamented Beakers, but also on half-decorated beakers. Aartswoud and Zeewijk are said by them to have yielded this type of sherds. The present study confirmed this claim and adds Sijbekarspel-De Veken to the list (table 3.1). Zoned decoration is therefore dated to Furholt's (2003a) plateaus D, E and F (2δ) (table 4.5). Zoned decoration, though rare, does occur on early Corded Ware (group 1) and late

Corded Ware (group 2) sites, yet is most frequent on the latter. The importance of this type of decoration is unclear. Since it is rare and occurs on sites dated to different periods it cannot be seen as a specific stage in the development but rather as one of the many decorative elements that occur.

A second claim (Drenth and Hogestijn, 1999) is that the so-called Veluwe shape, which is very well known from the central part of the Netherlands during the Bell Beaker period, has precursors on the Noord-Holland settlement sites. One such vessel was found in the southern part of Zeewijk-West and one at Mienakker.³⁰ Lanting (personal communication) proposed that the vessel from the southern part of Zeewijk-West was of a far younger, Iron Age, date. To test these opposing claims, a ¹⁴C date was taken of charred crust on this vessel. This date (GrA 56013, 4030±40 BP) indicates that the vessel very likely dates to the Corded Ware period. At the 2 δ confidence level, this date is related to Furholt's (2003a) plateaus D and E. The shape seems to resemble the later Veluwe shape; however, similar shapes were also present during other periods—for example, the Funnel Beaker period (e.g. Modderman *et al.*, 1976). It seems plausible but is not ascertained here that the Veluwe shape was based on older Neolithic shapes.

4.3.3.5 Testing existing ideas on the chronology of the Corded Ware Culture: Thick-walled and undecorated ware

Floore (1991: p.55) and Drenth and Lanting (1991: p.46) formulated ideas on the chronology of short wave moulded vessels. According to Floore (1991: p.55) short wave moulded vessels become less common in the late Corded Ware phase. During this late phase, according to Floore (1991: p.55) vessels with fingertip imprints—but without plastic bands—become more common. Drenth and Lanting (1991: p.46) state that short wave moulded vessels are present during each of their four phases.

From the current reanalysis of Corded Ware ceramics from settlements in Noord-Holland it is clear that short wave moulded vessels are not the typical domestic ware in the studied region (3.2.3.3). This type was only found in low numbers at Zandwerven and Aartswoud (table 3.1). Due to the plateaus in the calibration curve and uncertainty of association, these two sites have a long possible lifespan, spanning Furholt's (2003a) plateaus A to F (2 δ) (table 4.5). Vessels with fingertip imprints were found in all three Zeewijk areas, at Aartswoud and at Keinsmerbrug. These date to Furholt's (2003a) plateaus D to F (2 δ) (table 4.5). Short wave moulded vessels and fingertip-imprinted vessels were not found at Mienakker or Sijbekarspel-De Veken, both of which date to Furholt's (2003a) plateaus D to F (2 δ). The current study thus indicates that short wave moulded vessels only occur on early Corded Ware group 1 sites, while fingertip impressions are most common on these early Corded Ware group 1 sites. Both types do not occur on the late Corded Ware group 2 sites. These new propositions refute earlier propositions by Drenth and Hogestijn (1991) and Floore (1991).

Although short wave moulded vessels were previously seen as the main type of thick-walled domestic ware, my study shows that instead tri-partite vessels with an elongated S-shape or an enlarged beaker shape were the most common medium-thick-walled and thick-walled wares. These types were present during the whole of the Corded Ware period in the coastal zone (see section 3.3.1.4). This vessel type has morphological characteristics that are very similar to Vlaardingen group E vessels (Beckerman and Raemaekers, 2009: p.68–69). This type has been found

30 The vessel with a Veluwe-like shape from Mienakker unfortunately is missing and has not been analysed (Beckerman, 2013).

at both older and younger sites. Group E vessels have been found at several early Corded Ware group 1 sites, namely, Zeewijk-Oost, Aartswoud and Keinsmerbrug. On late Corded Ware (group 2) sites of Mienakker and the southern part of Zeewijk-West, group E vessels were present as well. The sites on which these vessels with an enlarged beaker shape have been found date to Furholt's (2003a) plateaus D to F (2δ) (table 4.5). Due to fragmentation, the profiles often cannot be fully reconstructed; however, given the shape of many sherds, it is likely that far more medium-thick-walled and thick-walled sherds from these and other studied sites and areas belonged to this type.

Several vessels (vessel 4 and presumably vessels 1 and 22) from the bottom layers at Zandwerven are similar to Vlaardingen group C vessels with an pronounced S-shape. It is not only the medium-thick-walled and thick-walled undecorated vessel that resemble Vlaardingen shapes, but also the more thin-walled beakers (section 3.3.1.5).

Since the medium-thick-walled and thick-walled vessels on Corded Ware sites in the coastal zone share many similarities with the vessels of the preceding middle Vlaardingen period, it seems likely that they reflect a persistent regional tradition. The supra-regional short wave moulded type was adopted as other types already fulfilled this function.

4.3.4 *The end of the Corded Ware Culture in Noord-Holland*

4.3.4.1 New ideas on the end of the Corded Ware Culture in Noord-Holland

Having discussed the possibilities and limitations of subdividing the Corded Ware period into different sub-phases it is now time to study the end of the Corded Ware period and the transition to the Bell Beaker period. The ceramics from Sijbekarspel-De Veken were included in this study because the site had previously been interpreted as the youngest Corded Ware site (Van Heeringen and Theunissen, 2001: p.79–87) and could therefore enhance our understanding of the transition from the Corded Ware Culture to the Bell Beaker Culture. Unfortunately only a small section (0.4%) of the site was excavated and just 66 sherds with a weight of 3 grams or more were found (section 2.3.7, Van Heeringen and Theunissen, 2001: p.80, Drenth *et al.*, 2008: fig.7).

Despite the small size of the assemblage, Sijbekarspel-De Veken yielded two beaker types that have not been found on any of the other studied sites. These are All Over Ornamented beaker type 2IIa and Bell Beaker type 2Ia, the so-called Maritime type. Both types were decorated with a dentated spatula, a decoration technique not present on any of the other studied sites. Despite such novel decorative motifs and decorative techniques, several other characteristics of the Sijbekarspel-De Veken ceramics share similarities with late Corded Ware group 2 sites under study. On Sijbekarspel-De Veken there is a large amount of thin-walled ware (63%) and a small amount of thick-walled ware (4%) (table 2.3). The average thickness is 6.8 mm, whereas on both the southern part of Zeewijk-West and Mienakker the average thickness is 6.9 mm (table 2.3). The tempering is also similar to that on the southern part of Zeewijk-West and Mienakker; stone grit-tempered sherds make up less than 20% of the sherds, and almost all sherds contain grog (table 2.2). In addition to types 2IIa and 2Ia, three sherds (vessels C, D and E) were decorated with only cord lines, a decorative motif present on all other studied sites and found in large numbers at Mienakker and in the southern part of Zeewijk-West (table 3.1). The shared technological characteristics between the new types (2IIa and 2Ia) and the older types (1a or 2IIb) and the comparability of the material from Sijbekarspel-De Veken and the other studied sites, especially

Mienakker and the southern part of Zeewijk-West, make it clear that there is no dichotomy between the sites.

The single ^{14}C date available for Sijbekarspel-De Veken, GrA 107 3960 \pm 30 BP, in calendar years translates to between 2571–2347 BC (2 δ) (table 4.3). This BP date is indeed one of the youngest dates for the studied settlements, but when calibrated at 2 δ , the date includes a long possible time span, covering Furholt's (2003a) plateaus E and F (table 4.3).

4.3.4.2 Testing existing ideas on the end of the Corded Ware Culture in Noord-Holland

The transition from the Corded Ware Culture to the Bell Beaker Culture is an oft-discussed topic. Models propose either that the developments from the Corded Ware Culture to the Bell Beaker Culture were continuous and mainly the result of internal changes or, conversely, that the Bell Beaker Culture was a novelty stemming from outside the Netherlands.

Lanting and Van der Waals (1976: p.9) consider this transition to reflect a continuous development. They state that the oldest Bell Beaker type, 2Ia (also known as the Maritime type), was directly derived from All Over Ornamented Beaker type 2IIa. A Maritime phase was proposed in which the Maritime 2Ia beaker was seen to characterize a distinct stage or phase in the continuous development of Bell Beakers out of Corded Ware beakers (Lanting, 2007-2008: p.48–55). By referring to it as a phase, however, Lanting (2007-2008: p.37–38) does not imply that solely this type was made; on the contrary, he lists examples of associations with Protruding Foot Beakers and All Over Ornamented Beakers. An overlap of about 50 years for the Corded Ware Culture and the Bell Beaker Culture is proposed (Lanting, 2007-2008: p.38).

Drenth and Hogestijn (1999: p.103–107) also proposed continuous developments, but they deny the existence of a Maritime phase; in their opinion this would imply a dramatic decline in the number of differently decorated beaker types.

Salanova (2001) does not support the idea of local development of the Maritime style. She postulates that the high uniformity over vast areas of Europe can only be explained in terms of movements of people (Salanova, 2001: p.91). Besse (2004: p.142) concludes that in the northern and eastern part of the Bell Beaker area Corded Ware plays an important role in the emergence of Bell Beaker culture, while in the southern part of the Bell Beaker area the emergence of Bell Beakers is less local and less continuous.

According to Furholt (2003a: p.98), there are no high-quality Dutch Bell Beaker dates that can be placed before plateau F. He presents older examples of Bell Beakers in France (2003a: p.98), and he argues that the oldest Bell Beakers are either from southwestern Europe or from Hungary. Because the oldest Bell Beakers do not stem from the Netherlands, Furholt (2003a: p.98) concludes that Bell Beakers were not a local development out of All Over Ornamented Beakers and Protruding Foot Beakers. Fokkens (2012: p.28) also discusses the start of the Bell Beakers in the Netherlands. He concludes that there is no evidence that type 2IIa was any earlier than type 2Ia.

Several of the above ideas can be refuted on the basis of this new analysis. To begin with, there is no Maritime phase with just Maritime Beakers, because the 2Ia sherds from Sijbekarspel-De Veken were found together with All Over Ornamented Beaker type 2IIa and sherds with cord decoration. As both types occur at the same site, it is indeed, as Fokkens (2012: p.28) proposes, impossible to decide whether 2Ia developed out of 2IIa or the other way around.

The argument by Furholt (2012) that the Bell Beakers in the Netherlands are not the oldest and are (therefore) not a local development cannot easily be refuted or confirmed within a regional context. Sijbekarspel-De Veken did yield a date (on a short-lived sample, hazelnut shell) that falls with his (Furholt, 2003a) plateaus E to F (2δ). Yet the relationship between the dated material and the ceramics is unclear (table 4.3). The Maritime Bell Beaker form Sijbekarspel-De Veken may indeed be younger than the French, Hungarian or southwestern European specimens. However, even if the Maritime Bell Beaker is not of Dutch origin, it does not simply rule out local developments—or, conversely, imply importation or migration.

The ideas of Salanova (2001) and Besse (2004) fit the observed patterns very well: at Sijbekarspel-De Veken the ceramics fit the local pottery traditions, yet at the same time new decoration patterns and techniques were present that are also found in large parts of Europe. Imports are unlikely due to the shared technological characteristics with the rest of the assemblage on this and the other Corded Ware sites in the coastal zone. Besse (2004: p.142) therefore seems right in concluding that Corded Ware influenced the later Bell Beakers. Furthermore, the option put forth by Salanova (2001: p.96) as an explanation for the observed standardisation over large area of Europe, namely, that potters were in contact with each other, also seems a good explanation for the observed patterns. This not only explains the standardisation of the decoration on Bell Beaker vessels, but also provides an explanation for the standardisation of Protruding Foot Beakers and All Over Ornamented Beaker types. The possibility of movements of potters will be further discussed in section 5.3.5.

4.4 A new regional or supra-regional chronology?

4.4.1 The coastal zone

The northern part of the coastal zone (Noord-Holland) and the southern part of the coastal zone (Zuid-Holland) are seen by many as regions with different cultural affiliations; a southern zone with the so-called Vlaardingens Culture and a northern zone with the Corded Ware Culture (Louwe Kooijmans, 1976: p.289, Van Gijn and Bakker, 2005: p.304, Drenth, 2005: p.335). Both cultures are seen as discrete in time and space and are said to only start to mix during a late phase of their existence (Louwe Kooijmans, 1976: p.289, Van Gijn and Bakker, 2005: p.304, Drenth, 2005: p.335). This study shows that during Furholt's (2003a) plateaus B to F (3090–2200 BC), the whole coastal zone not only shared a similar geogenesis and landscape zoning, but also similar cultural developments.

For the oldest site studied, Slootdorp-Bouwlust, there are no parallels in other parts of the coastal zone. The majority of the Slootdorp-Bouwlust finds share similarities with finds from Funnel Beaker Culture settlements. In the direct vicinity of Slootdorp-Bouwlust, another site, Kreukelhof, has yielded finds that presumably also belong to the Funnel Beaker Culture. A small number of Funnel Beaker sherds were also found at other sites in the coastal zone, including the site of Hazerswoude, which has also yielded Vlaardingens and Corded Ware material (Drenth, 2001: p.122).

The early Vlaardingens phase of Beckerman and Raemaekers (2009: p.81)—present at the site of Hazendonk—has no counterpart so far on sites in the northern coastal zone. During the middle and late Vlaardingens phase, as described by Beckerman and Raemaekers (2009: p.81), the developments in the northern and southern coastal zone are similar. The middle phase comprises ceramics of groups A, B, C and D, of which group C vessels are the most numerous

(Beckerman and Raemaekers, 2009: p.11). This last type has also been found at Zandwerven, the only Noord-Holland site that shares similarities with sites of the middle Vlaardingen phase. Material from four Vlaardingen assemblages assigned to this middle phase, Vlaardingen, Hazendonk, Hekelingen 3 and Voorschoten-Boschgeest, has been radiocarbon dated (table 4.6, figure 4.7). The most reliable dates range between 3366–2467 BC (2 δ) and comprise Furholt's (2003a) plateaus A to E. A long timespan is possible for the dates from Zandwerven and the dates from the Vlaardingen assemblages of the middle phase.

During the late Vlaardingen phase, the medium-thick-walled and thick-walled vessels had more elongated profiles (groups D and E), and on several sites thin-walled sherds with Corded Ware decoration have been found. These assemblages share similarities with the assemblages from the Corded Ware sites in Noord-Holland that also yielded vessels of group E, as well as thin-walled sherds with Corded Ware decoration (table 4.7). Dates for assemblages from three sites, Hazendonk, Voorschoten-Boschgeest and Vlaardingen, are associated with this late Vlaardingen phase (table 4.6, figure 4.7). The most reliable dates for the late Vlaardingen phase range from 2836–2292 BC (2 δ), which coincides with Furholt's (2003a) plateaus D to F. This is, again, a very long timespan. However, the late Vlaardingen phase and the Corded Ware phase thus date to the same Furholt (2003a) plateaus.

Since the late Vlaardingen period in the southern part of the coastal zone and the Corded Ware period in the northern part of the coastal zone date to the same period, it is interesting to further compare the similarities and differences in the ceramics from the two areas.

The enlarged beaker shape found in the northern part of the coastal zone is similar to Beckerman and Raemaekers' (2009) group E vessels from the southern part of the coastal zone. It seems to be the most common shape for this period in both parts of the coastal zone. Shape E dates (in both regions of the coastal zone) to Furholt's (2003a) plateaus D to F (2 δ) (table 4.7). The shapes of Beckerman and Raemaekers' (2009: p.81) late Vlaardingen phase are more elongated than those of the middle Vlaardingen phase. It is possible that this is influenced by the arrival of Corded Ware ceramics, yet this is hard to test. In addition to similarities, there are also differences between the two areas. Vessels of group D are only found in the southern part of the coastal zone. This type has a possible period of occurrence during Furholt's (2003a) plateaus A to F (table 4.7).

Beakers with Corded Ware decoration are found in late Vlaardingen contexts. Interestingly, vessels with beaker-like shapes (small group b and c vessels) also date to the middle Vlaardingen phase (Beckerman and Raemaekers 2009: p.81) (section 3.3.1.5). This raises the question of the origin of the beaker shape. Is this shape a local development or is it a new shape brought in from outside the coastal zone? While a more detailed comparison of Vlaardingen and Corded Ware shapes is needed to answer this question, it is, however, clear that the beaker shape without Corded Ware decoration is present on Vlaardingen sites of the middle phase (Beckerman and Raemaekers, 2009: fig.15; for example 15.9) and therefore predates the introduction of Corded Ware decoration types.

Another question concerns the possibility of Vlaardingen phase VL2a, as introduced by Glasbergen *et al.* (1967: p.26), as a phase during which elongated vessels were present but thin-walled sherds with Corded Ware decoration were not. This phase was proposed on the basis of the finds from a distinct layer (8) at Voorschoten-Boschgeest (Glasbergen *et al.*, 1967: p.26). Hekelingen 3, Haamstede Brabers and Leidschendam also have this phase, but Hazendonk lacks this phase (Louwe Kooijmans, 1976: p.286, Lanting and Van der Plicht, 1999-2000: p.70).

Furholt plateau (on 16)	Lab id	Date	Calibrated 16 (68.1%)	Calibrated 26 (95.4%)	Site	Phase	Remarks
Beckerman and Raemaekers, 2009							
A?	GrA 18055	4625±40	3498-3360	3620-3142	Heerjansdam	Late	
A	GrN 9134	4535±40	3360-3116	3366-3098	Hazendonk	Middle	
A	GrN 8235	4535±35	3359-3117	3364-3102	Hazendonk	Early	
A	GrN 8234	4505±40	3339-3106	3359-3035	Hazendonk	Middle	
A/B	GrN 6213	4470±40	3331-3032	3346-3022	Hazendonk	Middle	
A/B	GrN 9137	4450±40	3324-3024	3339-2932	Hazendonk	Middle	
A/B	GrN 9135	4435±50	3322-2942	3336-2921	Hazendonk	Middle	
A/B	GrN 4114	4420±120	3328-2919	3500-2760	Vlaardingen	Middle	
A/B	GrN 9136	4400±60	3262-2917	3332-2902	Hazendonk	Middle	
A/B	GrN 9190	4400±60	3262-2917	3332-2902	Hazendonk	Middle	
A/B/C	GrN 9197	4390±170	3341-2889	3519-2581	Hazendonk	Middle	Bad sample quality
B/C	GrN 2303	4320±60	3013-2891	3265-2707	Vlaardingen	Middle	
C	GrN 5175	4290±40	2927-2879	3023-2779	Hazendonk	Middle	
B/C/D	GrN 2487	4270±100	3078-2679	3324-2576	Vlaardingen	Middle	
B/C/D	GrN 2304	4250±75	2927-2678	3084-2589	Vlaardingen	Middle	
C/D	GrN 8239	4220±60	2905-2696	2924-2620	Hazendonk	Middle	
D	GrN 2480	4180±70	2886-2671	2907-2577	Vlaardingen	Middle	
D	GrN 11850	4135±30	2862-2632	2873-2601	Hekelingen 3	Middle	
D	GrN 4948	4130±40	2862-2625	2873-2581	Vlaardingen	Middle	
D/E	GrN 11847	4080±35	2836-2503	2861-2492	Hekelingen 3	Middle	
D/E	GrN 9198	4050±120	2864-2467	2899-2235	Hazendonk	Middle	Bad sample quality
E	GrN 11846	4040±35	2619-2490	2836-2472	Hekelingen 3	Middle	
E	GrN 5031	4030±40	2580-2481	2836-2467	Voorschoten Boschgeest	Middle	
E	GrN 9132	4015±30	2571-2488	2618-2470	Hazendonk	Late	
E	GrN 9133	4010±25	2569-2487	2573-2471	Hazendonk	Late	
E/F	GrN 4908	3980±60	2579-2351	2836-2292	Voorschoten Boschgeest	Late	
E	GrN 8232	3965±35	2567-2461	2575-2347	Hazendonk	Late	
x	GrN 2155/58	3670±30	2131-1981	2139-1956	Vlaardingen	Late	
New (Westbroekvindplaats 3: Ten Anscher and Bosman, 2010, Hazerswoude: Stevens, 2010)							
B/C	Urc 1933	4360±70	3089-2901	3331-2879	Westbroek vindplaats 3	Vlaardingen	Reservoir effect
A	SUERC 26358	4520±35	3350-3114	3360-3098	Hazerswoude	Vlaardingen	Residue on Vlaardingen sherd, V1017
A/B	SUERC 26357	4495±35	3335-3103	3352-3035	Hazerswoude	Corded Ware	Residue on Corded Ware sherd, V444, reservoir effect?
A/B	SUERC 26359	4435±35	3316-2945	3330-2926	Hazerswoude	Vlaardingen	Residue on Vlaardingen sherd, V871
C	SUERC 26366	4285±35	2916-2889	3015-2873	Hazerswoude	Vlaardingen	Animal bone associated with Vlaardingen sherd, V866
D	SUERC 26356	4100±35	2849-2578	2866-2500	Hazerswoude	N.A.	Alder post, V970
D	SUERC 26589	4175±35	2878-2696	2887-2634	Hazerswoude	Vlaardingen	Animal bone associated with Vlaardingen sherd, V231
D	SUERC 26367	4130±35	2861-2626	2873-2581	Hazerswoude	Corded Ware	Animal bone associated with Corded Ware sherd, V306
D	SUERC 26368	4130±35	2861-2626	2873-2581	Hazerswoude	Vlaardingen	Charred corylus avellana associated with Vlaardingen sherd, V503
D	SUERC 26369	4100±35	2849-2578	2866-2500	Hazerswoude	Corded Ware	Charred triticum dicoccum associated with Corded Ware sherd, V1020
D	SUERC 26370	4130±35	2861-2626	2873-2581	Hazerswoude	Corded Ware	Charred triticum dicoccum associated with Corded Ware sherd, V745
D	SUERC 26371	4165±35	2874-2679	2882-2631	Hazerswoude	Corded Ware	Charred triticum dicoccum associated with Corded Ware sherd, V574
D	SUERC 26360	4055±35	2831-2493	2848-2474	Hazerswoude	Corded Ware	Residue on Corded Ware Zigzag beaker, V106
E	SUERC 26361	3965±35	2567-2461	2575-2347	Hazerswoude	Corded Ware	Animal bone associated with Corded Ware sherd, V73
F	SUERC 26362	3925±35	2474-2347	2560-2295	Hazerswoude	Corded Ware	Animal bone associated with Corded Ware sherd, V149

Rejected

In the northern part of the coastal zone, sites with vessels with elongated profiles but without Corded Ware decoration have not been found.

Corded Ware decoration made with spatulas and cords is found in the late Vlaardingen contexts at the dated sites of Voorschoten-Boschgeest and Hazendonk. These contexts date to 2836–2292 BC (2 δ), Furholt's (2003a) plateaus D to F (table 4.7). In the northernmost part of the coastal zone, the settlement of Zandwerven presumably yielded the oldest spatula decoration and cord decoration in Corded Ware patterns. This site has yielded three dates, but it is unclear whether the dates are related to the lower spit and layer without Corded Ware decoration or to the top spit and layer with this decoration. Zandwerven dates to 3264–2300 BC (2 δ) (table 4.3). The presumably second oldest Corded Ware site in Noord-Holland, the northern part of Zeewijk-West, has yielded a date of 2876–2584 BC (2 δ) (table 4.3). Corded Ware decoration made with cords and spatulas may have had an earlier start in the northern part of the coastal zone, yet this remains uncertain because the dates are very imprecise.

Table 4.6 ¹⁴C dates from analysed Vlaardingen sites.

One site in the northern part of the coastal zone, Sijbekarspel-De Veken, has yielded Maritime Bell Beaker type 2Ia. In the southern part of the coastal zone (Maritime) Bell Beaker material has been found on several sites, such as the settlement at Vlaardingen (Drenth and Hogestijn, 1999: p.105). Both charcoal and wood associated with the Maritime Beaker from Vlaardingen have been dated, producing four dates ranging from 2837 BC to 1980 BC (2 δ). A comparison of the ceramics from Bell Beaker sites in the coastal zone might have contributed to our understanding of the origins of this culture but was not undertaken as part of this study.

Two sites, Hazerswoude and Westbroek vindplaats 3, were included in the comparison of the ceramics from the coastal zone in chapter 3, but had not been published at the time Beckerman and Raemaekers (2009) presented their chronological subdivision. The site of Hazerswoude is very interesting because it has yielded Vlaardingen, Corded Ware and Funnel Beaker ceramics (see section 3.2.4, Drenth, 2010). Drenth (2010: p.109) argues that the Vlaardingen and Corded Ware material relates to distinct phases; however, their find locations are not stratigraphically distinct. Fourteen samples have been ¹⁴C dated: five dates are related to Vlaardingen sherds, eight are related to Corded Ware sherds (Stevens, 2010) (table 4.6). The Vlaardingen sherds date between 3360 BC and 2581 BC (2 δ , Stevens, 2010, table 4.6). The Corded Ware sherds date between 3352 BC and 2295 BC (2 δ)—or if one outlier (SUERC 26357) is excluded, between 2873 BC and 2295 BC (2 δ). The Vlaardingen material thus dates to Furholt's (2003a) plateaus A to D, and the Corded Ware material to plateaus A to F or D to F. An overlap in date of the Vlaardingen and Corded Ware material at Hazerswoude is possible; however, a long period or several periods of use of the site are also possible. One Zigzag beaker (SUERC 26360) dates to 2848–2474 BC (2 δ), Furholt (2003a) plateau D and E. The Noord-Holland sites on which this type has been found date to between 2876 BC and 2208 BC (2 δ), Furholt's (2003a) plateaus D to F.

At Westbroek vindplaats 3 both Vlaardingen and Corded Ware material was found (Ten Anscher and Bosman, 2010: p.173). Charred residue on a 'Vlaardingen' vessel with a knob ear has been dated (UtC 1933) to 4360 \pm 70 BP, which calibrates to 3331–2879 BC at 2 δ (Ten Anscher and Bosman, 2010: p.178). This date has a very negative Δ 13C value (–30.2 ‰), which is indicative of a reservoir effect (Ten Anscher and Bosman, 2010: p.178). Amongst the Vlaardingen material on this site is a vessel that shares characteristics with Beckerman and Raemaekers (2009) groups C and D. The Corded Ware material comprises decorated beaker sherds of type 1b, possibly types 1d and 1e, and more thick-walled smitten sherds (Ten Anscher and Bosman, 2010: p.177–178).

From the analysis of the ceramics it is very clear that the whole coastal zone experienced similar ceramic developments between 3090 BC and 2200 BC, Furholt's (2003a) plateaus B to F. Although the ¹⁴C dates suffer from too many problems (including broad wiggles in the calibration curve) to enable the establishment of a fine-scaled chronology, my analysis confirms that similar sites from both parts of the coastal zone are indeed also of similar age. A continuous local tradition of producing medium-thick-walled and thick-walled ware is documented in both parts of the coastal zone. The thin-walled Corded Ware found in both parts of the region is also similar, but it seems to be influenced or introduced from outside. This comparison can be tested further by including more sites. Furthermore, the ratios of beaker and medium-thick-walled and thick-walled ware on Vlaardingen sites are presently unknown and could be studied.³¹ In the next chapter, ideas on the society in the coastal zone will be discussed.

31 In many studies of Vlaardingen ceramics just the presence of Corded ware material is mentioned; numbers are lacking.

Characteristics/Number of 14C dates falling on plateau on 1δ (after: Furholt, 2003a)	Sites	A (9)	B (9)	C (5)	D (5)	E (5)	F (1)
Majority quartz tempered (VI 1)	Hazendonk early and middle, Voorschoten-Boschgeest middle, Vlaardingen middle	9	9	5	5	1	
Majority grog tempered (VI 2)	Hazendonk late, Voorschoten-Boschgeest late					4	1
Shape A	Hazendonk early and middle	8	5	2	1		
Shape B	Hazendonk middle, Voorschoten-Boschgeest middle, Vlaardingen	9	9	5	5	1	
Shape C	Hazendonk middle, Voorschoten-Boschgeest middle, Vlaardingen	9	9	5	4	5	
Shape D	Hazendonk middle and late, Voorschoten-Boschgeest middle and late	7	5	2	1	5	1
Shape E	Hazendonk late, Voorschoten-Boschgeest late					4	1
Perforations under the rim	Hazendonk all layers, Voorschoten-Boschgeest middle and late	8	5	2	1	2	1
Fingertip decoration	Voorschoten-Boschgeest late					1	1
Cord decoration	Voorschoten Boschgeest late, Hazendonk late					4	1
Spatula decoration	Voorschoten-Boschgeest late, Hazendonk late					4	1
Early	Hazendonk early	1					
Middle	Hazendonk middle, Voorschoten-Boschgeest middle, Vlaardingen middle	8	9	5	5	1	
Late	Hazendonk late, Voorschoten-Boschgeest late					4	1

Table 4.7 Characteristics of Vlaardingen ceramics and ¹⁴C dates by plateau. In this table, the 1δ interval is used to clarify that, due to plateaus in the calibration curve, characteristics most often have a long possible lifespan. Note that if the more precise 2δ interval were to be used, this lifespan would most often be even longer.

4.4.2 The Netherlands

Ceramics found on sites in the northern and southern part of the coastal zone share similarities in their technological and morphological characteristics and decorations. The dates for these sites are also similar. Parallels for the ceramics found on the studied Noord-Holland settlements were found not only found in Noord-Holland, but in other regions (in the Netherlands and abroad) as well. In the following section, the dates for the characteristics found in regions beyond the coastal zone will be compared. This comparison is executed in order to increase our knowledge on the similarities and differences in the chronological developments in different Corded Ware regions.

4.4.2.1 Funnel Beaker

Funnel Beaker settlements are rare throughout the Netherlands. Nonetheless, the Funnel Beaker assemblage found at Slootdorp-Bouwlust shares similarities with the ceramics from P14 and Beekhuizerzand, both located to the east of the coastal zone (Ten Anscher, 2012, Modderman *et al.*, 1976).

None of the dates on the material from P14 are related to the Funnel Beaker period (Ten Anscher, 2012: p.56–62, table 4.3, appendix C). At Beekhuizerzand, charcoal from a former watercourse in which many sherds were found dates to 3489–3023 BC (GrN 7746, at 2δ) (Lanting and Van der Plicht, 1999–2000: p.66).

Whereas the number of known and dated settlements of the Funnel Beaker Culture is small, the number of dated funerary contexts is larger. On the basis of these funerary contexts, Lanting and Van der Plicht (1999–2000: p.67–68) date the Funnel Beaker Culture to 3400–2850 BC. However, Lanting and Van der Plicht (1999–2000: p.67–68) also suggest that a later start or end date are possible.

On the basis of the presence of neat *Tiefstich* decoration on a small group of high-quality sherds from Slootdorp-Bouwlust, both Hogestijn and Drenth (2000–01) and Van Heeringen and Theunissen (2001) have compared Slootdorp-Bouwlust to the Funnel Beaker funerary sites of either Brindley's (1986) horizon 4/5 or Bakker's (1979) transition from the late Drouwen to the early Havelte phase, around 3000 BC. The end of Brindley's (1986) horizon 5 is dated to around 2950 BC (Lanting and Van der Plicht, 1999–2000: p.67).

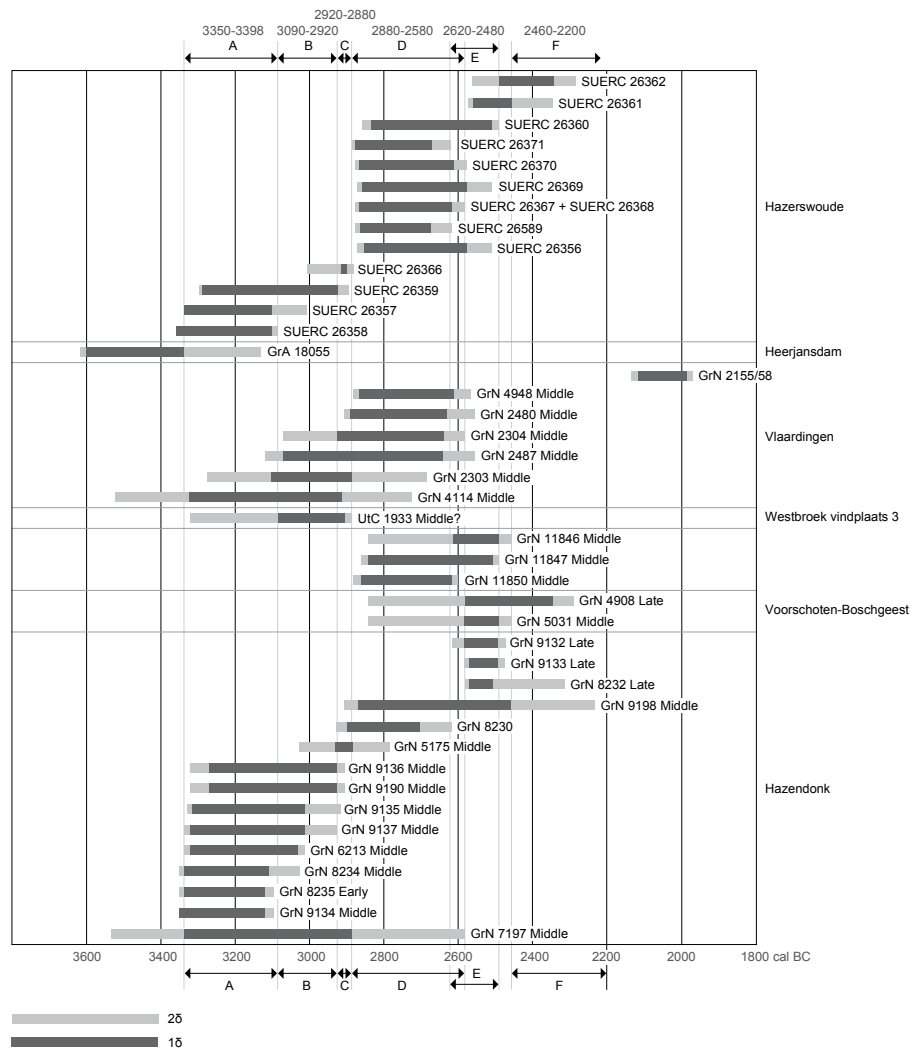


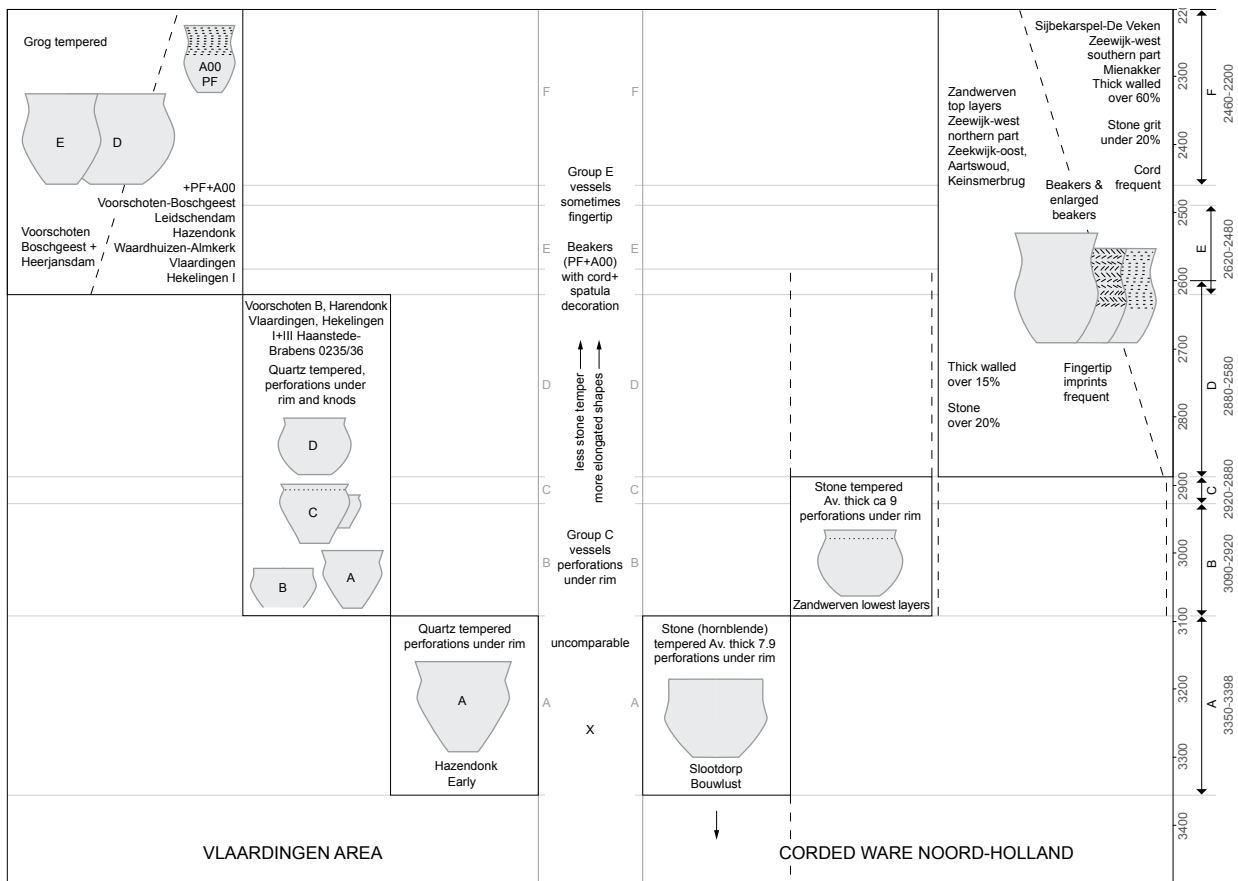
Figure 4.7 ¹⁴C dates from analysed Vlaardingen sites.

Slootdorp-Bouwlust—and possibly Kreukelhof—are the only Funnel Beaker sites found in the northern coastal zone. The ¹⁴C dates for Slootdorp-Bouwlust dates, 3494–3029 BC (at 2δ), are very similar to the date for Beekhuizerzand and also fit the end date for Brindley’s horizon 5. The ceramics are also similar to the Funnel Beaker settlement ceramics found at P14 and Beekhuizerzand and share similarities with Funnel Beaker funerary ceramics. It can thus be concluded that although the location is unique, the assemblage is very similar to that of other sites of the western branch of this pan-European culture.

4.4.2.2 Vlaardingen and Corded Ware

Unlike preceding Neolithic cultures, Corded Ware Culture remains are found across large parts of the Netherlands (Drenth, 2005). The Corded Ware dataset consists of settlement sites, found mainly in the western (Holocene clay) part of the Netherlands, and funerary contexts from the eastern (Pleistocene sand) parts of the Netherlands (Drenth, 2005: p.336, Drenth *et al.*, 2008: p.150–151). Funerary contexts are few in the coastal zone, as are settlements in the sandy part of the country (Drenth, 2005: p.336, Drenth *et al.*, 2008: p.150–151).

Prior to the present study, Vlaardingen and Corded Ware were viewed as distinct archaeological cultures (section 3.2.3). My research has shown that the chronological developments during Vlaardingen and Corded Ware times in the coastal zone are similar, both in the southern region (previously labelled as



Vlaardingen) and the Noord-Holland region (previously labelled as Corded Ware). Very similar thin-walled ceramics were used during the Corded Ware period, not just in the coastal zone, but in a much larger region.

At this point the dates for different Corded Ware elements from different regions in the Netherlands will be compared. This analysis is based on the ¹⁴C dates for the Corded Ware phase of P14, a comparison of the dates for beakers, and a comparison of the dates for thick-walled ware. Using this data, chronological claims that have been made for the Corded Ware period will be tested further.

The decorated thin-walled beaker sherds from the settlement site of P14 are similar to those found on the Noord-Holland sites. At P14, types 1a–1f, 2IIa–2IIc and Bell Beaker type 2Ia were found (Ten Anscher, 2012: p.165–175). The thick-walled ware shares less similarities. At the settlement site of P14, short wave moulded vessels, vessels decorated with fingertip imprints and beaker pots have been found (Ten Anscher, 2012: p.175–183) (table typochronology). Examples of the enlarged beaker shape have not been found at P14. Unfortunately, the P14 Corded Ware ceramics are not well dated. Ten Anscher (2012: table 4.3, p.58, 61, 171, 188, 298, 580, 582) associates one date with the Corded Ware Culture, on charred residue adhering to beaker number 61, which is tempered with grog and sand and has an aberrant shape, with a straight, slightly outward-sloping wall with coupled fingernail imprints in a sloppy pattern. The date (UtC 1908, 3990±60 BP) calibrates to 2837–2298 BP (2δ). The vessel was previously argued to be a Hazendonk 3 vessel (Ten Anscher, 2012: p.171, 298, Lanting and Van der Plicht, 1999-2000: p.22). Lanting and Van der Plicht (1999-2000: p.22) suggested this date could be wrong; the date is very likely to suffer from a reservoir effect (Ten Anscher, 2012: p.171, 298).

Figure 4.8 Developments in ceramics and ¹⁴C dates in the coastal zone.

The ceramic analysis has shown that beakers from the Noord-Holland tidal study area and from funerary contexts in the eastern and northeastern parts of the Netherlands decorated with spatula impressions and cord impressions are very alike (section 3.2.4 and 3.3). Dates for the characteristics of ceramics from funerary contexts and one (possible) settlement context in the eastern or sandy part of the Netherlands are presented below (table 4.8). These dates show that, just like in the coastal zone, different types of Protruding Foot Beakers and All Over Ornamented Beakers show long periods of overlap. This overlap is not only due to the broad plateaus in the calibration curve; it reflects real overlap, as they have been found together in graves (Lanting and Van der Waals, 1976: table I). Protruding Foot Beaker type 1d is associated with type 2IIc and possibly 2IIb, type 1e is possibly found in association with type 2IIb, and All Over Ornamented Beaker type 2IIb is found together with type 2IIa and possibly 2IIc (Lanting and Van der Waals, 1976: table I). Except for combinations with type 2IIc, of which no clear examples were found in the coastal zone, the same associations also occur on the Noord-Holland sites. On both the northern and southern part of Zeewijk-West and at Mienakker, types 1d, 1e and 2IIb are found in association, whereas at Sijbekarspel-De Veken, types 2IIa and 2IIb are possibly found together (table 3.1). At Voorschoten-Boschgeest, Hazerswoude and P14, types 1d and 2IIb (and on the latter two sites also 1e and 2IIa) are found in association as well (table 3.1).

In Noord-Holland, the beaker shape shows remarkable variation in the height of the shoulder, which cannot be explained chronologically. The same variation is observed on sites in the eastern Netherlands (table 3.2). Three reliable dates for vessels with a low shoulder (GrN 6349, GrN 851 and GrA 13617) give a date range of 2893–2209 BC (2 δ) (appendix 4.1). Six reliable dates for vessels with a high shoulder (GrN 5068, GrN 6129, GrN 6368, GrN-6368, GrN 2419, GrN 2481 and GrN 6128) give a date range of 2890–1980 BC (2 δ). Both the youngest and the oldest dates are found within the group of vessels with a high shoulder. The observed variation in shape thus does not need to be interpreted as a chronological aspect.

During the Corded Ware period, the medium-thick-walled and thick-walled vessels across the entire coastal zone display similar shapes. Medium-thick-walled and thick-walled vessels are also present in graves; both amphora and large specimens of beaker types have been found. Interestingly, the shapes of these vessels deviate from the most common medium-thick-walled and thick-walled vessels found in the coastal zone. The short wave moulded vessels were previously seen as typical domestic ware (Floore, 1991: p.55). Floore (1991: catalogue) lists more examples of this type found in graves (n=15) and megalith graves (n=5) than in settlements (n=9). This suggests that these pots are not to be interpreted as domestic ware (section 3.3). There are no ¹⁴C dates available for medium-thick-walled and thick-walled vessels found in funerary contexts. One short wave moulded vessel from the site of Odoorn-Eesserveld in the northeastern Netherlands has been ¹⁴C dated. This vessel originated from a feature located under a younger burial mound. This feature was interpreted as belonging to a settlement (Lanting and Van der Plicht, 1999-2000: p.79). A date on grain from this pit (GrN 5068, 3955±50 BP) calibrates to 2578-2296 BC (2 δ) (Lanting and Van der Plicht, 1999–2000: p.79). This is the only date pertaining to the different medium-thick-walled and thick-walled types.

From this comparison I conclude that it seems that there are regional differences in the medium-thick-walled and thick-walled wares across the different regions of the Netherlands. In Noord-Holland these vessels are similar to Vlaardingen group E vessels; in other parts of the Netherlands this type has thus far not been found. Outside the coastal zone, amphora and short wave moulded vessels occur

more commonly. Nevertheless, additional settlement research in other parts of the Netherlands as well as study of the medium-thick-walled and thick-walled vessels from other contexts is needed to substantiate this proposition.

In this study, the Corded Ware ceramics from Noord-Holland have been classified into two chronological groups: early Corded Ware (group 1) and late Corded Ware (group 2) (figure 4.6). Due to several problems with the dates (including broad wiggles in the calibration curve) it proved impossible to assign absolute dates to the two groups. Determining whether this new chronological division is applicable to the whole of the Netherlands is also problematic. The most important characteristics on which the groups are based are the thicknesses, the tempering and the ratios of the decoration techniques used. However, technological data is generally lacking for ceramics beyond the coastal zone. Moreover, the most numerous contexts, that is, graves, mostly yielded a single beaker, rendering it impossible to study ratios of types. Nonetheless, several comments can be made. The characteristic decoration features of early Corded Ware group 1 are proportionally more spatula-decoration and the presence of type 1b. The dates from the eastern part of the Netherlands do not show a clearly older date for these characteristics (table 4.8). There are just two dates for type 1b beakers, one from Hijkerveld-grave V and one from Eext Bergakkers. The two dates span the period 2577–2301 BC (2 δ), falling within Furholt's (2003a) plateaus E and F. Spatula decoration on ceramics from the eastern Netherlands can be dated 2880–2200 BC (2 δ), Furholt's (2003a) plateaus D to F. It cannot be tested whether the ratios of Corded Ware decoration techniques change over time.

The claim that the younger (that is, group 2) sites contain more cord decoration, more All Over Ornamented Beakers and more type 2IIa vessels also does not show directly from the dates for ceramics from the eastern Netherlands (table 4.8). Just three dates are available for All Over Ornamented Beakers, and type 2IIa has not been dated at all. The All Over Ornamented Beaker types date, just as the majority of the Protruding Foot Beaker types, to Furholt's (2003a) plateaus D to F (table 4.8). Cord decoration dates to Furholt's (2003a) plateaus B to F, or 3090–2200 BC. Again the ratios of these decorations cannot be studied.

Also, it has been proposed that in Noord-Holland, the earliest Corded Ware phases are absent (Lanting and Van der Plicht, 1999-2000: p.78). This, too, cannot be confirmed with ¹⁴C dates. Lanting and Van der Plicht (1999-2000: p.79) date the Corded Ware period to 2800–2400 BC, whereas Drenth and Lanting (1991) date it to 2900/2850–2450 BC. Even if the oldest dates from Zandwerven are *not* taken into account, eight dates from the analysed Noord-Holland sites have, at 2 δ , a possible date around 2850 BC (GrA 56013, GrN 12015, GrA 109, GrA 56014, GrA 110, GrA 108, GrA 48396, GrA 114). The oldest date (GrA 48396) starts at 2884 BC (2 δ) (table 4.3). The oldest dates from the eastern sandy part of the Netherlands are, with one exception, not necessarily older (appendix 4.1). The oldest dates with the highest level of certainty (GrN 6129, GrN 7802, GrN 14965 and GrN 851) also start around 2850 BC, with the oldest possible start at 2893 BC (2 δ) (appendix 4.1). One last date, GrN 10345, is less secure but has an even older start date, of around 3091 BC (2 δ). Therefore it is concluded that it cannot be ascertained that the Corded Ware occupation in Noord-Holland does not include the earliest Cord Ware phase (contra Lanting and Van der Plicht, 1999–2000: p.78).

The discussion of Corded Ware ceramics and their dates confirms that beakers with similar decoration are present in different parts of the Netherlands and were part a supra-regional phenomenon. The medium-thick-walled and thick-walled ware do, in contrast, not reflect supra-regional styles. While in the coastal zone enlarged beakers (Beckerman and Raemaekers (2009) group E) are most common,

Type	Dates ranging between (in BP) (1 minus ratings between brackets)	Calibrated 1 δ (68.1%)	Calibrated 2 δ (95.4%)	Sites	Number of dates falling on plateau on 1 δ including dates with 1 minus (after: Furholt, 2003)					
					A	B	C	D	E	F
1a	(4270±70)4165±55-3955±50	(3011)2876-2350	(3091)2890-2296	Odoorn-Eesserveld*, Ede-Hotel Bosbeek, Vaassen-tumulus 1941-III, Maarn-de Halm, Silvolde		1	1	4	1	1
1b	(3970±35)3945±40	(2566)2561-2349	(2577)2570-2301	Hijkerveld-grave V, Eext-Bergakkers					2	1
1c	3955±50 BP	2567-2350	2578-2296	Odoorn-Eesserveld*					1	1
1d	(4065±55)3940±40-3935±35	(2838)2546-2347	(2866)2568-2299	Eext Galgwanderveen tumulus 3, Renkum-Kwadenoord, tumulus A				1	3	2
1e	(4165±30)4065±45(3870±35)	(2874)2836-2494(2293)	(2881)2859-2475(2210)	De Eese-mound 1918 IV, Emmen-Angelslo, mound VIII, Eext-Galgwanderveen, tumulus 1, Annen-Holtkampen, Baarn-De Drie Eiken				3	1	2
ZigZag	(4165±30)-(3880±50)	(2874)-(2299)	(2881)-(2204)	Eext-Schaapdijksweg, tumulus b, Eext-tumulus visplas 1937, Annen-Holtkampen				2		2
2IIa	x	x	x							
2IIb	4140±70-4005±30(3965±50)	2871-2481(2351)	2893-2467(2298)	Anlo-veekraal grave B, Anlo-veekraal, grave C, Ermelose heide-tumulus 1				1	2	1
2IIc	4035±55	2623-2475	2862-2460	Witrijt					1	
2IId	x	x	x							
2Ia	x	x	x							
PF types	(4270±70)4165±55-3935±35(3880±50)	(3011)2876-2347(2299)	(3091)2890-2299(2204)	1a, 1b, 1c, 1d, 1e, Zigzag		1	1	10	8	9
AOO types	4140±70-4005±30(3965±50)	2871-2481(2351)	2893-2467(2298)	2IIa, 2IIb, 2IIc, 2IId				1	3	1
Spatula impressions	(4165±30)4065±45-3860±110(3850±50)	(2874)2836-2146(2209)	(2881)2859-1980(2151)	See types 1b, 1c, 1d, 1e, Zigzag, 2IIc				6	8	7
Cord impressions	(4270±70)4165±55-3860±110(3850±50)	(3011)2876-2146(2209)	(3091)2890-1980(2151)	See types 1a, 2IIb		1	1	5	3	2
Fingertip impressions	x	x	x							
Short wave moulded vessels	3955±50	2567-2350	2578-2296	Odoorn-Eesserveld*					1	1
Enlarged beaker shape	x	x	x							

*= settlement

Table 4.8 Eastern Netherlands characteristics and ¹⁴C dates by plateau. In this table, the 1 δ interval is used to clarify that, due to plateaus in the calibration curve, characteristics most often have a long possible lifespan. Note that if the more precise 2 δ interval were to be used, this lifespan would most often be even longer.

these lack from settlements and graves outside the coastal zone. In these funerary contexts as well as on the site of P14 short wave moulded vessels, amphora and other large vessel occur more frequently.

4.4.2.3 Early Bell Beaker

The transition from the Corded Ware Culture to the Bell Beaker Culture is a widely discussed topic (section 4.3.4.2). The site of Sijbekarspel-De Veken yielded sherds of a maritime Bell Beaker, Van der Waals and Glasbergen (1955) type 2Ia, as well as sherds decorated with cord lines that are either of type 1a or type 2IIb. The technological characteristics of the sherds show overlap with the assemblages found at Mienakker and in the southern part of Zeewijk-West, and they reflect ongoing traditions.

A comparison of the dates for this type of Bell Beaker from the coastal zone and the rest of the Netherlands is impossible as only very few samples have been dated and the dates are all problematic. For the coastal zone, several dates associated with type 2Ia are available. Sijbekarspel-De Veken was dated to 2571–2347 BC (2 δ). Four samples associated with the 2Ia beaker from Vlaardingen date to 2837–1980 BC (2 δ) (see section 4.4.1). There are just two dates associated with 2Ia beakers from funerary contexts in other parts of the Netherlands, but both dates were rejected. One date (GrN 6127), from De Eese tumulus IV period 1, has an uncertain association to the beaker and is merely a *terminus post quem* date; the other date, associated with the 2Ia beaker from a grave at Buinen (GrN 6152), also

has an uncertain association to the beaker as well as problems with the cleaning of the sample (appendix 1). The start of the Bell Beaker Culture in the Netherlands is thus poorly dated. Both the dates and the presence of the oldest Bell Beaker type in association with Corded Ware types do indicate overlap of the two types ascribed to different cultures.

4.4.3 *A new chronology*

On the basis of a critical review of the commonly applied chronological models it is clear that many of the assumptions on which they are based cannot be confirmed. This is due to several problems. First, the models are mainly based on unstratified funerary contexts, containing one beaker. Furthermore, there are problems with ¹⁴C dates, including uncertainty of association, an own age of the dated sample (the ‘old wood effect’), and broad wiggles in the calibration curve. Although the dates for settlements suffer from the same problems, the settlements do offer associations of different types not often found in funerary contexts. By studying the technological relationships between the different assemblages, this study has allowed the formulation of several new ideas.

The new chronology takes three scales into account: the local, the regional and the supra-regional. Patterns are observed at each of these scales. Several differences in the ceramic assemblages reflect local preferences, possibilities or functions. For example, differences in the types and ratios of the tempering materials sometimes reflect local preferences or possibilities rather than chronological differences. Although the majority of the decoration patterns reflect supra-regional or regional types, several patterns have only been found on one vessel or one site. At the settlement of Keinsmerbrug, the ceramic assemblage showed that the site had a different function than the other settlement sites studied. The function as temporary gathering location is reflected by a small assemblage with large differences in the characteristics and types of the vessels being used to prepare the same type of meal.

The ceramic assemblages also reflect regional traditions and developments. The assemblages could be subdivided into two chronological groups. Among early Corded Ware ceramics (group 1), 20% or more of the sherds are stone grit tempered; 15% or more have a thick wall of 9–10.5 mm; and spatula motifs are the most common decorative technique, although cord and fingertip decoration are also present (figure 4.6). Late Corded Ware (group 2) ceramics are rarely tempered with stone grit (less than 15% of the sherds), and thin-walled ware occurs more frequently (60% or more measure 5–7.5 mm in thickness). Decoration on group 2 sites is often applied with cords. All Over Ornamented Beakers are most frequently found on sites belonging to group 2. Sijbekarspel-De Veken yielded a sherd of a type 2Ia Bell Beaker. Fingertip impressions are not present on ceramics from Mienakker or Sijbekarspel-De Veken and are infrequent on ceramics from the southern part of Zeewijk-West (figure 4.6). Van der Waals and Glasbergen (1955) type 1b has only been found at group 1 sites. The same goes for short wave moulded vessels. Van der Waals and Glasbergen (1955) types 2IIa and 2Ia have only been found on group 2 sites. It is hard to substantiate the two groups with ¹⁴C dates. Dates for early Corded Ware (group 1) span Furholt’s (2003a) plateau Bs to F, or 3090–2200 BC. Late Corded Ware (group 2) dates span Furholt’s (2003a) plateaus D to F, or 2880–2200 BC. Although an earlier start for group 1 seems to be indicated, a clear chronological distinction between the groups cannot be made.

Especially the medium-thick-walled and thick-walled wares of both chronological groups reflect a regional—and persistent—tradition dating back to the middle Vlaardingen period that continued into the Bell Beaker period. In both the northern and the southern parts of the coastal zone, the medium to large vessels changed during this period, from having a S-shape to becoming more elongated. Both areas were previously viewed as distinct, with the northern part being labelled Corded Ware and the southern part being labelled Vlaardingen (Louwe Kooijmans, 1976: p.289, Van Gijn and Bakker, 2005: p.304, Drenth, 2005: p.335). This current study, however, shows that the ceramics from the entire coastal zone show the same chronological developments.

The thin-walled ceramics of both chronological groups also reflect supra-regional traditions. The shapes and decorative patterns of the thin-walled ware shares similarities with thin-walled ware found in other parts of the Corded Ware area. The most common types of decoration, namely, cord imprints in horizontal rows and oblique spatula imprints in one direction or alternating directions, are also the most common types in other Corded Ware regions (Glob, 1945, Loewe, 1959, Hein, 1987, Dresely, 2004). The medium-thick-walled and thick-walled ware is rooted in older regional traditions.

In the Dutch coastal zone, the thin-walled Corded Ware ceramics reflect supra-regional traditions, whereas the medium-thick-walled and thick-walled ceramics reflect persistent regional traditions. This pattern is also observed in other regions (Furholt, 2014a). The ways in which these different traditions reflect the various aspects of Corded Ware society will be further studied in chapter 5.

Corded Ware Culture Society

5.1 Introduction

One of the main aims of this study is to enhance our understanding of Corded Ware society. The well-preserved settlements in Noord-Holland in the Netherlands and the ceramics that were found in these settlements were chosen as a means to reconstruct the society that used these ceramics. This chapter presents reconstructions of the technology (what techniques were used), subsistence (what was consumed), economy (how technology and subsistence were organized), social organisation, individualisation, gender differentiation, the rise of elites and the ideology and religion. Following this, the results from the analysis of these Corded Ware communities in the Dutch coastal zone will be compared with data from other Corded Ware regions.

5.2 Corded Ware technology, subsistence and economy

5.2.1 Introduction

Reconstructions of Corded Ware technology, subsistence, and economy have played a major part in many other studies and have also led to various debates, as outlined in sections 1.2.2. and 1.2.3. Childe (1929: p.158) stressed the role that the economy and subsistence played in shaping Corded Ware society. His description of Corded Ware society even starts with a reconstruction of these aspects:

“A wandering race of hunters and pastoralist [...] by plunder or trade, they were able to secure products of distant lands...”

This idea of a reliance on pastoralism and a growing importance of cattle breeding has had a major influence on subsequent interpretations (De Laet and Glasbergen, 1959, Sherratt, 1997a, Heyd, 2013). However, others have stressed that the increase in the importance of cattle was a gradual process, one that had started before the Corded Ware period (Sørensen, 1997: p.228, Hübner, 2005: p.752). Furthermore, it has been argued that crop cultivation must have been important as well (Ebbesen, 2006, Larsson, 2009).

The Corded Ware period is seen as the time period during which major changes in technology and the economy occurred. Sherratt (1997a: p.385) argued for a ‘secondary products revolution’: the introduction, in different stages, of the ard, the wheel, wool and the horse allegedly led to fundamental changes in social organisation, gender roles and settlement patterns (Sherratt, 1997a: p.385). In the Dutch Corded Ware context, Sherratt’s ideas have been variously supported (Van der Waals, 1984, Fokkens, 1998) and rejected (Drenth and Lanting, 1997).

Corded Ware settlements are said to reflect a new way of life. Settlements were smaller than during the preceding period and they were inhabited by nuclear families (Hecht, 2007, Müller *et al.*, 2009: p.140). Unfortunately, in large parts of the Corded Ware distribution area, settlements are rare or unknown archaeologically, which means that reconstructions of the technology, subsistence and economy are ultimately based on a limited dataset (Larsson, 2009: p.63-64).

The present study therefore aims to answer the following questions: (1) What characterises the technology of the Corded Ware Culture? (2) Was technological change the (only) motor behind other changes? (3) Do these changes represent a (secondary products) revolution or were they more gradual? (4) What was the subsistence strategy of the Corded Ware Culture? and (5) Can this strategy be seen as 'cattle-isation' or mixed farming, or is it more appropriately viewed as regionally adapted subsistence strategies?

The well-preserved dataset of Corded Ware settlement sites found in a tidal area in the province of Noord-Holland in the Netherlands was chosen as the main dataset to answer these questions on both the local and – by comparison with other studies – the regional and supra-regional scales. Four approaches will be taken to reconstruct the technology, subsistence and economy. The Odyssee research project included a reconstruction of the technology, subsistence and economy on the sites of Keinsmerbrug, Mienakker and Zeewijk. A summary of these results will be presented here (section 5.2.2). Following this, the ceramic assemblages from several sites with different dates will be compared to ascertain whether the ceramics were part of a 'revolutionary' package or, instead, show gradual change (section 5.2.3). The ceramic artefacts from these settlement sites will be analysed to determine whether they reflect changes in the technology – for example, the introduction of wool, represented by spindle whorls, or the introduction of cheese, reflected in the presence of cheese strainers (section 5.2.4). The importance of the cultivation of cereals will be assessed by studying the use of these grains as temper or to decorate ceramics (section 5.2.5).

5.2.2 Subsistence and technology: Results of the Odyssee project

The analysis of well-preserved remains found on Corded Ware settlements in Noord-Holland has greatly enhanced our understanding of Corded Ware subsistence (section 2.1.3). The Corded Ware people inhabited a tidal area with a mosaic-like vegetation (Kleijne *et al.*, in prep.). The settlements were all located on creek levees, with one exception: Zandwerven is located on a beach barrier (Drenth *et al.*, 2008: p.158). The inhabitants exploited the diverse landscape and used it to grow crops, keep cattle, hunt mammals, fowl, catch fish and gather wild plants and shell fish (Drenth *et al.*, 2008: p.158). Cattle played an important part in the subsistence base, but pigs, sheep and possibly goats were also kept and eaten (Drenth *et al.*, 2008: p.163). Hunted species include seals, beaver, elk, roe deer, brown bear, aurochs and possibly red deer. Fowling involved a variety of bird species, including ducks (Drenth *et al.*, 2008: p.163). Both fresh and salt water fish were caught (Drenth *et al.*, 2008: p.163). Crop cultivation involved naked barley and, to a lesser extent, emmer wheat (Drenth *et al.*, 2008: p.165). Orache seeds, crab apples, hazelnuts and acorns figure amongst the gathered plant species (Kubiak-Martens, 2012: p.99, 2013: p.116).

The Odyssee research project showed that there were differences in subsistence among the sites of Keinsmerbrug, Mienakker and Zeewijk. Keinsmerbrug was interpreted as a non-permanent extraction camp that was used for gatherings of people from different communities (Kleijne *et al.*, in prep.). The site was used to catch very large numbers of ducks, and some hunting of other wild species and

Plough marks found at	T.p.q. ¹⁴ C date	T.a.q. ¹⁴ C date	Conclusion	Reference
Bornwird	Sherds of the (late) Funnel Beaker Culture and the Corded Ware Culture were found embedded in the arable field.	The peat layer covering the field is dated GrN 5295, 3930±50 BP (2571-2236 cal. BC 26).	Funnel Beaker Culture or Corded Ware Culture.	Drenth and Lanting, 1997: p.56.
Groningen UMCG	Pottery and flint artifacts attributed to the Funnel Beaker Culture were found in pits and ditches and embedded in the arable field.	x	Funnel Beaker Culture.	Overeem, 2001: p.1.
Groningen Oosterpoort	Charcoal from pits below the field has been dated to GrN 14165, 5030±40 BP (pit cut by the field) and GrN 13442, 4515±35 BP (3358-3047 cal. BC 26).	In both pits and the top soil sherds, an arrowhead and a fragment of an axe have been found (all dated to the Funnel Beaker period). Charcoal from the top soil dates to GrN 13441, 4565±35 BP (3493-3104 cal. BC 26).	Funnel Beaker Culture.	Kortekaas, 1987: p.109-124, Drenth and Lanting, 1997: p.56.
Emmerhout	x	Plough marks were found underneath the artifact-bearing layer that was uncovered during the 1958 excavation. The cultural layer contained both Vlaarding and Corded Ware Culture ceramics.	Funnel Beaker Culture.	Drenth and Lanting, 1997: p.56-57.
Hellevoetsluis Ossenhoek	x	The plough marks are covered by a part of the cultural layer containing finds dated to the Vlaarding period.	Vlaarding Culture	Goossens, 2009: p.67.
Zandwerven	x	Plough marks were found under the layer with find material uncovered during the 1958 excavation. both Vlaarding as well as Corded Ware Culture ceramics.	Vlaarding Culture or Corded Ware Culture.	Drenth et al., 2008: p.158.
Westbroek vindplaats 3	The ard marks cut through a pit in which Vlaarding sherds were found. Both Vlaarding and Corded Ware Culture sherds were found in the field.	x	Vlaarding Culture or Corded Ware Culture.	Drenth and Lanting, 1997: p.56-57, Ten Anscher and Bosman, 2010: p.175.

Table 5.1 Ploughmarks.

grazing of cattle took place at the site as well (Zeiler and Brinkhuizen, 2012: p.147, Kleijne *et al.*, in prep.). Mienakker was probably inhabited by a single extended family that inhabited the site year-round (Kleijne *et al.*, in prep.). Zeewijk is a larger site that was either used by one household for a more prolonged period or by several households for a few generations (Theunissen *et al.*, 2014: 264-266). Ploughmarks have been found at both Mienakker and Zeewijk (Kleijne *et al.*, in prep.), at Zandwerven (Van Regteren Altena *et al.*, 1966) and at Portelwoid and Sijbekarspel-De Veken (Drenth *et al.*, 2008: p.158).

The plough, which is often argued to be an important new technology in this period (Sherratt, 1997a, Van der Waals, 1984), was used on several Corded Ware settlements in Noord-Holland. But the plough was not necessarily a new item of technology. Drenth and Lanting (1997: p.62) postulated that the ard, which is a type of plough, may have been common in the preceding Funnel Beaker period as well. The ploughmarks found at the sites of Groningen UMCG, Groningen Oosterpoort, Bronwird, Emmerhout and Hellevoetsluis Ossenhoek testify to the fact that the introduction of the plough pre-dates the Corded Ware period (table 5.1). However, it should be noted that it is difficult to date ploughmarks, as the marks themselves cannot be dated and finds from fields are rare and do not necessarily date from the same period as the ploughmarks. Several authors have argued that the Corded Ware material culture arrived as a 'package' accompanying new innovations, including the plough (Glob, 1969, Kristiansen, 1989, Fokkens, 1998). However, the examples of ploughmarks on sites that pre-date the Corded Ware period contradict this theory. The introduction of Corded Ware material culture can thus not be seen as the result of the introduction of the plough. Fokkens (2008: p.19-20) argues that although people experimented with the plough during older periods, the ard only became accepted on a much larger scale in the Netherlands after 2500 cal. BC.

Not just the presence of the plough, but also the general subsistence strategy in the preceding Vlaarding period is of interest. According to Louwe Kooijmans (1993: p.102) and Amkreutz (2013: p.531-532), this Vlaarding subsistence strategy can be characterised as "*an extended broad spectrum economy*", involving a varied diet including both domesticated animals and crop cultivation as well as hunting, fishing, fowling and the gathering of wild plants. Brinkkemper *et al.*, (2010: p.47), however, state that, because of the limited amount of data, it is not possible to establish the proportions of vegetable and animal products or of wild and domesticated products in the menu. Notwithstanding the limited data, it appears that the Vlaarding communities had a subsistence strategy that enabled

	Site	Phase	Landscape zone	Ratio wild-domesticated animals		Ratios domesticated mammals-wild mammals-birds-fish				Domesticated animals			Crops	
				Domesticated	Wild	Domesticated mammals	Wild mammals	Birds	Fish	Cattle	Sheep/goat	Pig	Barley	Emmer
Zuid-Holland	Hekelingen III	Vlaardingen unspecified	Marshes	33%	67%	33%	34%	2%	31%	25%	14%	61%	38~	9~
	Hazendonk (phase 1b)	Middle Vlaardingen		12%	88%*	12%	86%	1%	unknown	12%	13%	75%	24	7
	Vlaardingen	Middle and Late Vlaardingen		15%	85%	2%	42%	3%	53%	50%	3%	47%	4^	285^
	Voorschoten-Boschgeest	Middle and Late Vlaardingen	Coastal zone	55%	45%	55%	13%	0%	33%	77%	8%	15%	unknown	unknown
	Leidschendam-Prinsen Hof	Vlaardingen unspecified		89%	11%	89%	11%	0%	0%	50%	8%	42%	unknown	unknown
	Rijswijk-de Schilp	Vlaardingen unspecified		84%	16%	84%	14%	0%	2%	87%	1%	12%	unknown	unknown
Zandwerven	Vlaardingen and Corded Ware	75%		25%	75%	1%	22%	2%	94%	4%	2%	Present	Present	
Noord-Holland	Kolhorn (north)	Corded Ware	2%	98%	2%	2%	95%	unknown	93%	6%	1%	Present	Present	
	Kolhorn (south)	Corded Ware	2%	98%	2%	1%	97%	unknown	98%	200%	0%	Present	Present	
	Keinsmerbrug	Corded Ware	0%	100%	0%	0%	91%	9%	81%	7%	12%	Few	Few	
	Mienakker	Corded Ware	9%	91%	9%	2%	47%	41%	96%	2%	2%	Many	Many	
	Zeewijk	Corded Ware	15%	85%	15%	3%	19%	62%	80%	10%	10%	Many	Many	
	Sijbekarspel-De Veken	Corded Ware/Bell Beaker	8%	92%	8%	1%	85%	6%	80%	10%	10%	Present	Present	

The percentages are based on number of bones as for the Vlaardingen sites only numbers and no weights were presented.

Zuid-Holland after: Van Heeringen and Thuenissen, 2001 and Brinkkemper, Drenth and Zeiler, 2010

Noord-Holland botany after: Kubiak-Martens, 2012, 2013, 2014, zoology after: Van Heeringen and Thuenissen, 2001 and Zeiler and Brinkhuizen, 2012, 2013, 2014

* Fishbones from this site have not been counted

~ The crops from Hekelingen site A phase 1b and site B phases 1b and 2a have been counted

^ information on crops are only known for phase 1b

Highest

them to make the best use of the possibilities offered by their technology and the environment.

Table 5.2 Subsistence strategy.

For the different regions inhabited by the Vlaardingen communities, different subsistence strategies have been proposed (Brinkkemper *et al.*, 2010: p.40). On sites located in the marshes, hunting and fishing played an important part in the subsistence strategy, whereas in the coastal zone, livestock was the main food source (table 5.2) (Brinkkemper *et al.*, 2010: p.40).

The important role of cattle is seen by many as a defining characteristic of the Corded Ware Culture (Childe, 1929, De Laet and Glasbergen, 1959, Sherratt, 1997a, Heyd, 2013, Holmqvist-Saukkonen *et al.*, 2013). The proposition that cattle played a more important role in the Corded Ware period than during earlier periods can, however, be dismissed. We now know that cattle were important in the preceding period as well; on several Vlaardingen sites in the coastal zone, cattle were a very important part of the subsistence base (table 5.2) (Goossens, 2009: p.67, Brinkkemper *et al.*, 2010: p.26-47, table 2, Amkreutz, 2013: p.531-532).

The subsistence strategy of the Corded Ware inhabitants of Noord-Holland does not seem to have been dictated by an overarching Corded Ware 'template', but, rather, was adapted to the local landscape and its possibilities. Differences in the subsistence base among Corded Ware communities were found in other regions as well (section 1.2.3.3, Klassen, 2005b, Ebbesen, 2006, Rasmussen, 2013). For example, on the Danish peninsula of Jutland, Corded Ware settlements show differences in their subsistence strategy, reflecting the different landscapes that they inhabited (Klassen, 2005b, Ebbesen, 2006, Rasmussen, 2013). On a coastal site, Gaasmosen, long-distance herding was combined with seasonal hunting and fishing (Rasmussen, 2013). In the eastern part of Jutland, where the soils were more fertile, the cultivation of emmer wheat played a more important role (Klassen, 2005b: p.17-22). Isotope analysis was used to reconstruct the diet of Scanian Corded Ware people; it showed diversity in the food sources exploited (Fornander, 2013: p.13). Furthermore, there were differences in the diet between

regions, and the proportion of marine food consumption sometimes changed during an individual's lifetime (Fornander, 2013: p.24-25).

It is concluded that the lifestyle of the inhabitants of the Corded Ware settlements in the Noord-Holland coastal area was a continuation of the previous Vlaardingen period. The idea that Corded Ware settlements represent the arrival of a package containing new technologies, including the plough, a focus on cattle breeding, and a new material culture, was refuted.³⁶ On the Corded Ware settlements in Noord-Holland, both cattle husbandry and plough-based crop cultivation were important, but these two aspects cannot be seen as the driving force behind the whole Corded Ware Culture. However, even though the plough had been known in the area since the preceding Vlaardingen period, plough technology may have had a significant influence on Corded Ware society. Furholt (2014a: p.16), for example, proposes that the long-term effects of technological innovations could have triggered other economic and social transformations. Subsistence strategies vary among different parts of the Corded Ware area. Individual Corded Ware communities do not necessarily share the same subsistence base with their neighbours. On the contrary, the subsistence choices suggest that regional links between landscape and subsistence were stronger than the links between supra-regional material culture and subsistence.

5.2.3 Technology and economy: Comparing ceramic assemblages

Corded Ware Culture has been interpreted by, for example, Glob (1969) and Kristiansen (1989) as representing a new lifestyle; innovations were seen to have been accompanied by new material culture, including ceramics (namely, beakers). Other scholars have argued against this 'package' and envision more gradual change (Fokkens, 1998: p.487). By comparing the ceramics from older and younger sites, these different propositions can be tested. Radical change arriving as package would have resulted in ceramics that differ strongly from the ceramics of preceding cultures, while gradual changes in the technology and economy would be reflected as gradual changes in the ceramics.

Corded Ware ceramics and older Vlaardingen ceramics show both similarities and differences in their technological and morphological characteristics and decoration. The medium-thick-walled and thick-walled ceramics found on the Corded Ware sites in Noord-Holland are similar, in morphology and presumably technology, to those found on older sites. On the settlement of Zandwerven, the medium-thick-walled ceramics from the oldest period have a pronounced S-shape. Younger medium-thick-walled and thick-walled ceramics from Zandwerven and the other Noord-Holland Corded Ware sites under study are not revolutionarily different, but they do show more elongated profiles (chapter 3). This development, in which the profiles become more elongated, was also observed on sites located in the southern coastal zone (chapter 3).

The thin-walled ware shows stronger differences, in that the characteristic decoration with cord imprints and spatula imprints is not found on ceramics from the preceding period. Vessels with a beaker shape are, however, found in middle Vlaardingen contexts at Hazendonk and Voorschoten Boschgeest (section 3.3.1.5, fig. 3.6) (Beckerman and Raemaekers, 2009: p.73). During this period, decoration with cord and spatula imprints was not present. It is likely that these vessels pre-date the Corded Ware habitation of the coastal zone. However, due to the broad wiggles in the calibration curve this cannot be confirmed with ¹⁴C dates.

36 The link to other new technologies, such as wool, will be discussed in section 5.2.4.

The technological characteristics of Corded Ware ceramics of all thickness classes also show overlap with those of older ceramics from this region.

In the whole of the coastal zone, we can thus observe the following pattern: during Beckerman and Raemaekers' (2009: p.73) early and middle Vlaardingen phases, the medium-thick- and thick-walled ceramics have a pronounced S-shape. A limited number of thin-walled beakers are present, but spatula decoration and cord decoration are not. During the younger phase, which is contemporary to Beckerman and Raemaekers' (2009: p.73) late Vlaardingen phase, gradual changes are visible in the medium-thick-walled and thick-walled vessels, in that they become more elongated. The thin-walled ware undergoes a more radical change, with the introduction of spatula and cord decoration. This is an ongoing process, and more gradual changes in technology and decoration of the vessels can be observed during this final period (chapter 3).

The thin-walled beakers are here argued to be the product of a supra-regional network in which the inhabitants of the Dutch coastal zone took part. This supra-regional network was used to exchange goods, ideas, technology and possibly people (sections 4.4. and 5.3.5). Cord-decorated and spatula-decorated beakers relate to products of the supra-regional network in terms of their style but were presumably produced locally. The use of these beakers for important daily activities also materializes the importance of being part of this supra-regional network. To conclude, during the Corded Ware period there were gradual changes in the medium-thick-walled and thick-walled ware, which was part of a regional tradition, and there was more radical change in the thin-walled ware.

Whether the same is true in other regions of the Netherlands is difficult to establish since detailed data are lacking. The limited data available seem to indicate that the cord- and spatula-decorated beakers found in the coastal zone are very similar to those found in other parts of the Netherlands, but that the medium-thick-walled and thick-walled ware is different than comparable wares found beyond the coastal zone. Short wave moulded vessels, which are rare in Noord-Holland, may have been more common in other parts of the Netherlands (section 3.3.3). These regional differences within the Netherlands may have been caused by differences in (supra-regional) contacts. The regional differences may also have been caused by continuity of differences in the ceramics from the periods preceding the Corded Ware period. In other words, older traditions continued while new ceramics were introduced. The differences may, at the same time, also reflect different local (environmental) circumstances and/or differences in the subsistence base and social organisation. Supra-regionally, there is evidence that in other Corded Ware regions the characteristics of ceramics from preceding cultures are also still present during the Corded Ware period (Furholt, 2014a: p.10-11, fig.5).

In this section examples were presented of regional differences in the ceramics that reflect continued traditions from preceding periods. At the same time, in the wide region stretching from Russia to the Netherlands and from southern Scandinavia to Switzerland, the material culture – including beakers with cord and spatula decoration – is very similar. These beakers embodied the contacts within the supra-regional network in which their decoration was so widely shared. The supra-regional network was used to exchange goods, ideas, technologies and possibly people.

5.2.4 Technology and economy: Ceramic artefacts

The start of wool production, part of the secondary products revolution as defined by Sherratt (1997a: p.385), can be studied through ceramic analysis. The presence of (ceramic) spindle whorls at a site indicates people were engaged in spinning wool, and often a direct correlation between spindle whorls and wool production is assumed. For example, Müller *et al.*, (2009, p.132) state:

“Further important ceramic finds consist of a spindle whorl and small imitations of wheels and miniature axes. While the former hints at wool production, the latter probably represent items with a more ritual purpose.”

But also Van Heeringen and Theunissen (2001: p.73, fig. 8) regarded spindle whorls as a “*clear indication for the processing of wool*” [my translation]. However, spindle whorls do not necessarily indicate wool processing; they may also indicate the spinning of other fibres, such as flax (Maier and Schlichtherle, 2011). Spindle whorls have been found in all three areas of the settlement of Zeewijk (section 3.2.4.3). Two questions regarding these spindle-whorls arise: (1) Was spinning a new technique and (2) What was being spun: wool or flax? In order to answer the first question, we need to rule out the occurrence of older indications for spinning. On sites of the preceding Funnel Beaker period, “*Spindle whorls are as rare as snow in summer*” according to Bakker (1979: p.60). A spindle whorl was found in the destroyed megalithic grave at Mander, but the association to the Funnel Beaker finds is uncertain (depot Overijssel, OKT 536). Unfortunately, only a very limited number of Funnel Beaker settlements from the Netherlands are known, and even fewer have been studied. On the Funnel Beaker settlement sites of Beekhuizenzand (Modderman *et al.*, 1976), P14 (Ten Anscher, 2012), Bornwird and Birdaard (Fokkens, 1982), Groningen UMCG (Overeem, 2005) and Oostrum (Beckerman, 2008), spindle whorls have not been found or published. Several spindle whorls have been found on three sites that are interpreted as belonging to the Vlaardingen culture: Hazerswoude (Drenth, 2010: p.125), Hekelingen III (Drenth, 2010: p.125) and Voorschoten-Boschgeest (Glasbergen *et al.*, 1967: p.7 and 22). These sites contained not just Vlaardingen material, but also younger, Corded Ware and – in the case of Voorschoten-Boschgeest – Bell Beaker material. For the Voorschoten-Boschgeest example it is alas unclear whether the spindle whorl is related to the Vlaardingen Culture, the Corded Ware Culture or the Bell Beaker Culture (Glasbergen *et al.*, 1967: p.17, 22). It does, however, seem unlikely that spinning was first introduced during the Corded Ware period in the coastal zone; it appears to have arrived somewhat earlier.

The second question, what was being spun with the spindle whorls, is more difficult to answer. Late Neolithic lakeside dwellings in Switzerland and southwestern Germany have yielded very well-preserved organic remains (Leuzinger and Rast-Eicher, 2011, Maier and Schlichtherle, 2011). On these sites flax was spun to make textiles and nets (Leuzinger and Rast-Eicher, 2011, Maier and Schlichtherle, 2011). The spindle whorls that have been found on the German and Swiss settlements are very similar to the examples from the Corded Ware settlements in Noord-Holland (figure 5.1) (Leuzinger and Rast-Eicher, 2011: fig.3a, Maier and Schlichtherle, 2011: fig. 2.4). The production of flax textiles and nets became increasingly important from the middle phase of the Late Neolithic, 3300 cal. BC, onwards (Maier and Schlichtherle, 2011: p.576). During the Corded Ware period (2700–2400 cal. BC) in southwestern Germany, flax was produced, but presumably less frequently than in the directly preceding period (Maier and Schlichtherle, 2011: p.571 and 573). Leuzinger and Rast-Eicher (2011: p.541) suggest that from the Corded Ware period onwards

wool was also used in the Swiss lakeside settlements. Arguments for this are the increased proportion of sheep bones and a different shape of the spindle whorls (Leuzinger and Rast-Eicher, 2011: p.541).

Grömer and Kern (2010) analysed the cord imprints on Corded Ware ceramics from Austria to determine what kind of cord was used to make the impressions. After experiments with different types of cords, they concluded that for the majority of cord-decorated Corded Ware vessels, cord made from bast fibres and grasses had been used to make the impression (Grömer and Kern, 2010: p.3144). A small group of Corded Ware vessels showed impressions of cord made from flax (Grömer and Kern, 2010: p.3144). Woolen cord was not used (Grömer and Kern, 2010: p.3144). This analysis was not replicated for the Noord-Holland beakers, but visual inspection suggests the Dutch imprints are similar to the Austrian examples.

The interpretation that flax was spun is strengthened by the palaeobotanical evidence for flax on the Noord-Holland Corded Ware settlements. Remains of flax were found at Aartswoud (Van Heeringen and Theunissen, 2001: p.130), Mienakker (Kubiak-Martens, 2013: p.108) and Zeewijk (Kubiak-Martens, 2014). According to Kubiak Martens (2014) flax was cultivated locally and was presumably used for both its oil and its fibres (Kubiak-Martens, 2013: p.108). At both Zeewijk and Mienakker, bone tools (so-called ripples) were found that were possibly used for working flax (Hogestijn, 1997: fig.3, Van Ginkel and Hogestijn, 1997: p.100 and fig.62, Drenth *et al.*, 2008: p.164). Pieces of twined cord were found at Aartswoud (Van Heeringen and Theunissen, 2001: fig.112) and Zeewijk (Kubiak-Martens, 2014). The latter was studied by Kubiak-Martens (2014), who was able to determine that the cord had been made from flax fibres. Gracia Diaz (2013: p.85) concludes that a hammer stone found at the settlement site of Mienakker shows traces that could have been caused by the splitting of fibers, an essential step in flax processing. There is thus ample evidence that during the Corded Ware period flax was used in the coastal zone.

The evidence for wool production is more limited (Kleijne *et al.*, 2013: p.253). Because the number of sheep bones found is low, Brinkkemper *et al.*, (2010: p.38) conclude that wool played no significant role during the Vlaardingen period. During the Corded Ware period their role presumably did not change dramatically. The number and proportion of sheep bones found in the settlements studied is low (Zeiler and Brinkhuizen, 2012: p.133, 2013: p.158, 2014: p.181). Furthermore, it is doubtful that the sheep that were present had hair that was long enough to use for wool (Zeiler, personal communication 2014). Use wear analysis of flint, stone and bone tools from Keinsmerbrug, Mienakker and Zeewijk also did not show any evidence for wool processing (Garcia Diaz, personal communication 2014). Because sheep were present, it cannot be ruled out that wool was used; however, on balance, the evidence seems to indicate that mostly flax fibres were used for the production of textiles.

Evidence for other new technologies has not been found in the ceramic assemblages; the residue analysis did not provide any clear indications for the use of milk or other dairy products (Kleijne *et al.*, 2013: p.253, Oudemans and Kubiak-Martens, 2012, 2103, 2014). Only at Mienakker, and for only one sample, did the residue analysis indicate milk fat mixed with plant oils (Oudemans and Kubiak-Martens, 2013: p.146). No ceramic artefacts have been found that might suggest the production of cheese (for example, cheese strainers) or other types of dairy. Thus the ceramic assemblages do not show any indications for the introduction of new techniques relating to wool and dairying. Indications for spinning and weaving of presumably flax are present; however, this technique was not newly adopted in the Corded Ware period, as is shown by the spindle whorls from Vlaardingen contexts.

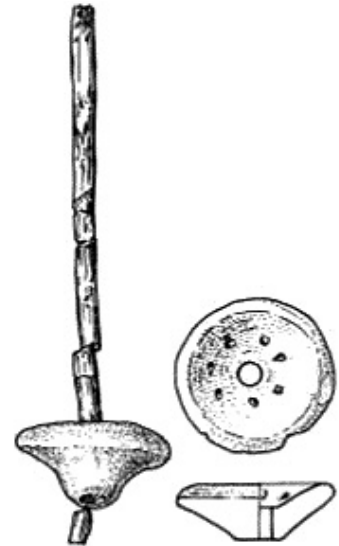


Figure 5.1 Spindle whorl from Switzerland (after: Maier and Schlichtherle, 2011: fig. 2).

5.2.5 Subsistence: Cereal tempering and cereal imprints

Two sherds from the settlement site of Mienakker were tempered with grains of sea barley (*Hordeum marinum*) (identification Kubiak-Martens in: Beckerman: 2013: p.38, section 2.3.6). Cereal imprints on Corded Ware ceramics are not unique; they occur in southern Sweden (Larsson, 2009: p.63-64), Denmark (Ebbesen, 2006: p.225) and central Germany (Müller *et al.*, 2009: p.135) (section 2.2.4.4). The existence of decoration that potentially represents cereal crops has been proposed as well. Klassen (2005b: p.16-17) interpreted vertical zones consisting of several inverted V shapes found on ceramics from Jutland as images of cereal spikes.

Cereal imprints are, however, not restricted to the Corded Ware period. At Sloodorp-Bouwlust (section 2.3.1) five sherds with a weight of more than 3 g showed impressions of naked barley (*Hordeum vulgare nudum*) and emmer (*Triticum dicoccum*) (identification De Cock-Buurman, 1993). Wheat impressions have been found on Linearbandkeramik Culture vessels (Bakels and Zeiler, 2005: p.311, fig. 14.1). Jennbert (2008: p.102, table 3) provides examples of both Ertebølle and Funnel Beaker sherds from Löddesborg in southern Sweden decorated in this fashion.

Several explanations for the presence of cereal imprints, cereal tempering and cereal-like decoration have been put forward. Larsson (2009: p.63-64) interprets the cereal impressions found on ceramics from Sweden simply as an indication of agriculture. Alternatively, such imprints may also have been used to express the importance of cereals. Raemaekers has postulated that becoming Funnel Beaker Culture also meant becoming Neolithic, and that the transition to cereal production was accompanied by a change in vessels, used to prepare meals with these cereals (Raemaekers, 2015). Klassen (2005b: p.19-22) suggests an important social and symbolic role for cereals. He proposes that, particularly during the youngest phase of the Corded Ware period in Denmark, emmer was gaining importance and also had great symbolic value (Klassen, 2005b: p.19). Klassen interprets this, together with the presence of grinding stones in graves and ploughmarks under graves, as indications for beer drinking (Klassen, 2005b: p.19-22, section 5.3.6).

5.3 Social organisation and individualisation, gender differentiation and the rise of elites

5.3.1 Introduction

The Corded Ware period is seen by many as a period in which society changed from being group-oriented and egalitarian towards being more individualistic and stratified (Westermann, 2007, Pelisiak, 2013, Vandkilde, 2004, Müller *et al.*, 2009) (section 1.2.3). Others argue against such individualisation and elites and argue that the Corded Ware communities were without significant social differences (Hübner, 2005: p.746, Ebbesen, 2006: p.240). The former argue that settlements and graves reflect changes in society. They argue that settlements became smaller, that this new settlement pattern led to changes in the social structure and that – in this changing society – private property could have played an essential role (Hübner, 2005: p.752, Müller *et al.*, 2009: p.140). The replacement during the Corded Ware period of the communal graves found in the preceding periods with single graves is seen by these researchers as a reflection of individualisation (Westermann, 2007: p.22). The grave goods in Corded Ware graves are seen as gendered artefacts. Several interpretations for these gender differences have been put forward. Turek (2012: p.197) suggests that gender differences reflect the division of labour, whereas Drenth (2005: p.360) proposes that they reflect a society in which the highest social positions were occupied by men (Drenth, 2005: p.360). Conversely, Vandkilde (2006: p.414-417) proposes that there was no male dominance, and Ebbesen (2006: p.240), too, proposes that men and women were ‘strikingly equal’. Male graves often contain artefacts interpreted by archaeologists as warrior equipment, and Corded Ware men were seen as bellicose by Childe (1929). The suggested martiality has been interpreted as an expression of the rise in importance of private property and elites; a function of the need to defend this private property; and/or a reflection of society and its ideology as a whole (Fokkens, 1999, Ebbesen, 2006, Vandkilde, 2006). In such narratives, the characteristic Corded Ware beaker is seen as a symbol of this changing society and is interpreted as an alcohol drinking cup (Childe, 1925: p.223, Sherratt, 1997a: p.392). Alcohol is seen to provide a source of social influence or even domination (Childe, 1925: p.223) or to act as a lubricant in the process of forming a new social fabric (Sherratt, 1997a: p.392).

The Corded Ware settlements in Noord-Holland can help to solve these debates. If individualisation and the rise of elites are indeed reflected by smaller settlements and differences in wealth among individuals and/or households, we may be able to identify such differences by comparing the sizes of sites from different periods and by comparing the spatial patterns on and between sites. Section 5.3.2 deals with this reconstruction of the settlement system based on the new multi-disciplinary analysis of three Corded Ware settlements in Noord-Holland as part of the *Odyssee* research project. In section 5.3.3 the spatial patterns of ceramics on these settlements will be used to reconstruct the social organisation. In section 5.3.4 the Corded Ware settlements from Noord-Holland will be compared with older Funnel Beaker and Vlaardingen settlements and with settlements from other Corded Ware regions in order to assess the extent to which regions differ and whether the Corded Ware settlements mark a new settlement organisation or a continuation of older traditions.

In addition to the models formulated for the social organisation of Corded Ware society, there are also several models for the start of the Corded Ware period and for the changes that occurred during the Corded Ware period. Three models for the start of the Corded Ware period have been put forward. The Corded Ware

culture was the result of either (1) migration, (2) diffusion or (3) a combination of both. Ceramics can be used to test these models; in section 5.3.5 these three propositions are tested by comparing the ceramics on and between different settlements from Noord-Holland.

In section 5.3.6 the alcohol hypothesis will be tested by analysing the use of beakers and other types of vessels on the Noord-Holland settlements. This should answer the question of whether the beaker was indeed a drinking cup reflecting a society in which status and influence were important.

5.3.2 *The settlement system: Results of the Odyssee project*

A reconstruction of the settlement system can help to reconstruct past Corded Ware social organisation. Therefore, this section will present a reconstruction of the Corded Ware settlement system in Noord-Holland. In addition, this section will test the idea that during the Corded Ware period the settlement pattern of larger village communities of the preceding period was replaced by a pattern involving smaller groups or nuclear families (as a consequence dotting the landscape with dispersed small hamlets or single homesteads) (Hecht, 2007, Müller *et al.*, 2009: p.140). A comparison of the size of settlements of the Corded Ware period and preceding periods can indicate whether people indeed started to live into smaller groups during the Corded Ware period. Comparisons within and between sites of the different types of ceramics present, the size of the ceramic assemblages, the use of these ceramics and the spatial patterns in which they have been found can help to answer the questions on group composition. Furthermore, such a comparison can help to enhance our understanding on the similarities and differences in wealth within sites, between sites and between periods. Activity patterns on sites may also indicate divisions of labour. A comparison of the presence of different ceramic types and their use in different regions and in different contexts, both settlement and funerary, can enhance our understanding of social organisation at a larger scale.

The researchers of the Odyssee project concluded that Keinsmerbrug was a settlement where people (from different households or groups) gathered for special reasons like feasting and consumption of specific foods, in addition to those foods procured through the hunting of ducks, fishing and/or herding of cattle (Smit *et al.*, 2012: p.222). The large variety in the characteristics of the ceramics found at Keinsmerbrug certainly reflects this (Beckerman, 2012). Although only low numbers of sherds were found, these do show strong variation in their characteristics, mainly their tempering. Furthermore, the ceramics seem to have been used in a more opportunistic strategy. Whereas at other sites medium-thick-walled and thick-walled vessels show hardly any cooking residues, at Keinsmerbrug residues in both thin-walled beakers and medium-thick-walled and thick-walled vessels show that these ceramics were used to prepare cooked meals.

The other two settlements studied as part of this project reflected a different function (Kleijne *et al.*, 2013, Theunissen *et al.*, 2014). Both Mienakker and Zeewijk were more sedentary sites, inhabited by one extended family or, in the case of Zeewijk, possibly several households at the same time (Theunissen *et al.*, 2014). These more sedentary sites also revealed evidence for specific activities that were performed. At Mienakker, for example, a hide boat was likely used for the catching of haddock in deep water, and on this site all stages of amber bead production were documented (Kleijne *et al.*, in prep.). The ceramics from Mienakker and Zeewijk also reflect this more sedentary, year-round use. The assemblages are more uniform; the use of types seems to be less opportunistic; and a greater diversity of activities, like spinning, were carried out.

The idea postulated by Hecht (2007) and Müller and colleagues (2009) that during the Corded Ware period settlements were organised at the level of the nuclear family level as a reflection of a society that became more individualised is not supported by the current analysis. The habitation of Keinsmerbrug is not characterised by competition and individualisation but, rather, by collaboration. Mienakker and Zeewijk indeed show that the family was likely to be the basic level of organisation, but these settlements were part of a larger network of settlements, in which, Kleijne and colleagues (in prep.) argue,

“the more dynamic locations were used for extraction of resources in specific seasons, whereas the more stable areas were used for agriculture, animal husbandry and permanent settlement.”

The people inhabiting this part of the coastal zone thus likely formed a close-knit network that was able to use the landscape to its fullest. The size of the different settlements may reflect the size of the population that inhabited it. Several sites do not seem to fit the characterisation of small hamlets or single homesteads. For example, the cultural layer of the site of Zeewijk measures 3,076 m², the cultural layer of Aartswoud extends over an area of over 25,150 m², and that at Flevo 1 encompasses 34,356 m² (Drenth *et al.*, 2008: fig.7). It is, however, unclear whether these areas were inhabited only once or repeatedly over a more prolonged period of time. The ceramics analysis of the Zeewijk material indicates habitation during different phases. The idea of the extended family as a basic unit of society may indeed be valid, yet with the side note that these families worked together and that the extent to which one site represents one family is difficult to test and therefore open to debate.

On the basis of the analysis of the Corded Ware settlement system in Noord-Holland and a supra-regional comparison, we can conclude that the settlement system, just like the subsistence strategy, was not dictated by an overarching Corded Ware template. There were regional differences in the settlement system that enabled the inhabitants to use the possibilities of the local landscape to its fullest. A more detailed analysis of the spatial patterning of ceramics on the different sites will be presented below (section 5.3.3). These patterns, as well as the settlement system described above, will be compared to reconstruct the social organisation within the settlements themselves and in this region as a whole.

5.3.3 Social organisation: Studying spatial patterning of ceramics

Spatial patterning of the ceramics at the settlement level (or within specific parts of a settlement) and comparison with other settlements may be used to study the social organisation on a site. Analysis of ceramic assemblages and their patterning can indicate whether there were differences among people, families or groups of people within and between sites. Differences in the patterning of the different types found, such as Protruding Foot Beakers and All Over Ornamented Beakers, may indicate temporal, functional and/or social differences.

There are several differences among the ceramic assemblages that reflect both chronological differences (chapter 4) and differences in site use and site function. Differences in ceramic assemblages reflecting differences in social status were not found.

The majority of ceramics occur dispersed over the site, and not infrequently sherds belonging to a single vessel were found at different spatial extremes of one site or site area (Nobles, 2012, 2013a, 2014). Most vessels were not deposited where they were used (Beckerman, 2012: p.48, Nobles, 2012: p.287). No spatial patterning for the different vessel types could be observed (Nobles, 2012, 2013a, 2014).

Lanting (2007/2008: p.16) proposed that All Over Ornamented beakers developed in the Corded Ware context as the result of a group of people wanting to distinguish themselves. Such a distinction, however, does not show up in the data studied. At both Mienakker and Zeewijk the different All Over Ornamented sherds were found mixed with sherds from other types of beakers and of medium-thick-walled and thick-walled ware.

It did prove possible to assign several vessels from Keinsmerbrug and Mienakker to specific structures (Nobles, 2012 and 2013). At Mienakker two undecorated vessels with a beaker shape are likely associated with Mienakker house MKII (Beckerman, 2013; Nobles, 2013a: p.55, 216, 226 and table 11.7). An undecorated beaker and a collection of wall sherds decorated with oblique spatula impressions (Van der Waals and Glasbergen, 1955: p.12, type 1e) are likely associated with funerary structure MKI (Beckerman, 2013: p.55, Nobles, 2013a: p.55, 216, 226 and table 11.7). At Keinsmerbrug, vessels 1 and 4 and, to a lesser extent, vessel 12 were found close together inside a house near hearth pits (Beckerman, 2012: p.48, Nobles, 2012: p.287). None of these ceramics are of exceptionally good quality, nor do they possess other characteristics; they are, instead, extremely similar to the other ceramics found at the respective sites.

In conclusion, the spatial patterning of the ceramics found on the studied settlements does not provide indications for differences in status within or between sites.

5.3.4 Comparing settlements of different dates and regions

In this section, a comparison will be made between the settlements of the Corded Ware period and the preceding period in the Netherlands. Following this, the settlements of the Corded Ware and preceding periods in other parts of the Corded Ware area will be compared. This is done to understand differences in the social organisation on settlements between periods and regions.

Comparing the settlements and settlement systems of the Corded Ware period with those of the preceding Funnel Beaker and Vlaardingse periods can indicate whether the settlement sites of the Corded Ware period mark a new tradition or, instead, represent a continuation of older traditions. Funnel Beaker settlements, mainly found in the sandy part of the Netherlands, show significant differences in size, ranging between 5600 m² and 50.000 m² (Van Gijn and Bakker, 2005: p.286). As is the case with the Corded Ware settlements, the size of these sites may reflect a long period of accumulation of settlement waste (Van Gijn and Bakker, 2005: p.286-287). Vlaardingse settlements are also said to show differences in size and function, yet data on the exact spatial extent of the cultural layers of the different sites have not been published (Van Gijn and Bakker, 2005: p.293, Amkreutz, 2013: p.398). The coastal dunes and intercoastal ridges, as well as the levees in the rivers area, were inhabited year-round by family groups who cultivated cereals and kept animals (Raemaekers, 2003: p.398, Van Gijn and Bakker, 2005: p.299). At the same time, the stream ridges in the freshwater–intertidal zone were used by special task forces for specialised food procurement strategies, including fishing and hunting and possibly crop cultivation (Raemaekers, 2003: p.398, Van Gijn and Bakker, 2005: p.299). The river dunes sites thus represent special activity sites, likely linked to permanent settlements elsewhere (Raemaekers, 2003: p.398, Van Gijn and Bakker, 2005: p.299).

Little is known about the spatial distribution of finds on Vlaardingse and Funnel Beaker sites in the Netherlands. Van Gijn and Bakker (2005: p.287-288 and 291) assume there were functional differences among sites of the Funnel Beaker Culture, yet they do not see any evidence for social hierarchy. Bakker

(2010) supports this view. Bakker (2010: p.11-12) argues that the similarities in the ceramics from different regions argue against social differences between these regions. Furthermore, he argues that the grave goods also do not reflect social stratification (Bakker, 2010: p.11-12). Müller (2010: p.1), on the contrary, has argued that the Funnel Beaker societies of the north group changed from the individual and group diversity seen around 3400 BC to a more stratified social organisation, seen around 3000 BC. The presence of communal and monumental graves is taken as an indication for the presence of one dominant group within society (Müller, 2010: p.13-14). Statements in the literature about the presence or absence of social hierarchy in the Vlaardingen communities have not been found.

In conclusion, there are similarities between the settlement system of the Corded Ware Culture and that of preceding cultures in the coastal zone. The Vlaardingen and Corded Ware settlement systems can both be characterised as adaptive systems combining crop cultivation with animal husbandry and fishing, hunting and gathering. The number of inhabitants per settlement varied (Raemaekers, 2003: p.398-399), and indications for crafts occur more frequently on the sites that were inhabited year-round (Kleijne *et al.*, in prep., Garcia Diaz, 2013, 2014, Beckerman, 2012, 2013, 2014).

The available data on settlement sizes, settlement finds and their patterning do not fit with the idea that during the Corded Ware period settlements became smaller, as was proposed by Hecht (2007) and Müller and colleagues (2009). Nor they fit with the idea proposed by Vandkilde (2004), Westermann (2007) and Pelisiak (2013) that the Corded Ware period was a period in which society changed from a being group-oriented and egalitarian to being more individualistic and stratified. In my opinion, there are no clear cases that would argue for accumulation of private property. Nor do these data fit with the notion of permanent competition between groups or group members proposed by Czebreszuk and Szmyt (2013).

In order to understand the extent of the similarities or differences among regions, it is interesting to compare the patterns observed in the Dutch coastal zone with those from other settlement systems and individual settlements in other Corded Ware regions. The Corded Ware area spreads from The Netherlands to Russia and from southern Scandinavia to Switzerland. Corded Ware settlements are mainly known from parts of the Netherlands, Germany, Switzerland, Finland and Denmark. In other parts of the Corded Ware area, settlements – let alone clusters of settlements – are very rare or even non-existent (Larsson, 2009: p.63-64). On the settlement site of Wattendorf-Motzenstein, at least four hut structures were found (Müller *et al.*, 2009: p.130). The spatial analysis of the distribution of artefacts and ecofacts around those huts indicates that each household was an independent economic unit (Müller *et al.*, 2009: p.137). Hecht (2007: p.244-245) also proposed that in the region between the Danube in Bavaria and Lower Saxony, Corded Ware nuclear families lived in small houses in permanently inhabited small villages and used a diverse range of temporary settlements. Agriculture was practised with the aid of the plough and the wheel. The adoption of new technologies came with new opportunities and caused specialisation (Hecht, 2007: p.244-245). For example, part of society practised transhumance and tended to cattle outside the main village (Hecht, 2007: p.244-245). Specialised crop cultivation for flax production and craft specialisation occurred as well (Hecht, 2007: p.244-245). According to Klassen (2005b: p.18), settlements of the late Funnel Beaker Culture in Denmark are larger and have a larger number of house plans compared with those of the Corded Ware period. The Corded Ware people are taken to be more mobile, and their settlements usually consist of just one or two buildings (Klassen, 2005b: p.3). Larsson (2009: p.63) also emphasizes that the large sites of the Funnel Beaker Culture are in sharp contrast to the

Corded Ware settlements, which mainly consist of a single longhouse and fewer deposits. A dichotomy in the settlement patterns with the preceding and possibly partly overlapping Funnel Beaker Culture is also proposed for southeastern Poland and western Ukraine (Kadrow, 2008: p.250). In Finland more than 150 Corded Ware settlements have been found, some of which are very large (Nielsen, 1997: p.170). The Finnish site of Haoho is considered the largest Corded Ware settlement known in Europe (Nielsen, 1997: p.170). There is thus variation between regions in both subsistence strategy and settlement size. Unfortunately, little is known about the social organisation within settlements, and indications for social hierarchy are lacking.

In the Dutch coastal zone the settlement system of the Corded Ware period is a continuation of that of the preceding period. Indications for social stratification are lacking for both periods. Because settlements from both the preceding Funnel Beaker period and the Corded Ware period in other parts of the Netherlands are rare, it is impossible to make claims about the similarities and differences among the settlement systems and the social organisation for those regions. In different parts of the wider Corded Ware area, there are differences in the size and function of settlements. In several regions there are differences with the preceding period, whereas in other regions there are similarities (Nielsen, 1997, Klassen, 2005b, Hecht, 2007, Kadrow, 2008, Larsson, 2009). It can thus be concluded that although the large Corded Ware area exhibited similar supra-region elements – including funerary monuments, beakers and axes – there were also strong differences in the subsistence strategy and the settlement system.

5.3.5 Inter-community contacts

The influence of inter-community contacts and mobility on the start of and the changes during the Corded Ware period has always been a much debated topic (section 1.2.2.1). While in early models (one wave of) migration was seen as the motor behind change (for example, Childe, 1925, 1929), in the second half of the twentieth century, many archaeologists considered diffusion to be responsible for the spread of the Corded Ware Culture (for example, Malmer, 1962, Lanting and Van der Waals, 1976). Recently, migration – of individuals or small groups – in combination with diffusion has been proposed by several authors (Kosko, 1997, Larsson, 2006), and this migration and diffusion are argued to have continued throughout the Corded Ware period.

This section presents the three different models and tests the validity of each by means of ceramic analysis. The first model proposes that the Corded Ware Culture is the result of mass migration. Supporters of this model have argued that neither the economic nor the cultural traits of the Corded Ware period resemble those of the preceding period (Äyräpää, 1915, Buchvaldek, 1967, Glob, 1969, Gimbutas, 1979). One wave of migration would thus have resulted in huge differences between the ceramics of the pre- and post-migration periods. However, the studied Corded Ware sites from the Dutch coastal zone argue against the migrationist model. In the studied region, new supra-regional types as well as regional types fitting in to a continued tradition were found. All of the Corded Ware settlements studied here have yielded thin-walled vessels with a beaker shape decorated with cord imprints in horizontal rows and spatula imprints in one or alternating directions. This decoration is found across the whole of the Corded Ware region (Glob, 1945, Loewe, 1959, Hein, 1987, Dresely, 2004). Vessels from Zandwerven and Aartswoud show short wave moulding, a decoration type also present in the entire Corded Ware region (Floore, 1991: p.5). On other sites medium-thick-walled and thick-walled vessels are decorated with fingertip imprints without wavy plastic

bands. Clear examples of other medium-thick-walled and thick-walled vessel types known from other Corded Ware regions, such as amphorae, were not found at the sites studied here. Effectively, the undecorated, medium-thick-walled and thick-walled ware seems to be part of a regional tradition that is rooted in earlier periods (chapter 3). Because a large wave of migration would have resulted in large-scale or even total replacement of older ceramic traditions, this model can be rejected.

The second model proposes that the Corded Ware Culture was the result of diffusion. Proponents of this model argue that the Corded Ware Culture formed via large-scale communication networks (Furholt, 2003b: p.26). Social novelties and new styles of material culture spread as a macro-regional fashion movement and saw a differentiated reception regionally and locally (Vandkilde, 2006: p.412). Local practices and foreign novelties mixed, transforming society in the process (Vandkilde, 2006: p.412). Diffusion would thus have resulted in a ceramic assemblage consisting of new types and types that are a continuation of older traditions. Both types would have been made locally and there would have been differences in the types among different regions.

This model fits the studied ceramic assemblages very well. There indeed are two types of wares representing two traditions: (1) a continued tradition of producing medium-thick-walled and thick-walled vessels in a regional fashion and (2) a new tradition of producing thin-walled, cord-decorated and spatula-decorated beakers in a supra-regional fashion. The thin-walled ware and the medium-thick-walled and thick-walled ware show similar technological characteristics; they are therefore argued here to have been produced locally. Both wares are often tempered with the same materials (table 2.2). The choice of temper differs among sites and over time. Clearly, whereas the use of decoration techniques and patterns that are well known supra-regionally could suggest that these vessels were imported, the technological characteristics argue in favour of local production instead. Such diffusion of pottery styles is not a single event, and ongoing contacts are reflected in the ceramics. Both older supra-regional beaker types, like Protruding Foot Beaker type 1b, as well as later beaker types, like the Bell Beaker type 2Ia, are present at (different) sites in Noord-Holland (types follow Van der Waals and Glasbergen, 1955). The proportion of thin-walled ware also seems to increase over time. In other Corded Ware regions the same pattern – a regional tradition for the production of coarse wares and a supra-regional tradition for the production of fine wares – has been observed (Salanova, 2001, Besse, 2004, Furholt, 2008, Larsson, 2009). The pattern observed in Noord-Holland thus not only seems to fit the inhabitants of the Dutch coastal zone, it also seems to characterise the Corded Ware Culture as a whole.

The third model proposes a combination of diffusion and migration. In this scenario diffusion is combined with the movement of individuals or small groups. This model has recently found more support (Kosko, 1997, Larsson, 2006). Isotope analysis of (human) bone and soil samples sometimes combined with DNA analysis has presented archaeologists with evidence for the movement of individuals and small groups. Haak and colleagues (2008), for example, studied thirteen individuals from four closely related multiple burials of the Corded Ware Culture found at Eulau, in Saxony-Anhalt in Germany. Isotope analysis showed that the buried men and children were of local origin (Haak *et al.*, 2008: p.18229). The buried women, however, presumably spent their early lives in another region (Haak *et al.*, 2008: p.18229). In the graves of the Boscombe Bowmen and the Amesbury archer from southern England, All Over Ornamented beakers as well as Maritime Bell Beakers were found (Barclay, 2011, Cleal, 2011). Isotope analysis has shown that none of the men were born locally (Chenery and Evans, 2011a: p.32, 2011b: p.87). Evidence for the movement of individuals or small groups has

been attested not only for the Corded Ware period but also for the Bell Beaker period. Studies focussing on Bell Beaker burials from southern Germany, Austria, the Czech Republic and Hungary have all shown that the number of individuals who changed residence during their lifetime is high (17.5–63%) (Grupe *et al.*, 1997, Price *et al.*, 2004, Price *et al.*, 1994). The proportion of female migrants is higher than the proportion of male migrants (Grupe *et al.*, 1997: p.523, Price *et al.*, 2004: p.31). Isotope studies focusing on the cultures preceding the Corded Ware culture are still rare. Szostek and colleagues (2013) analysed multiple Funnel Beaker/Baden graves from the settlement of Bronocice I in southern Poland that overlap in time with groups of Corded Ware pastoralist in the same region. All analysed Funnel Beaker/Baden individuals were of local origin (Szostek *et al.*, 2013: p.115).

Several explanations for these observed movements of individuals or small groups have been proposed. Haak and colleagues (2008: p.18229) concluded that the isotopic evidence for women moving was caused by an exogamic marriage system with patrilocality. The existence of an exogamic marriage system during the Corded Ware period has been proposed in various studies (Kosko, 1997, Grupe *et al.*, 1997, Larsson, 2006, Vander Linden, 2007). The people who moved to another settlement could have brought in new material culture as well as new ideas. This exogamic marriage system may thus have been the motor behind social and material culture change (Müller, 2013). Another explanation for mobility may be the wish to increase personal prestige, with individuals undertaking long journeys to obtain prestige goods (Fitzpatrick, 2009). Sheridan (2008b: p.64) argued that the presence of isotopic outliers can also suggest that non-local people came to prospect for metals. A combination of prestige and a exogamic marriage system has also been proposed, with marriage networks being a means to gain prestige through the acquisition of an exotic partner (Brodie, 2001, Needham, 2005).

Material culture, including ceramics, does not provide direct evidence for the movement of people. However, archaeologists have used aspects of material culture to support claims about the degree of mobility (Ebbesen, 2006: p.237). Homogeneity of material culture in large areas is seen by Salanova (2001: p.91) as an indication of movements of people. Ebbesen (2006: p.237) proposed that the presence of different types of ceramics on one site reflects a system of exogamic marriage. This hypothesis of an exogamic marriage system and its impact on social organisation is sometimes tested by means of ceramic analysis. Sheridan (2008 a-b), for example, studied beaker graves from Scotland. These graves contained All Over Ornamented beakers as well as early (Maritime) Bell Beakers quite similar to Dutch Bell Beakers. She therefore argues that these are evidence for small-scale but long-distance movements of people (Sheridan, 2008a-b). Uniformity of types over large areas as well as differences within ceramic assemblages on individual sites are thus used as indication for the movement of individuals or small groups (Salanova, 2001, Ebbesen, 2006, Sheridan, 2008a-b). These same patterns may, however, also have been caused by diffusion. Studying the *chaîne opératoire*, or operational sequence, of the two wares found on the studied settlements can enhance our understanding of the people who made and used the vessels. The *chaîne opératoire* of both wares shows both differences and overlap. Overlap is observed in the technological characteristics. The temper seems to be local, and overlap in temper types and combinations of the different wares is common (table 2.2). Although this overlap could indicate one potter made both thin-walled and medium-thick-walled and thick-walled ware, the differences are also striking. From the analysis of the function of ceramics it became clear that the thin-walled wares, and especially the cord-decorated beakers, were often used to prepare cooked meals. The medium-thick-walled and thick-walled wares were far less often used

for preparing cooked meals and were likely used for storage. Different beaker types, for example Van der Waals and Glasbergen (1955) protruding Foot types and All Over Ornamented types, were found together and in association with medium-thick-walled and thick-walled ware. Distinct patterning of types on sites or on different parts of sites that might indicate differences between the owners of these vessel types has not been observed (Nobles, 2012, 2013a, 2014). It is likely that both wares were used in close association by the same group of people. It remains, however, unclear who potted the different wares; the similarities and differences seem to indicate that different potters worked in close association. It is possible that the thin-walled vessels were made by new potters with knowledge of making cord-decorated and spatula-decorated beakers who moved to this region or, conversely, that they were made by local potters who obtained knowledge on potting these beakers via their contacts in the supra-regional network.

To conclude, the studied ceramic assemblages thus provide evidence for the importance of older regional traditions as well as for the importance of being part of a supra-regional exchange network. This supra-regional exchange network could have provided knowledge on potting the characteristic Corded Ware beakers; however, the supra-regional network could have led to the movement of people with knowledge on potting these beakers. These two options – diffusion and the movement of individuals – are not mutually exclusive and could have occurred at the same time.

The observed patterns at Keinsmerbrug can be used in a thought experiment on how this supra-regional network worked. After multi-disciplinary analysis of the remains of this site it was concluded that this site was used for feasts involving gatherings of people from different communities (Smit *et al.*, 2012: p.222). The archaeological data reflect that these gatherings included the consumption of special foods (Smit *et al.*, 2012: p.222). Moreover, these intercommunal gatherings could have been used as a social arena where relationships were formed, contacts were established or renewed and alliances were created. Cultural exchange – for example, the exchange of knowledge on potting – was an essential part of such meetings. But these gatherings could also have served to ‘exchange’ people, whether as marriage partner or as skilled potters and/or to overcome (gender) imbalances within individual groups.

To conclude, the Corded Ware Culture in Noord-Holland – as that in other regions – was most likely the result of diffusion, possibly combined with the movement of individuals or small groups. The people of the Corded Ware society in Noord-Holland and the coastal zone as a whole can be characterised as having strong roots in the region. Both the subsistence strategies as well as the medium-thick-walled and thick-walled ceramics show a long-term local tradition. At the same time the Corded Ware period is synonymous for the importance of a supra-regional network. Being part of the supra-regional network and being able to exchanging ideas, goods and possibly people was an important aspect of social organisation. The importance of being part of this supra-regional network was expressed locally by making the supra-regional cord-decorated and spatula-decorated beakers. The importance of these beakers was also stressed by using them for important daily tasks, such as cooking. Furthermore, the presence of these beakers in funerary contexts, of both males, females and children, also expresses the importance of the supra-regional network.

5.3.6 The alcohol problem: Analysing the use of ceramics

5.3.6.1 Introduction

The spread and value of beakers has been interpreted in terms of their – valuable – contents. According to Sherratt (1997a: p.376), the pottery itself was not valuable; it derived its value from the special nature of what was consumed from it (Childe, 1925, Sherratt, 1997a-b). Alcohol is also seen as a good explanation for the presence of beakers in male graves. Martiality, individualisation and the rise of elites have been linked with drinking, and drinking has been linked with beakers (Sherratt, 1997a).

Because of this link with social structure, an investigation of the drinking of alcoholic beverages from Corded Ware beakers can greatly enhance our understanding of both the use and the role of beakers, as well as of Corded Ware social structure and society as a whole. In this section, this alcohol-drinking hypothesis will be tested. The debate on the presence or absence of alcohol, as well as on the social role played by alcohol, has focused on three questions: (1) Who was drinking? (2) What was being drunk? and (3) What was the social role of alcohol? Questions 1 and 2 will be addressed in sections 5.3.6.2 to 5.3.6.5; question 3 will be addressed in section 5.3.6.6.

5.3.6.2 The social role of alcohol: Who was drinking and what was being drunk?

The different ideas on the social role of alcohol and who was drinking it, as well as ideas on what type(s) of alcohol were consumed, will be presented here. According to Childe, the owners and distributors of alcohol, by controlling access to this substance, achieved influence or even domination (Childe, 1925: p.223). Sherratt (1997a: p.392) added that alcohol was not only a source of influence but also a social lubricant. This lubricant was needed, according to Sherratt (1997a: p.392), to render possible the unusual social and economic change of this period. Drinking is often linked to institutional violence and martiality. The combination of a battle axe and a cord-decorated beaker or sometimes an amphora in male graves has led Vandkilde (2006: p.411) to suggest that warriors may have participated in communal drinking rituals. Warrior clubs may have existed to organise males of high rank (Vandkilde, 2006: p.417). Cord-decorated beakers are mostly found in male graves and are evidence, according to Vandkilde (2006: 417), of the drinking rituals of such clubs. Drinking alcohol has (thus) also been associated with an elite. Sherratt (1997b: p.422), however, associates drinking with older males with family authority. He postulates that alcohol was rare and that access to it was seen as the hallmark of special status (Sherratt, 1997b: p.422). Koch (2003: p.135) links expensive drinks, that is, drinks with a high percentage of alcohol, consumed during the Bronze Age and the Iron Age to chiefs who had a role in redistributing economic surplus, handling diplomatic connections and reducing strife (Koch, 2003: p.125). During feasts organised to showcase these political roles, chiefs would share mead (Koch, 2003: p.135-136). Koch (2003: p.129-130, 135) also links alcoholic drinks containing less alcohol to people of lower status.

Vander Linden (2001b: p.47-48), however, postulates that drinking was not restricted to older males, but was integrated into everyday life and ideology. The size of beakers in graves is related to the kind of drinker the deceased was (Vander Linden, 2001b: p.47-48). Beakers found in graves of children and juvenile are usually small, whereas the size of beakers in adult graves is variable. This variation is explained by Vander Linden (2001b: p.47-48) in terms of the amount of alcohol

the deceased would drink. In this alternative view drinking was not restricted to males, or even males of a specific age or social status.

Ideas have been formulated not only on the presence or absence of alcohol but also on *what* was being drunk (Sherratt, 1997a, Larsson, 2006: p.251, Guerra-Doce, 2014: p.7). Three different drinks have been proposed: mead, beer and a mixed drink. Furthermore, the use of hemp or other hallucinogenic substances has also been proposed (Sherratt, 1997a: p.397).

The main ingredients for preparing alcoholic drinks are fruit and honey, malted grain, tree sap, and milk (Guerra-Doce, 2014: p.7). Mead is made from honey. In the temperate parts of Europe in prehistory, honey would have been the source with the highest amount of sugar (McGovern *et al.*, 2013: p.13-14). Drinks including honey will have a higher alcohol percentage (McGovern *et al.*, 2013: p.13-14). Honey is also very difficult to obtain and was therefore very valuable (Koch, 2003: p.135).

The presence of beer has been proposed for the Corded Ware period (Vander Linden, 2001). Klassen (2005b: p.19-22) postulates that cereal production played an important role in the Corded Ware period and that during that period the amount of cereal grown increased and cereal gained a remarkable ritual importance. Klassen (2005b: p.21) postulates that beer is one of the main reasons that people grew cereals.

Koch (2003) and McGovern and colleagues (2009, McGovern *et al.*, 2013) propose that a combination of mead and beer was brewed. This mixed beverage, dubbed Nordic grog by McGovern and colleagues (2013), has been reconstructed based on a combination of archaeological, biomolecular and archeobotanical analyses indicating that various ingredients were fermented together (McGovern *et al.*, 2013: p.12). This drink contained honey, fruit, cereals, and sometimes juniper and possibly birch pine and herbs (McGovern *et al.*, 2013: p.12).

Another proposed content of beakers is hemp or another hallucinogenic substance. Sherratt (1997a: p.397) states that the Cord decoration found on beakers across a large region possibly served as an advertisement of the contents, as the cord may have been made from hemp (Sherratt, 1997a: p.397).

5.3.6.3 Evidence for the use of beakers and other vessels

Although many authors have proposed that alcohol was present and played an important social role during the Corded Ware period, actual evidence for the use that these Corded Ware beakers or other vessel types were put to is limited. The indications for use of Corded Ware and some younger and older ceramics are listed in table 5.3. For the Corded Ware period, evidence of alcohol is found on one site only: Refshøjgård (eastern Jutland, Denmark) (Westermann, 2007: p.28, Klassen, 2005a-b). At this site a cord-decorated beaker from a grave contained non-carbonised barley grains (Westermann, 2007: p.28, Klassen, 2005a-b). However, the beaker could also have been used for storing these cereal grains. Lipid analysis was undertaken on the All Over Ornamented Beakers and on a Maritime Bell Beaker found in the graves of the so-called Boscombe bowmen and the Amesbury archer, both from England (Šoberl & Evershed, 2011: p.54-58, Mukherjee *et al.*, 2011: p.154-156). The results are not very clear; the lipids in the beakers buried with the Boscombe bowmen showed poor preservation of lipids, either due to conditions within the soil or due to the presence of alcohol (Šoberl & Evershed, 2011: p.54-58) (table 5.3). The vessels found next to the Amesbury archer were possibly sealed or made waterproof with milk; the low concentrations of lipids argue against cooking (Mukherjee *et al.*, 2011: p.154-156) (table 5.3). Lipid analysis was also undertaken on four sherds from the Swedish Corded Ware

settlement site of Lötvreten (Valbo parish, Gästrikland) (Larsson, 2009: p.250). This analysis showed that the vessels were used for food (table 5.3). One sherd yielded residue from terrestrial animal fats and fatty acids from marine animals and plants (Larsson, 2009: p.250). The other samples showed small amounts of lipids; they probably derive from fish, marine mammals and/or plants (Larsson, 2009: p.250). For one of the sites currently under study, Aartswoud, the presence of charred residues on beaker sherds was previously published (Guerra Doce, 2006a: p.251, Ittersson-Scholte, De Vries Metz, 1981: p.117).

The evidence for the use of Bell Beakers is more substantial, yet this evidence mainly stems from Spain (table 5.3). Bell Beakers have indeed been used for alcohol consumption there, and evidence for both beer, mead and, in one case, a hallucinogenic substance has been found (Rojo Guerra *et al.*, 2006: p.244-253, Guerra Doce, 2006a: p.249-251, Guerra Doce, 2006b: p.63, 69-70, Montero Ruiz, 2008, p.164-165, Guerra Doce, 2014: table 1) (table 5.3). The analysis of Bell Beakers from Spain also led to the identification of other uses. Guerra Doce (2006b: p.69) concludes that Bell Beakers were a special form of pottery with a ritual character, but that not all Bell Beakers were drinking cups. She also attests to their use as food vessels, as funerary urns and as reduction pots to smelt copper ore (Guerra Doce, 2006b: p.69). Remains indicative of food have been found on Bell Beakers from England, Scotland, France and Spain (table 5.3). Several Bell Beaker sherds from Spain and France show copper slag (table 5.3). Bell Beakers have been used as urns in Ireland, England and Portugal (table 5.3). Guerra Doce (2006a: p.255) proposes a link not just between food and Bell Beakers but between special meals, including prized ingredients, and Bell Beakers.

Evidence for alcohol use that pre-dates the Corded Ware period has also been put forward. McGovern (2009: p.134 and map 2) postulates that the earliest alcohol was introduced to northwestern Europe around 5400 BC and to England and Scotland around 4000 BC. The evidence McGovern (2009: p.138) provides for alcohol is the presence of large vats at Tayside and Barnhouse and the presence of lids at these two sites as well as at Skara Brae, on Orkney (table 5.3). These could have served to facilitate fermentation (McGovern, 2009: p.138). Furthermore, with the exception of those from Skara Brae, all of these sites yielded cereal pollen as well as evidence for honey (McGovern, 2009: p.138). The contexts from which the evidence stems are described very summarily and references are lacking. Guerra Doce (2014: p.11) therefore states that the evidence presented by McGovern (2009) for alcohol is not solid. The evidence for the consumption of alcohol becomes stronger for the Bronze Age and the Iron Age. Examples of different drinks from various contexts and different countries are listed in table 5.3.

In addition to the direct evidence for alcohol use and for other types of uses of beakers and other vessels, there is indirect evidence as well. Anthropological studies have been used to reconstruct the social and political roles alcohol could have played (Dietler, 2006). Furthermore, negative evidence – that is, beakers without contents – has been used to refute the alcohol-drinking theory (Brodie, 1997, Case, 1995, Vander Linden, 2001b: p.47). Remarkably, this absence of residues is seen by Larsson (2008: p.251) as support for the theory that beakers were meant for holding beverages. However, the large Corded Ware vessels found in Sweden also do not contain evidence for cooking (Larsson, 2009: p.251). Furthermore, the shape of the beakers has been used as an argument against the drinking hypothesis. According to Gibson (2002), the shape is not suitable for drinking. Other indirect arguments for alcohol are the find spots of beakers; the presence of beakers in (male or even warrior) graves has been used as an argument for them having been used to hold alcohol (Klassen, 2005b: p.19-22). Because Corded Ware sherds are present on Swedish sites belonging to the Pitted Ware

Evidence for alcohol

Country	Site	Type of site	Findings	Literature
Corded Ware				
Denmark	Refshøjgård, East Jutland	Funerary	Non-carbonised barley grains are found in a cord-decorated beaker.	Westermann, 2007: p.28, Klassen, 2005a.
Bell Beaker				
Spain	La Peña de la Abuela	Funerary	Maritime Beakers with residues of a primitive wheat beer.	Rojo Guerra et al. 2006: p.244-251, Guerra Doce, 2006a: p.250, Guerra Doce, 2014: table 1.
	Valle de las Higuerras	Funerary	Bell Beaker bowl with beer and a plain vessel with traces of mead and beer.	Rojo Guerra et al. 2006: p.252, Guerra Doce, 2006a: p.250, Bueno Ramirez et al. 2005, Guerra Doce, 2014: table 1.
	La Calzadilla	Funerary	Bell Beaker bowl with beeswax and traces of cereals, possibly mead.	Rojo Guerra et al. 2006: p.252, Guerra Doce, 2006a: p.251, Guerra Doce, 2006b: p.69-70, Guerra Doce, 2014: table 1.
	La Loma de Tejería	Mining camp	Two Bell Beaker sherds with traces of beeswax, possibly mead.	Rojo Guerra et al. 2006: p.252-253, Montero et al., 2008, Guerra Doce, 2014: table 1.
	Calvari d'Amposta Tarragona	Funerary	Beer and hallucinogenic substance in Beaker pottery.	Rojo Guerra et al. 2006: p.253, Guerra Doce, 2006a: p.249, Guerra Doce, 2006b: p.63
	Túmulo de la Sima	Funerary	Three Maritime Beakers containing beer.	Guerra Doce, 2006a: p.250, Guerra Doce, 2014: table 1.
	Devesa do Rei	Ceremonial site	Cerotic acid, pollen from heather, cistus and oaks indicative of honey or mead.	Guerra Doce, 2014: table 1.
	Perro Alto	Funerary	Bell Beaker with residues of beer.	Guerra Doce, 2014: table 1.
Abriego de Carlos Alvarez	Shelter with art	Bell Beaker with residues of beer.	Guerra Doce, 2014: table 1.	
Younger periods (Bronze Age)				
Spain	A Forxa	Funerary	Residues indicative of beer.	Guerra Doce, 2014: table 1.
	Prats	Ritual pit	Residues indicative of beer.	Guerra Doce, 2014: table 1.
	Genó	Settlement	Residues indicative of beer.	Guerra Doce, 2014: table 1.
	Fuente Álamo	Funerary	Tartrates indicative of grape or pomegranate wine.	Guerra Doce, 2014: table 1.
	Can Sadurní cave Barcelona	Settlement	Beeswax and microscopic evidence for beer from Bronze age pottery.	Rojo Guerra et al. 2006: p.253, Villalba et al. in press, Guerra Doce, 2014: table 1.
Scotland	Ashgrove Fife	Funerary	In the grave of a 55 year old man (buried with a flat bronze dagger) a beaker vessel contained pollen indicating honey, an ingredient of mead. The burial dates to c. 1700 BC.	Vander Linden, 2001b: p.47, Koch, 2003: p.126, Westermann, 2007: p.28, McGovern, 2009: p.138, Guerra Doce, 2014: table 1.
	Machrie Moor	?	Residues on the wall of a vessel indicating honey. Date: 1750-1500 BC (McGovern, 2009) or 3rd millennium cal BC (Guerra Doce, 2014).	McGovern, 2009: p.138, Guerra Doce, 2014: table 1.
	Kinloch Bay	Settlement	Indications for beer are found including pollen of cereals, royal fern and meadowsweet.	Guerra Doce, 2014: table 1.
	North Mains	Funerary	Grave of 20-25 year old woman buried with a decorated vessel containing pollen indicating honey and cereal. Presumably a mixed drink, honey-beer, was consumed. However, Guerra Doce (2014) also suggests the option of a porridge of cereals. Date: 1750 BC.	Koch, 2003: p.130, McGovern, 2009: p.138, Guerra Doce, 2014: table 1.
Denmark	Egtved	Funerary	Burial of a eighteen to twenty year old woman. Clothing (open skirt and disc and woollen belt with a bronze disc) have authors led to suggest she was either a priest or a dancer. In the burial a birch-bark container was found with berries, wheat grains, myrtle and pollen from the lime tree, meadowsweet and white clover. Dendro date on coffin: 1370 BC.	Koch, 2003: p.129, McGovern, 2009: p.144, Guerra Doce, 2014: table 1.
	Nandrup	Funerary	Male buried with a long sword and a large dagger. According to McGovern et al. (2013) a Nordic grog, a mixed beverage with beer and mead, was consumed, according to Koch (2003) mead was consumed. Date: 1500-1300BC.	Koch, 2003: p.128, McGovern, 2009. 145, McGovern et al., 2013: p.2, Guerra Doce, 2014: table 1.
	Kostræde	Deposition	Combined archaeological, biomolecular and archeobotanical research indicated that a large strainer once contained Nordic grog, a mixed beverage with beer and mead dating to 1100-500 BC.	McGovern et al., 2013: p.2, Guerra Doce, 2014: table 1.
	Bregninge	Funerary	A man was buried with a sword, bronze hilt, a bronze battle-axe, tweezers, an awl and a razor. A medium sized pot contained pollen from lime and from flowers such as meadowsweet and white clover indicating honey and thus mead. Date: 1500-1300 BC.	Koch, 2003: p.128-129, Guerra Doce, 2014: table 1.
Older periods (fourth and third millennium BC)				
Scotland	Tayside	?	Large vats with lids. The lids are said to have facilitated fermentation. Honey and cereal pollen. Mid fourth millennium BC. Guerra Doce (2014: p.11) states that there is no solid evidence for alcohol.	McGovern, 2009. 138, Guerra Doce, 2014: p.11
Scotland	Barnhouse	Settlement	Large vats with lids. The lids are said to have facilitated fermentation. Honey and cereal pollen. Barley lipids, sugars, bark resins, cattle milk and meat. Mid fourth millennium BC. Guerra Doce (2014: p.11) states that there is no solid evidence for alcohol.	McGovern, 2009. 138, Guerra Doce, 2014: table 1 and p.11
Scotland	Skara Brae	Settlement	The size of vessel and the presence of lids are used as arguments for fermentation. Furthermore evidence for the presence of honey was found. Mid fourth millennium BC. Guerra Doce (2014: p.11) states that there is no solid evidence for alcohol.	McGovern, 2009. 138, Guerra Doce, 2014: p.11
Scotland	Rhum	?	Honey and cereal pollen. Grooved Ware, late third millennium. Guerra Doce (2014: p.11) states that there is no solid evidence for alcohol.	McGovern, 2009. 138, Guerra Doce, 2014: p.11

Culture, Larsson and Graner (2010: p.239) have postulated that the (drinking) ceremonies and rituals connected to beakers were adopted by other cultures, who did not adopt other aspects of the Corded Ware culture.

To summarize, although the use of Corded Ware beakers is an important element of many reconstructions of Corded Ware society, the actual evidence for their purpose and use is very limited or absent. The next sections therefore present a more detailed analysis of the use of Corded Ware settlement ceramics and funerary beakers to test the alcohol-drinking hypothesis for Dutch Corded Ware communities.

5.3.6.4 How vessels recovered from Corded Ware settlements in Noord-Holland were used

The current study aims to reconstruct not only the characteristics of the Corded Ware ceramics but also their use and role. Therefore, chapter 3.2.4 presented the indications for use of the ceramics.

Table 5.3 Evidence for the use of beakers and other vessels.

Evidence for food

Country	Site	Type of site	Finds	Literature
Corded Ware				
Sweden	Lötveten (Valbo parish), Gästrikland	Settlement	Lipid analysis on four sherds : in one sherd terrestrial animal fats and fatty acids from marine animals and plants. The other samples contain low amounts of lipids, they probably originated from fish or marine mammals, and/or plants.	Larsson, 2008: p.250.
The Netherlands	Aartswoud	Settlement	Burnt food substances on beaker sherds.	Guerra Doce, 2006a: p.251, Iterson-Scholte and De Vries Metz, 1981: p.117.
Bell Beaker (or Corded Ware)				
England	Tusculum North Berwick	Settlement	Black crust on a cord-decorated beaker.	Guerra Doce, 2006a: p.251.
Bell Beaker				
England	Barnack Cambridgeshire	Funerary	Porridge remains in a beaker from a grave.	Guerra Doce, 2006a: p.251.
	Yarnton Oxfordshire	Funerary?	Organic matter on a flint scraper found inside a beaker.	Guerra Doce, 2006a: p.251, Case 1995: p.63.
Scotland	Broomend Aberdeenshire	Funerary	Antler ladle in beaker in which bone and a black substance were noticed.	Guerra Doce, 2006a: p.251, Case 1995: p.63.
France	La Margot à Montrond cave (Jura)	Settlement	Beakers used for food during seasonal hunt.	Pétrequin & Pétrequin, 1988, p.252.
Spain	Túmulo de la Sima, Miño de Medinaceli, Soria	Funerary	Animal fat in beaker.	Guerra Doce, 2006a: p.251.
	El Valle de las Higuerras	Funerary	Animal fat in beaker.	Guerra Doce, 2006a: p.251.

Evidence for copper ore

Country	Site	Type of site	Finds	Literature
Bell Beaker				
Spain	El Ventorro	Workshop	Bell Beaker sherds with copper slag.	Guerra Doce, 2006a: p.252
	El Acebuchal	Workshop	Bell Beaker sherds with copper slag.	Guerra Doce, 2006a: p.252
	Son Matge	Workshop	Bell Beaker sherds with copper slag.	Guerra Doce, 2006a: p.252
	La Bauma del Serrat del Pont	Workshop	Bell Beaker sherds with copper slag.	Guerra Doce, 2006a: p.252
France	Travers des Fourches	Settlement	Bell Beaker sherds with copper slag.	Guerra Doce, 2006a: p.252

Evidence for the use as urn

Country	Site	Type of site	Finds	Literature
Bell Beaker				
England	Barrow hills, Oxfordshire	Funerary	Flat-grave of a child containing a secondary deposit. Inside a Bell Beaker a nearly complete baby skeleton and a small amount of cremated bones.	Guerra Doce, 2006a: p.254.
	Church hill Findon, Sussex	Flint mine/Funerary	Beaker containing a cremation deposited in the shaft of a flint mine.	Guerra Doce, 2006a: p.254.
	Carninac Tregavethan, Cornwall	Funerary	Cremation in a beaker.	Guerra Doce, 2006a: p.254.
Portugal	Palmela Quint do Anjo	Funerary	One femur and one vertebra in a Maritime beaker.	Guerra Doce, 2006a: p.254.
Ireland	Drumstaple, Co. Derry	Funerary	Beaker possibly used as urn.	Guerra Doce, 2006a: p.254.

Unsure

Country	Site	Type of site	Finds	Literature
Bell Beaker (or Corded Ware)				
England	Boscombe Down, grave of Boscombe bowmen	Funerary	Lipid analysis on seven AOC and one Maritime beaker showed poor preservation of lipids, this could be due to either conditions within the soil or with the consumption of alcohol.	Soberl & Evershed, 2011: p.54-58.
	Amesbury, grave of Amesbury archer	Funerary	Lipid analysis on five AOO beakers, very poor preservation of residues. The pots were possibly sealed with milk. Low concentrations of lipids argue against cooking.	Mukherjee et al. 2011: p.154-156.
Spain	Trincones I	Funerary	Barley preparation. Use for beer uncertain.	Guerra Doce, 2014: table 1.
	Los Dolientes I	Settlement	Remains of (wild) pear; possibly used for pear jelly, juice or cider.	Guerra Doce, 2014: table 1.
Younger periods (Bronze Age)				
Sweden	Hamneda	Funerary	Pollen of cereals and roosebay willow herb could either be interpreted as flour, bread, porridge, gruel or beer.	Guerra Doce, 2014: table 1.

Table 5.3 (continued) Evidence for the use of beakers and other vessels.

The analysis of the presence or absence of charred residues on the Corded Ware settlement site ceramics from Noord-Holland led to some very interesting results. One of the most striking conclusions was that particularly the thin-walled ware showed charred residues indicative of cooking. Of the thin-walled (5–7.5 mm) sherds, 38% shows cooking residues, whereas of the medium-thick-walled (8–8.5 mm) or thick-walled (9–10.5 mm) sherds, just 24% have these residues. Thus 65% of the sherds with residues are thin-walled. Possibly even more striking is that the cord-decorated beakers, those similar to beakers found in funerary contexts in large parts of Europe, were often used for cooking (table 2.4). Of the cord-decorated sherds, 56% show evidence for cooking. Vessels with spatula decoration (35%) and vessels with fingertip-decoration (34%) were less frequently used for cooking (table 2.4).

Oudemans and Kubiak-Martens (2012, 2013, 2014) analysed the residues for a total of 57 vessels from Keinsmerbrug (16), Mienakker (16) and Zeewijk (25) as part of the Odyssey project. A combination of archaeobotanical analysis (with the use of SEM microscopy) and chemical analysis (by means of DTMS) was applied (Oudemans and Kubiak-Martens, 2012, 2013, 2014). This analysis showed that at Mienakker and Zeewijk a variety of often well-processed meals were prepared (Oudemans and Kubiak-Martens, 2013, 2014). At Keinsmerbrug just one type

of meal was prepared: emmer porridge with fat (Oudemans and Kubiak-Martens, 2012). Neither botanical nor chemical evidence for alcohol was found.

From the analysis of the use of ceramics at Corded Ware settlements in Noord-Holland, it can be concluded that especially those vessels that are similar to vessels found in other Corded Ware regions were used for cooking. The often undecorated medium to large vessels (which are very common in the coastal zone but not outside that region) show residues far less often. These vessels may have been used as storage vessels. Vessels may of course also have had more than one function; cooking vessels may have been used for storage as well and the other way around. No evidence of alcohol was found, however, in either the cord-decorated and spatula-decorated thin-walled ware or in the medium-thick-walled and thick-walled vessels that are part of a regional tradition on the Corded Ware settlements in Noord-Holland.

5.3.6.5 Comparing the use of beakers between settlement and funerary contexts in the Netherlands

Analysis of the use of Corded Ware ceramics from settlement sites in Noord-Holland showed that beakers, often with cord decoration, were most often used as cooking vessels. The dominant hypothesis in the literature regards these beakers as alcohol drinking vessels. Theoretically, the inhabitants of the settlements in Noord-Holland may have used the Corded Ware beakers in a way that deviated from the way in which they were used elsewhere. Alternatively, the alcohol hypothesis itself could be incorrect all together. In order to test which option is most plausible, the indications for use of beakers from another region and for different contexts were also analysed. This comparison includes 96 Corded Ware beakers from (possible) funerary contexts from the eastern part of the Netherlands.

It proved difficult to study traces of use on Corded Ware funerary vessels from the eastern part of the Netherlands. This is due to three reasons. The first problem concerns the depositional context. The majority of the funerary contexts are found in the sandy parts of the Netherlands and thus suffer from preservation problems. Second, the vast majority of the funerary contexts were excavated in the (first half of the) previous century and information on the graves and associated grave goods either was not documented or has gone missing. Third, many of the beakers were complete or nearly complete and were both cleaned and reconstructed for museum display. Often the beakers show signs of brushing, lumps of glue, filling in of missing parts and even painting. It is unclear whether (charred) residues were not present at the time of deposition or whether they were present at some point but are now no longer present due to preservation circumstances, the excavation method or the post-excavation treatment.

The use of vessels was studied in two ways: indications of use were mainly studied by visual inspection in archaeological storage facilities (87 vessels). A further 9 specimen could be added through the study of literature e-depots or personal contacts. While the majority of these beakers (86) did not show any residues or showed only uncertain residues (table 5.4), 10 beakers from graves did show charred residues that likely indicate cooking (table 5.5).

The majority of the vessels found in the graves studied are beakers (tables 5.4 and 5.5), but bowls, amphorae, miniature beakers and a spoon have also been found. None of these show charred residues (table 5.4).

The 96 beakers are most often decorated with spatula imprints, and the motifs resembling Van der Waals and Glasbergen (1955) types 1b, 1d and 1e occur most frequently. Cord-decorated vessels are far less frequently present in graves from the eastern part of the Netherlands. Of the 10 beakers with charred residues that

may indicate cooking, 9 are decorated with spatula imprints. They comprise Van der Waals and Glasbergen (1955) types 1b (n=4), 1d (n=3) and 1e (n=2).

In the literature, the use of alcohol is often linked to a specific gender or group (section 5.3.6.2). It is therefore also interesting to know the contexts of the beakers with cooking residues, as their presence in both male and female graves would argue against the perceived link between alcohol and males (part of a warrior band and/or an elite). Unfortunately, of these beakers with residues, little is known in terms of their find context (table 5.5). Several beakers with residues show associated grave goods. Tumulus II at Borger yielded a Van der Waals and Glasbergen (1955) type 1b beaker found in association with two axes, one flint axe and one diabase (Schoneveld, 1988) (table 5.5). The deceased was buried on his or her right side with the head facing west. In the grave of Albergen Monnikenbraak a stone axe was found together with a plain beaker (table 5.5). The Van der Waals and Glasbergen (1955) type 1b beaker from Noordbarge tumulus IV is presumably associated with a flint blade. The position of the deceased in Borger tumulus II, as well as the grave goods from Borger tumulus II, Noordbarge tumulus IV and Albergen Monnikenbraak, are associated with males or even warriors (Ebbesen, 2006: p.234). However, in tumulus IV at Borger two beakers, one of Van der Waals and Glasbergen (1955) type 1b (without residue) and one of type 1e (with residue) and one amber bead were found. Jewellery is often associated with Corded Ware female burials (Turek and Černý, 2001: p.605).

Within the scope of this project it was only possible to make a preliminary inventory of the funerary vessels. Further analysis is needed and should comprise (1) a larger inventory, (2) botanical and chemical analysis of the charred residues, and (3) lipid analysis of the charred residues (indeed, lipid analysis is needed of both funerary and settlement ceramics from the Corded Ware period). Such analyses should, moreover, be executed in different parts of the Corded Ware region to outline similarities and differences in the use and social function of beakers.

Notwithstanding the limited scope of this preliminary inventory, it can already be concluded that cooking residues are also present on decorated beakers from funerary contexts in the eastern part of the Netherlands. These beakers are associated with weaponry as well as female related jewellery. These charred residues – which may indicate cooking – are thus far the only indication we have for the use of these funerary vessels. Evidence for alcohol in this region has not been documented. To summarize, the Corded Ware beakers found in graves in the eastern Netherlands and the Corded Ware beakers from settlements in the coastal zone provide no positive evidence for their use as containers for alcohol but do show evidence of having been used as cooking vessels.

5.3.6.6 New ideas on the social role of beakers and their use

Childe (1925), Sherratt (1997a) and many others have proposed that Corded Ware beakers, which are found in large parts of Europe, were used for alcohol consumption. However in the whole Corded Ware region the number of Corded Ware beakers that have clearly been used for cooking vastly outnumbers the Corded Ware beakers that have undisputedly been used for consuming alcohol (table 5.3). On the settlement sites of Noord-Holland, the thin-walled ware, often decorated with cord imprints, was most often used for cooking (table 2.4). While evidence for the use of beakers from funerary contexts in the Netherlands is mostly lacking due a paucity of research, several beakers from funerary contexts decorated with spatula impressions showed charred residues indicative of cooking (table 5.5). Although the use of beakers for cooking has been attested to in settlement as well

Site	Findnumber or location	Location (code)	Vessel type	Residue	Remarks	Study location
Anloo	no number	356-2	1b	Clean		Depot Drents museum
Anloo tumulus II	1941/I 3	360-4	1e	Clean		Depot Drents museum
Anloo, veekraal graf D	no number	356-2	1a	Clean		Depot Drents museum
Annen Holtkampen		Kast W	1e	Clean		Depot GIA
Annen Holtkampen		Kast W	Zigzag, lower part	Clean		Depot GIA
Assen, Taarloze weg	1962/V 12	356-2	1e?	Clean		Depot Drents museum
AZC Leek			1d/1e	Clean		Depot Nuis
AZC Leek			1e?	Clean		Depot Nuis
AZC Leek			Spoon	Clean		Depot Nuis
Balloo	1934/II 2	362-6	1b	Clean		Depot Drents museum
Balloo	1874/I 3a	350-4	2Ib	Clean		Depot Drents museum
Beilen	1879/IV 2	350-4	1b	Clean		Depot Drents museum
Borger tumulus IV	1985/XII 7a	355-5	1d	Clean		Depot Drents museum
De Bloemert	Trench 84, layer 1, feature 67	Plank 12-c	1d, lower part	Clean		Depot Nuis
De Bloemert	Trench 84, layer 1, feature 67	Plank 12-c	1e, rim sherd	Soot		Depot Nuis
De Paascheberg, Weerdinge	1934/IV 2	350-4	1d	Clean		Depot Drents museum
Drouwen	1939/XII 30	352-4	1a, cord and herringbone	Clean		Depot Drents museum
Drouwen	1939/XII 2	352-4	1b, miniature	Clean		Depot Drents museum
Eese		1937/V 2 and 1918/VII 69	1a with applied ridge	Clean		Depot GIA
Eese		1919, 1918/VII 106	1d	Clean		Depot GIA
Eese		1918 VII/42	2Ib, lower part	Clean		Depot GIA
Eeserveld		Kast G	Sherds	Soot?		Depot GIA
Eext	1927/XI 8	352-3	1a	Clean		Depot Drents museum
Eext	1933/III 35	352-3	1b	Clean		Depot Drents museum
Eext		Kast G	2Ib	Clean		Depot GIA
Eext		Kast G	Bowl on 6 feet, type 1e decoration	Clean		Depot GIA
Eext Galgwandenveen	1970/XII 28	Museum display	1d	Soot		Depot Drents museum
Eext Schaapsdijkweg B	1923/I 1	350-4	Zigzag	Clean		Depot Drents museum
Eext, Schaapsdijkweg	1955/XII 2	362-5	1c	Clean		Depot Drents museum
Eext, subtumulus periode I	1954/XII 3	355-5	Undecorated, Corded Ware?	Clean		Depot Drents museum
Emmen Noordbargeres I	D2012-XI-99, trench 29, feature 28	Plank 17-2	1e	Clean		Depot Nuis
Fochteloo 100 bunder	FM 1968-XII-1	Kast G	1b	Clean		Depot GIA
Gardensche Veld, Apeldoorn		1934/429 VIII	1d	Clean		Depot GIA
Hankenberg	1895/2 3	350-4	Amphora	Clean		Depot Drents museum
Hattermerbroek, bedrijventerein zuid, graf 1	5155		1b	Soot? No charred cooking residues	Personal communication Meurkens	Literature: Drenth and Meurkens, 2011: fig. 5.17
Hattermerbroek, bedrijventerein zuid, graf 2	9249		Plain	Soot? No charred cooking residues	Personal communication Meurkens	Literature: Drenth and Meurkens, 2011: fig. 5.13
Hattermerbroek, bedrijventerein zuid, graf 3, vlak 4	7878		1d/1e	No charred cooking residues	Personal communication Meurkens	Literature: Drenth and Meurkens, 2011: fig. 5.33
Hattermerbroek, bedrijventerein zuid, graf 3, vlak 4	7879		Zigzag	Soot? No charred cooking residues	Personal communication Meurkens	Literature: Drenth and Meurkens, 2011: fig. 5.34
Havelte graf VI	1972, 101	Kast G	1b?	Clean		Depot GIA
Hijken settlement	1970/X 81	Museum display	1a with cord and herringbone	Clean		Depot Drents museum
Hijkerveld flatgrave		Kast G	Beaker, plain small	Clean		Depot GIA
Hijkerveld flatgrave		Kast G	Bowl, undecorated	Clean		Depot GIA
Hijkerveld graf V		Kast G	1b	Clean		Depot GIA
Hijkerveld graf VIII		Kast G	1e	Clean		Depot GIA
Hijkerveld graf VIII		Kast G	Sherds	Soot?		Depot GIA
Hooghalen	1880/VII 5	352-5	1b	Clean		Depot Drents museum
Hooghalen	1880/VII 4	Museum display	1b	Clean		Depot Drents museum
Hooghalen	1880/II 3	350-4	1d	Clean		Depot Drents museum
Kruidhaarsveld	1935/XI 10	361-6	1e	Clean		Depot Drents museum
Noordbarge	824	Kast G	1d, small	Soot?		Depot GIA
Noordbarge Hoge Lo		Kast G	Undecorated	Soot?		Depot GIA
Noordbarge Hoge Lo		Kast G	Undecorated, miniature	Clean		Depot GIA
Noordbarge Hoge loo, graf I	1972	Kast G	1e?	Clean		Depot GIA
Noordbargeres spoor 29	D2012-XI-108	Plank 17-2	Zigzag	Clean		Depot Nuis
Peeloo	1935/X 8	352-4	1b	Clean		Depot Drents museum
Peeloo	1935/X 8a	352-4	1b	Clean		Depot Drents museum
Peeloo	1935/X2	361-4	1e	Clean		Depot Drents museum
Putten, road to Ermelo		1934/425 VIII	1a	Clean		Depot GIA
Putten, road to Ermelo		Kast U	1b, sherd	Clean		Depot GIA
Putten, road to Ermelo		1934/427 VIII	1d	Clean		Depot GIA
Putten, road to Ermelo		1934/426 VIII	1d	Clean		Depot GIA
Putten, road to Ermelo		1934/428 VIII	1d, mini	Clean		Depot GIA
Putten, road to Ermelo		1935/4 XII	Type ?	Clean		Depot GIA
Rhee	1936/I 50	352-4	1b	Clean		Depot Drents museum
Roden	1933/XI 1	352-4	2Ib	Clean		Depot Drents museum
Ruinen, Galgenberg	1942/I 2	356-2	Amphora	Clean		Depot Drents museum
Site unknown	1956/X 7a	355-5	1a	Clean		Depot Drents museum
Site unknown	1935/VIII 3	352-3	1d	Clean		Depot Drents museum
Sleen		Kast G	Sherds from lower part of beaker	Soot?		Depot GIA
Speulde, Ermelo		1934/430 VIII	1a	Clean		Depot GIA
Tienelweg bij Dennenoord	1936/II 1	352-4	1b	Clean		Depot Drents museum
Voorst Twello			?	No charred cooking residues	Personal communication Meurkens	
Vredenheim	1940/VII 2	355-5	1a	Clean		Depot Drents museum
Weg Rolde Grolloo	1907/X 2	350-4	Zigzag	Clean		Depot Drents museum
Zeijen, Jodenbergje	1934/I 10	Museum display	1b	Clean		Depot Drents museum
Zeijen, Jodenbergje	1934/I 7	352-3	1b, with ear	Clean		Depot Drents museum
Zeijen, Jodenbergje	1934/I 8	352-3	1e	Clean		Depot Drents museum

Table 5.4 Funerary vessels without cooking residues.

Site	Findnumber or location	Location (code)	Vessel type	Residue	Remarks	Study location
Zeijen, Noordscheveld	1925/IX 8	361-6	1b	Clean		Depot Drents museum
Zeijen, Noordscheveld	1925/IX 9	352-3	1c	Clean		Depot Drents museum
Unknown	1927/39 VI	Plank 17-2	1b	Clean		Depot Nuis
Unknown	1969-I-3	Box 3046	1d sherds	Clean		Depot Nuis
Unknown	D2012-XI-147	Plank 17-2	Zigzag	Soot?		Depot Nuis
Unknown		Kast B	Zigzag, sherds	Clean		Depot GIA
Unknown	224/38	Plank 17-2	Plastic band at rim with two rows of oblique oval imprints in herringbone pattern.	Clean		Depot Nuis
Unknown	FM 1970-IX-18	Box 3046	Sherds, cord-decorated and undecorated.	Clean		Depot Nuis
Unknown	D2010-IX-7		Sherds, two decorated	Two sherds with a brown layer on the inside and outside. Silt?		Depot Nuis

Also part of the metrical analysis

Table 5.4 (continued) Funerary vessels without cooking residues.

Site	Findnumber or location	Location (code)	Vessel type	Residue	Find location	Associated finds	Literature	Study location
Ermelo, Groevenbeekse heide	OKT 257		1b	Residue	Flat grave	Unknown	Van Sprang, 1993: fig. 41.	E-depot Overijssel
Noordbarge graf IV	459	Kast G	1b	Residue. Cooking or iron?	Excavation 1972	A flint blade with the same findnumber is present in the same find box.	Lanting, 2007/2008: p.183-184	Depot GIA
Hijken	1953/VII 6	362-5	1b	Soot or charred residue	Unknown	Unknown		Depot Drents museum
Borger tumulus II	1984	Kast DD	1b	Small patches of residues	Tumulus II, in this tumulus the deceased was buried on its right side, head facing west.	Two axes, one flint axe and one diabase	Schoneveld, 1988	Depot GIA
Ermelo, Groevenbeekse heide	1934/VIII.426		1d	Residue	Unknown	Unknown	Van Sprang, 1993: fig. 57a.	Van Sprang, 1993: fig. 57a.
Eext Vijzelkampen	1937/VI 118	352-4	1d	Residue. Cooking or iron?	Beaker from a sandpit, find circumstances unknown, possibly a grave.	None	Jager, 1985: p.230-231 and fig. 37	Depot Drents museum
Anloo	1952/XII 1	355-5	1d, zoned	Soot or residue	Tumulus with two graves, the beaker was found in grave 1.	None	Jager, 1985: p.207-209 and fig. 12	Depot Drents museum
Ermelo, Groevenbeekse heide	e 1949/3,1		1e	Residue	Unknown	Unknown		E-depot RMO
Borger tumulus IV	1985/XII 7b	355-5	1e	Residue. Cooking or iron?	Tumulus IV, in this tumulus two beakers were found, a large and clean type 1b beaker (1985/XII 7b) and this type 1e beaker.	Amber bead	Schoneveld, 1988	Depot Drents museum
Albergen, Monikenbraak	POM 52		Plain	Residue	Disturbed tumulus with charred bones.	Stone axe		E-depot Overijssel

Also part of the metrical analysis

Table 5.5 Funerary vessels with cooking residues.

as funerary contexts, this may be a regionally specific type of use. Outside the Netherlands, the evidence for the function of Corded Ware ceramics is, however, very limited as well. One example of the use of beakers for alcohol has been found on the site of Refshøjgård in Denmark (Westermann, 2007: p.28, Klassen, 2005a-b). One example of the use of Corded Ware ceramics for food has been found on the site of Lötvreten in Sweden (Larsson, 2009: p.250).

Evidence for the use of the typical Corded Ware beakers with cord and spatula decoration for cooking thus vastly outnumbers the evidence for their use as alcohol containers. But the use of Corded Ware beakers for alcohol cannot be completely relegated to the realm of fiction until more research has been carried out.

Because the 'inevitable drinking-cups' as Childe (1925: p.223) named them were not, or in any case not exclusively, used as alcohol drinking cups, the social role related to this alcohol hypothesis should also be reassessed. Alcohol has been linked to both martiality, individualisation and elites. The presence of beakers in the graves of males who have been interpreted as warriors has led to the suggestion that communal drinking rituals were held (Vandkilde, 2006: p.411). However, this study has shown that cord-decorated beakers were used as cooking vessels at Corded Ware settlement sites in Noord-Holland. Furthermore, it has shown that several spatula-decorated beakers from graves, including examples from likely male graves, from other parts of the Netherlands also show charred cooking residues, whereas indications of alcohol remained absent. Therefore it can be concluded

that neither the alcohol hypothesis nor the social roles associated with it can be substantiated.

Corded Ware beakers were previously seen as the symbol of a period with ‘unusual social and economic change’ and as associated with a ‘social lubricant’ (alcohol) for forming a new social fabric (Sherratt, 1997a: p.392). In other interpretations, these beakers were seen as symbolising a source of power (Childe, 1925: p.223) or martiality (Vandkilde, 2006: p.411). All these interpretations seem less likely now that this study has shown that these beakers were used for everyday situations (cooking) and were discarded all over the studied settlements.

Since beakers were found scattered all over settlements and were found in both male and female graves, they cannot be seen as (the exclusive) symbol for alcohol drinking events of bellicose warriors. Furthermore, the overwhelming indications for the use of beakers as cooking vessels suggests a completely different use and social role. It is proposed here that the use of these beakers for an important daily task – namely, cooking – reflects the value that is attached to these beakers as symbols of the supra-regional Corded Ware network. The use of these beakers as grave goods similarly expresses this importance.

5.4 Corded Ware ideology

Inferring the ideology of past societies, that is, the coherent system of ideas about human relationships and the organization of society, through archaeology is difficult. Ideology can, nevertheless, be expressed in the (predictable) behaviour of humans, and it is this behaviour that can be studied archaeologically. Expressions of ideology can be both material and immaterial. Ceramics, their production, their use and their discard also reflect human behaviour and can thus be used to infer aspects of the ideology of (past) societies.

Traditionally, the ideology of the Corded Ware Culture has been interpreted as being the result of, and reflecting the changes in, the economy and (new) social order (Sherratt, 1997b: p.424, Turek, 2012: p.197, Müller *et al.*, 2009: p.140). Sherratt (1997b: p.424) proposed that the new economy, based on mobility and smaller groups, led to rituals reflecting opportunity and mobility. According to Turek (2012: p.197), new farming technologies are reflected in rituals utilizing bulls’ heads and solar symbolism. Graves in which the deceased is buried in a crouched position under a burial mound with a set of gendered grave goods are often seen as an important element of the Corded Ware Culture and are said to express (new) gender roles and social diversification (for example, Sherratt, 1997b, Turek, 2012, Hübner, 2005). The majority of reconstructions of Corded Ware Culture ideology are based on grave goods. Turek (1997: p.236) was one of the few who published ideas on Corded Ware ideology based on settlement data. He stated – based on the scarcity of pits – that there were ideological rules against digging into the ground (Turek, 1997: p.236).

While at the supra-regional level Corded Ware ideology may have centred around solar symbolism and bull symbols, in our dataset no evidence for this was found. Furthermore, because the Noord-Holland Corded Ware settlements contained various pits, Turek’s ‘no digging’ rule appears not to have been in place and/or adhered to (Van Heeringen and Theunissen, 2001). In other regions indications for digging exist as well: the huts found at Wattendorf-Motzenstein and Switzerland all show a sunken floor as part of the house (Müller *et al.*, 2009: p.140).

The Corded Ware settlements in the Dutch coastal zone thus do not reflect the literature on Corded Ware ideology, and neither do the graves in this region. Corded Ware funerary monuments, or ‘monument of the radical changes’ as Hübner (2005) labelled them, are completely lacking in the Noord-Holland Corded Ware

region, as are strong indications for a change in the economy and a new social order with social diversifications and indications for an ideology reflective of this. Evidently, the current reconstructions of the supra-regional Corded Ware ideology do not fit the studied Corded Ware settlements in Noord-Holland.

On the basis of the ceramic analysis, new ideas on Corded Ware ideology in the Dutch coastal zone as well as in other regions can be formulated. The material culture, for example, in part reflects strongly normative behaviour: The use of two types of ceramics, a medium-thick-walled and thick-walled variety rooted in older regional traditions and a new, thin-walled type similar to ceramics used in a large supra-regional area are a reflection not only of social organisation but also of ideology.

The local production and use of supra-regional beaker types decorated with cord and spatula imprints should not just be viewed as a reflection of the large exchange network. Beakers were indisputably also a symbol or a material expression of the ideology connected to the importance of this exchange network. By using beakers for important daily tasks as well as in the funerary ritual of both males and females, the importance of these supra-regional ties was stressed. The use of medium-thick-walled and thick-walled ceramics that are part of an ongoing regional tradition also had symbolic and ideological value. By using these ceramics, people were stressing their regional connections and roots. The ceramic assemblages found on Corded Ware settlement sites in the Dutch coastal zone are thus not only a practical assemblage used for food storage, production and consumption; they simultaneously functioned as symbols. The ceramics reflect an ideology in which aspects of traditionality and regional roots as well as supra-regional contacts and exchange were similarly important.

5.5 New ideas on Corded Ware society

The results of the current analysis of well-preserved Corded Ware settlements from Noord-Holland and the use and discard of their ceramic assemblages has made a major contribution to our knowledge of Corded Ware society. Prior to this study, Corded Ware society was mainly reconstructed based on funerary contexts. The current research shows that there was not one uniform Corded Ware society sharing the same technology, subsistence, economy and social organisation and ideology across all parts of the large Corded Ware area (extending from Scandinavia to Switzerland and from the Netherlands to Russia). On the contrary, there seems to have been huge variation between different groups who were united by their use of cord-decorated and spatula-decorated beakers.

In Noord-Holland, Corded Ware society can be characterised as having a subsistence strategy that was very well adapted to the diverse local landscapes and combined the growing of crops with the keeping of animals, hunting, fowling, fishing and the gathering of wild plants and shell fish (Drenth *et al.*, 2008: p.158, Kleijne *et al.*, in prep.). The settlements were organised in a system combining larger and smaller sites in order to exploit the environment to its fullest. This was not a revolutionary new lifestyle but, rather, a continuation of older strategies; as such, it included older technologies, such as the plough. Indications for individualisation and the rise of elites were not found; however, at least at Keinsmerbrug, indications for cooperation, in the form of the hunting parties and feasts, were found.

The studied ceramics reflect a society with both ongoing regional traditions and supra-regional contacts. The presence of locally produced supra-regional types in combination with local vessels reflecting older regional traditions is here argued to be an indication of diffusion. Isotope studies provide direct evidence for mobility

of individuals during the Corded Ware period (Haak *et al.*, 2008: p.18229, Chenery and Evans, 2011a: p.32, 2011b: p.87). Ceramics, unfortunately, do not provide direct evidence for mobility. It is likely, however, that the supra-regional exchange network included not only an exchange of goods, ideas and technologies but also the movement of individuals or small groups.

Furholt (2014: p.5, 15-16) concluded that the Corded Ware Culture was not a totality, but

“rather a set of types which show a wide distribution, but which are always integrated into a locally specific and thus regionally variable context.”

Furholt (2014: p.16) explains the wide distribution of these supra-regional types in terms of an increase in mobility as a result of the long-term effects of technological innovation. These ideas do fit the observed patterns found on the settlements in Noord-Holland very well. The ceramics assemblages contain both beakers with a wide distribution and a medium-thick-walled and thick-walled ware that reflects regional traditions.

The uniform picture of Corded Ware society having the same subsistence strategy, technology, economy, material culture, social organisation and ideology across the Corded Ware area now seems to be an untenable caricature. There never was *one* Corded Ware subsistence strategy, and it is here concluded based on the current research that the links between landscape and subsistence were stronger than those between material culture and subsistence (section 5.2.2). Furthermore, Corded Ware Culture did not arrive as a package of new technologies and new material culture. The settlements in Noord-Holland do not show indications of radical changes in the social organization, such as an increased individualization or the rise of elites and martiality.

Evidence for Corded Ware beakers having been used for the consumption of alcohol (Childe, 1925: p.223, Sherratt, 1997a: p.392) is limited to one example, namely, at the site Refshøjgård in Denmark (Westermann, 2007, Klassen, 2005a). Evidence from the settlements in the Dutch coastal zone as well as in the graves in the eastern Netherlands indicates that these beakers were primarily used for cooking. Beakers were not a symbol of individualisation and martiality; their use in important daily tasks as well as in the graves of both males and females reflects their role as symbols of Corded Ware inter-societal interactions within the supra-regional contact networks.

It can safely be concluded that there is no such thing as *one* Corded Ware society. In the period between c. 2900 and 2200 BC, the different peoples inhabiting the area bounded by and including Scandinavia and Switzerland and the Netherlands and Russia all seem to have had regionally specific subsistence strategies and economies. There are differences in the material culture and in settlements and graves, and society was organised differently. At the same time, these different groups have several shared elements, such as the use of beakers with cord and spatula decoration. The supra-regional contacts were used to exchange goods, ideas, skills, technologies and likely people. Partaking in this supra-regional Corded Ware network was considered very important, and this importance was expressed by using beakers with supra-regional affinities in daily activities, such as cooking, as well as in funerary rituals.

Conclusions

6.1 Introduction

A phenomenon was haunting Europe, the phenomenon of Corded Ware. This is not an original first sentence, as the Communist Manifesto by Marx and Engels (1979 (1848)) starts by stating: “*A phantom (or spectre) is haunting Europe, the phantom of communism.*” But while it may not be very original, the imagery seems very pertinent. Between c. 2900 and 2200 BC in a large area of Europe—stretching from the Netherlands to Russia and from Scandinavia to Switzerland—very comparable traits, including cord-decorated and spatula-decorated beakers, battle axes and individual burials under mounds, are seen. The first line of the manifesto is all the more applicable because, while the material culture is known, the people to whom these items belonged remain an enigma, a phantom. Finally, this line is suitable since one of the first (and certainly the most influential) reconstructions of the Corded Ware Culture was made by Gordon Childe, who implicitly (and sometimes more explicitly) based his theories and reconstructions on Marxism³⁷ (Childe, 1979, Gathercole, 2009).

Gordon Childe (1929: p.158) described the Corded Ware people as

“a wandering race of hunters and pastoralists. They appear as pre-eminently martial folk: yet, whether by plunder or trade, they were able to secure products of distant lands... These conquering battle-axe wielders exerted a profound influence wherever they went.”

After almost a century of research, the amount of material remains relating to the Corded Ware Culture has increased immensely. The main research questions, however, has remained the same: how can we make these invisible people visible? The grand narrative on the Corded Ware Culture proposed by Gordon Childe has not only been of major and lasting influence on later reconstructions of this culture, it has also sparked many debates.³⁸ Holmqvist-Saukkonen *et al.* for example (2013, p.63) defined the Corded Ware Culture as:

“(A) revolutionary culture linked with a new way of life (cattle breeding), settlement patterns, burial practices and material culture that replaced the ‘traditional’ Neolithic culture forms...”

37 This chapter presents just a short introduction to Childe’s work in the context of Marxist archaeology. For a more extensive overview and/or review of the work of Childe, see Trigger (1980), McNairn (1980), Sherratt (1989, 1997–1998), Harris (1994), McGuire (2002, 2006), Faulkner (2007) and Saville (2009). For an overview and/or review of Marxist archaeology, see Spriggs (1984), McGuire (2002), Patterson (2005) and Faulkner (2008). This short introduction to Childe and Marxist archaeology draws heavily on these titles as well as on the works of Childe, Marx and Engels themselves.

38 For an outline of the influence and debates Childe sparked see chapter 1.

This and many other current models are either based on (elements of) the grand narrative by Gordon Childe or are a response to (aspects of) this narrative. It is therefore interesting to use the results from the current study to test the theories and narrative of Gordon Childe, using the ceramics from a group of well-preserved Corded Ware settlements from a tidal area in Noord-Holland.

6.2 Gordon Childe: Theoretical background and the first grand narrative of the Corded Ware Culture

6.2.1 Theoretical background: A Marxist concept of history

“Our dumb relics and monuments can never reveal the names of prehistoric chieftains, the dreams of seers or the issues of individual battles. But they can be made to disclose the economic organisation of a people and a period. We can determine how a given group got its food, how far labour was specialised, what part commerce played in the community’s life, what geological, botanical and chemical knowledge the hunters, farmers and craftsmen were applying in their several pursuits. That is what is disclosed when we study a culture, not as a dead group of fossils or curios but as a living, functioning organism.” (Childe, 2004a (1935): p.36)

This quote indicates the possibilities as well as the limitations Childe envisioned in studying prehistory. Moreover, the quote shows the starting point Childe took for reconstructing past societies: the economy. Childe explicitly uses the Marxist materialist concept of history and, in his own words (Childe, 1979: p.93), takes

“a material, biological fact as the first clue to discovering the general pattern underlying an apparent chaos of superficially unrelated events. It starts from the obvious truth that men cannot exist unless its members can secure enough food to stay alive and reproduce.”

So the direct starting point for Childe is existence itself and the way in which people secure their existence (McNairn, 1980: p.162). This subsistence strategy, in turn, is seen as being determined by both the environment (including natural resources and climate) and by science and technology, or the knowledge used to exploit the environment (Childe, 1979: p.93, McNairn, 1980: p.119-120).

In Childe’s work theoretical concepts are of major relevance. The first is that of dialectics.³⁹ The historical process is seen as a dialectical process, and history is, according to Childe (1979: p.93),

“not a mere succession of inexplicable or miraculous happenings, but ... all the constituent events are interrelated and form an intelligible pattern.”

So although the process of history is neither predetermined nor a linear development, it does produce a pattern (Childe, 1979: p.93, Parker Pearson, 1984: p.60). Marx stressed the contradictions and the difference between appearances and reality (Patterson, 2005: p.8). Childe (1979: p.94) used the concept of dialectics to study the complex relations of the organisation of society.

Before looking in more detail at the mode of production that lies at the core of Childe’s concept of history, it is worth stressing that Childe himself did not view history as predetermined (Childe, 2004g (1958): p.195-196). The title

39 The concept of dialectics, like many concepts, notably Marxist concepts, has been strongly debated, and various definitions have been formulated. For a discussion of various (Marxist) definitions of the concept of (materialist) dialectics in the study of (pre)history, see, for example, Patterson’s 2005 work (p.8).

of Childe's 1951 book, *Man makes himself*, reveals that Childe embraced the (Marxist) concept of agency to explain what happened in prehistory. This process was outlined by Marx (2009 (1852): p.9) as follows:

“Man makes his own history, but he does not make it out of the whole cloth, he does not make it out of conditions chosen by himself, but out of such he finds close at hand. The tradition of all past generations weighs like an Alp upon the brain of the living.”

Furthermore, Marx and Engels proposed (1956 (1844): p.125):

“History does nothing, it ‘possesses no immense wealth’, it ‘wages no battles’. It is man, real, living man who does all that, who possesses and fights; ‘history’ is not, as it were, a person apart, using man as a means to achieve its own aims; history is nothing but the activity of man pursuing his aims.”

These two quotes illustrate that Marxist history is the (materialist) history of man, the history of acting individuals, with individuals acting within their given material circumstances. For Childe (1979: p.93), this translated into the position that “*man makes himself*” and that

“The historical process is not a mere succession of inexplicable or miraculous happenings, but that all the constituent events are interrelated and form an intelligible pattern. But the relations are not conceived mechanically. The process is not repetitive or predetermined.”

Although agency is also a concept much used in current, post-processual, archaeology, the definition of the concept is different there.⁴⁰ Whereas in post-processual archaeology the focus lies on active individuals, Childe used a ‘dialectic approach of agency’ and took the material conditions and social relations of these individuals into account (McGuire and Wurst, 2002: p.88-89, McGuire, 2012: p.78). The difference may be illustrated by means of an example: The invention of new tools may in a post-processual concept be seen as the actions of a single individual, whereas Childe sees this invention as a social product as well (2004d (1947b): p.91).

Although Childe adopted a materialist view, this was not a deterministic materialism in which matter would always steer mind (Childe, 1950c: p.4, 14-15, Kus, 1984: p.101-104). Rather, Childe adopted the Marxist concept of true and false consciousness (McNairn, 1980: p.139, Trigger, 1980: p.139, Kus, 1984: p.101-104, Trigger, 1994: p.22). This concept explains why humans do not always act as we would expect; how human beings perceive their situation does not necessarily accurately or truly reflect that situation (Trigger, 1980: p.139).

In addition to the concepts outlined above, Childe also used the concept of totality to describe the top regional unity of cultures, with shared supra-regional elements as well as regional differences. The Corded Ware Culture is seen by Childe (1958: p.140) as such a totality. In recent years the word totality has acquired a negative connotation and has been perceived as a static generalisation. However, the Marxist use of the concept of totalities does not perceive a totality as fixed; rather, it describes “*dynamic sets of facts and their interrelations*” (Patterson, 2005: p.8-9).

Thus the concept of totality is used to describe unities, but these unities are formed by contradictions in dialectical relations (Patterson, 2005: p.8-9).

40 The various concepts of agency are discussed by Callinicos (2006: p.1-4).

6.2.2 Mode of production

For Childe, reconstructing the mode of production (or economy) was key to understanding past societies (Childe, 2004a (1935): p.36, 2004c (1947): p.90). As Marx (1975 (1876): p.118) defines it in *Capital*:

“It is not only what is made but how and by what instruments of labour that distinguishes different economic epochs. Instruments of labour not only supply a standard of the degree of development that human labour has attained, but they also indicate the social relations in which men work.”

The mode of production is the combination of the forces and the relations of production (Marx, 1993 (1939): p.85, McNairn, 1980: p.124, 150-151, Kus, 1984: p.104, Callinicos, 2005: p.41). These forces of production can be defined as the work itself and how that work is performed, the labour power and means of production (Marx, 1999 (1859): p.4, Childe, 2004i (1958): p.194, Callinicos, 2005: p.54, Patterson, 2005: p.20). The relations of production, in turn, are the economic relations; the relations of (classes of) people over the productive forces (Patterson, 2005: p.21, Callinicos, 2005: p.54). Knowledge of the economy would also enable archaeologists to infer the social organisation and the beliefs of people (Trigger, 1980: p.96). As Childe proposed (2004i (1958): p.196): *“The archaeological data are interpreted as the fossilised remnants of behaviour patterns.”* The mode of production or the economy formed the base or foundation of society. On top of this base arises the ‘superstructure’, consisting of the ideology and social, legal and religious institutions (Marx, 1999 (1859): p.4, McNairn, 1980: p.35, Patterson, 2005: p.43). Childe (1979: p.93) proposed that *“The way people get their living should be expected in the long run to ‘determine’ their beliefs and institutions.”* However, these ideas should not be used mechanically or rigidly, and the superstructure can, in turn, also influence the economic base (see section 6.2.4 on change; McNairn, 1980: p.151, Shanks and Tilley, 1987: p.167). Ideology was seen by Childe as functioning as a lubricant for the working of society and for holding society together (McNairn, 1980: p.110).

6.2.3 Culture

According to Childe, culture was (2004c (1947a): p.82) *“undeniably”* a most significant subject for archaeology, presenting archaeologists with the opportunity to study past societies. Childe’s own concept of culture notably changed during the course of his career (Childe, 2004c (1947a): p.82, Patterson and Orser, 2003: p.8-9, Patterson, 2005: p.43). In his earlier work (Childe, 1929: p.v-vi), culture is described as follows:

“We find certain types of remains—pots, implements, ornaments, burial rites, house forms—constantly recurring together. Such a complex of regularly associated traits we shall term ... a culture”.

In his later work Childe stressed that culture also includes the way society adapted to the environment in order to survive and expand (Childe, 2004a (1935): p.38, Childe, 1979: p.94). In his most recent work, Childe (2004e (1949): p.104) changed his views and stated that

“...culture is not a mechanical aggregate of abstracts ‘traits’ but a functioning whole, all the parts of which influence all the rest”.

His concept of culture thus changed from a normative one to a functional one (Trigger, 1980: p.40). Childe attempts to interconnect the mode of production and the base and the superstructure of society with his concept of culture (Childe, 2004b (1946): p.77). As he notes much later in his career (Childe 1979: p.95),

“A Marxist prehistorian will aim at deducing from the assemblage he calls a culture a detailed picture of a working economic organisation.”

The relationship between mode of production and culture is not simple (Patterson, 2005: p.19-20, p.43). Patterson (2003: p.43) proposes that Childe saw material culture as belonging to the economic foundations, whereas the symbolic aspects of this culture would belong to the ‘ideological superstructure’. Childe therefore criticises those prehistorians who only classify artefacts without taking the mode of production into account (Childe, 2004c (1947): p.90).

Tools are an important part of material culture, seen by Childe as both (1) a functional means of coping with nature and (2) expressing both the scientific knowledge and the social traditions of society (Childe, 2004d (1947): p.99, Trigger, 1980: p.95, 180). Since tools are the product of social and economic conditions, tools can also be used to study the economic and social aspects of society (Childe, 1950c: p.2, Trigger, 1980: p.136). The technology of tools needs to be studied because it is this technology that can enhance our understanding of the forces and relations of production (Trigger, 1980: p.145).

6.2.4 Change

For Childe, understanding the past economy was central to explaining past societies, and contradictions between the forces and relations of production were perceived as the motor for change (Patterson, 2005: p.43, Trigger, 1980: p.97). Progress in the forces of production, for example because of new inventions, could lead to contradictions with the relations of production and ownership, and this, in turn, could lead to change and revolution (Parker Pearson, 1984: p.62). Revolution is thus the adjustment of the relations of production to the forces of production (Trigger, 1980: p.131, 175, McNairn, 1980: p.125). However, change and revolution are not inevitable; the superstructure, the social and ideological organisation, can enable as well as counter change (Trigger, 1980: p.99, 121-122, McNairn, 1980: p.125, 127, McGuire, 2006: p.66). As outlined above (section 6.2.1) according to Childe (1979: p.93), history was made by active agents, and there are thus no universal laws for the progress of history. Therefore unilinear evolutionism and economical and technological determinism, using the presence of technologies or the economic organisation to explain both the base and the superstructure of societies, will not work (Trigger, 1980: p.121-122, 132, 173, McNairn, 1980: p.125, Parker Pearson, 1984: p.62-63).

Change, new ideas, techniques and cultural traits could come from both within and outside societies (Trigger, 1980: p.102). During earlier parts of his career Childe stressed the importance of the external factor of migration. Changes occurring due to an influx from outside societies, that is, migrations, were a factor that could explain change in a region (Childe, 1950b). In early culture-historical reconstructions of specific prehistoric cultures, migration often played a dominant role in explaining change. However, Childe (2004c (1947): p.82) later also stated that migrations are *“only incidents, perhaps even minor incidents”*.

During this later part of his career, Childe stressed the importance of diffusion alongside internal factors (Childe, 1958: p.195, Trigger, 1980: p.44-49, 102-104, McNairn, 1980: p.105-110, Gathercole, 2009: p.185). Diffusion was defined as the transmission of ideas (Childe, 2004a (1935): p.39, 1979: p.95) and was seen

as the pooling of human experience or the process of communities borrowing devices and processes from their neighbours (Childe, 2004a (1935): p.39, Trigger, 1980: p.44, McNairn, 1980: p.106). Childe (2004c (1947): p.86) stated: “*I believe that technological progress is closely bound up with intercourse, the exchange of ideas between societies.*” The very last line of Childe’s (1979: p.95) article titled “Prehistory and Marxism” reads: “*So prehistory may, after all, in a Marxist sense be the history of thought.*” Thus Childe saw the exchange of ideas—or thoughts—as an important motor behind changes in prehistory.

6.2.5 Ideas on the Neolithic

Now that the different elements of Childe’s theoretical—that is, Marxist—views have been outlined, it is time to see how he used these concepts to reconstruct the Neolithic. It is not surprising that the starting point for Childe’s reconstruction of the Neolithic was materialistic: its economic base. The change from food gathering to food production was seen by Childe as the main element of the Neolithic revolution (Childe, 2004g (1954): p.159, McNairn, 1980: p.92). The revolutionary aspect was reflected not so much in the pace of change, but in the change itself: the transformation was seen as a slow process, yet the changes were seen as profound and irreversible, as they gave humans control over the food supply (Childe, 1951 (1936): p.59, Patterson, 2005: p.47). The mode of subsistence was transformed due to the technological innovations of food production (Patterson, 2005: p.44).

The mode of production of Neolithic communities was seen by Childe as being a self-sufficient one: households all produced their own food, tools, ceramics and clothes (Childe, 2004a (1935): p.33, McNairn, 1980: p.83-84). This self-sufficiency, however, does not imply that communities were isolated. On the contrary, Childe (2004f (1952): p.119) proposed that “*No known Neolithic community was in fact, content to rely exclusively on local material.*” These contacts were seen as vital for diffusion and thus progress (Patterson, 2005: p.48). Nonetheless, communities did not rely on this exchange, and there was no regular division of labour (Childe, 1979: p.94).

Surplus production was seen by Childe (1950a: p.6, 1951 (1936): p.63) as an important aspect of the new Neolithic economy. This surplus could be used to acquire products and luxury goods from other societies (Childe, 1950a: p.6, Childe, 2004g (1954): p.160). The production of surplus and the exchange between societies allegedly marked the start of a gradual process that led to changes in the superstructure. The first steps were marital mobility and itinerant experts; later full-time specialists would exist (Childe, 1950a: p.7, 1951 (1936): p.71). Thus exchanges between societies—diffusion and, later, migration of individuals—“*ultimately provided the foundations for development of intercommunal specialisation*” (Childe, 1951 (1936): p.74).

These specialists not only produced goods; they were also essential for creating the ideology and for spreading new ideas between communities (Childe, 1951 (1936): p.74). Thus both the economic base and the superstructure changed. When the exchanged products are luxuries,

“Few would risk becoming full-time specialists: most remained farmers or hunters or fishers” (Childe, 2004g (1954): p.162, Childe, 2004h (1957): p.178).

Only when the surplus was large enough did luxuries change into necessities, which, in turn, led to revolutionary changes in the economy (Childe, 1979: p.95, Faulkner, 2013: p.13). Childe defines the differences between the Neolithic and the Bronze Age also in terms of the mode of production. Neolithic communities

are defined as “self-sufficing food-producing”, whereas Bronze Age communities imply “an economic revolution which has evoked and provided a living for specialized craftsmen and merchants” (Childe, 2004a (1935): p.33-34). During the Bronze Age, the demand for copper was a necessity that led to the formation of a group of full-time specialists (Childe, 2004h (1957): p.178, McNairn, 1980: p.85-87). This dependence on technicians from outside the local community marked the end of the self-sufficiency of the local community that was seen as characteristic for the Neolithic (Childe, 2004f (1952): p.120, Trigger, 1980: p.67).

6.2.6 Childe’s grand narrative of the Corded Ware Culture

Although in Childe’s time the Corded Ware sites excavated were few in number and the dataset mainly consisted of funerary contexts, Childe nonetheless felt confident in writing a grand narrative for this culture. The longest accounts Childe wrote on the Corded Ware Culture are published in the books *The Danube in prehistory* (1929) and *The prehistory of European societies* (1958).

Migration accompanied by the use of violence was seen as an important background to the start of the Corded Ware Culture (Childe, 1929: p.158). For example, the presence of battle axes and cord-decorated beakers in lake dwellings in Switzerland were seen as direct evidence for conquest of these previously non-beaker villages (Childe, 1929: p.158). Military competition and conquest were seen as promoting cultural development, as they prompted flexibility and heterogeneity (Trigger, 1980: p.47). In addition to migration and conquest, Childe stressed the importance of diffusion for the spread of the Corded Ware Culture (Childe, 1958: p.144). Herding provided mobility and more contacts, both of which could accelerate the spread of ideas (Childe, 1958: p.144).

The economic base was the starting point for Childe’s narrative of the Corded Ware Culture (Childe, 1929: p.145-160, 1958: p.134-135, 140-141). Childe (1958: p.134) placed the Corded Ware Culture amongst cultures he characterised as “warrior herdsman”. Corded Ware is used by him as an epithet that can be applied to a number of distinctive cultures and peoples that share certain traits (Childe, 1958: p.140). Stockbreeding was of paramount importance, and this was combined with some cereal cultivation and hunting (Childe, 1958: p.141).

Important aspects of the superstructure of the Corded Ware Culture are the rise of elites and individualisation (Childe, 1958: p.134). The growing importance of cattle led to more violence and the need for defences and leaders, as cattle could be raided (Childe, 1958: p.134). The economic system also opened up opportunities for accumulating wealth. This led to an increased need for leaders. The possibilities for acquiring wealth thus gave rise to the first economic differentiation within society (Childe, 1958: p.134). Economic power was concentrated in the hands of men (Childe, 1958: p.134).

There are regional differences between Corded Ware communities, yet these communities all shared cultural traits (Childe, 1929: p.145-155, 1958: p.140 and 144). Childe presented both an overview of shared cultural types and a short introduction to Corded Ware finds from various regions. The shared items include beakers and amphora decorated with cord impressions, and in later phases spatula impressions in herringbone patterns (Childe, 1929: p.145). Furthermore, Childe lists battle axes, blades, necklaces made from animal teeth, perforated shell discs and amber discs amongst the shared cultural items (Childe, 1929: p.145-147, Childe, 1958: p.140). Childe noted that both barrow graves and flat graves with the deceased placed in a flexed position are found in all regions (Childe, 1929: p.148-150). He also stressed differences between regions in both chronology and (material) culture (Childe, 1929: p.151-155, Childe 1958: 142-143).

The Corded Ware Culture is succeeded by the Bell Beaker Culture (Childe, 1929: p.188-201). This Bell Beaker Culture was not seen as the product of mass migrations, but as the result of the movement of small, “*well armed bands*” looking for new pastures and raw materials, including luxuries, such as gold, amber and copper (Childe, 1929: p.196, Childe, 1958: p.144). According to Childe (1925: p.222), “*The Beaker-folk was a principal agency in opening up communications, establishing commercial relations, and diffusing the practice of metallurgy.*” In the Rhine region the Corded Ware Culture and Bell Beaker Culture fused (Childe, 1929: p.188-201). This fusion led to a mixed material culture including burials, battle axes, and beakers combining Corded Ware and Bell Beaker elements (Childe, 1929: p.197, Childe, 1958: p.144, 148). In the following sections these ideas will be tested by comparing them with the results obtained in the present study as well as in other recent studies.

6.3 Confronting Gordon Childe: New ideas on the Corded Ware Culture

6.3.1 The economic base: “A wandering race of hunters and pastoralists”?

6.3.1.1 New results: Subsistence

The present study shows that the Corded Ware communities in the Noord-Holland tidal area were well adapted to the diverse landscape and used it to grow crops, keep cattle, hunt mammals, fowl, catch fish and gather wild plants and shellfish (section 5.2.2, Drenth *et al.*, 2008: p.158, Theunissen *et al.*, 2014: p.260-261). The three sites studied in detail show differences in their subsistence strategy. At Keinsmerbrug, large numbers of ducks were hunted, and this site was interpreted as a non-permanent extraction camp that was used for gatherings of people from different communities (Smit *et al.*, 2012). The other two sites, Mienakker and Zeewijk, were probably inhabited year-round and were used for a larger variety of activities (Kleijne *et al.*, 2013, Theunissen *et al.*, 2014).

To understand the Corded Ware Culture it is crucial to know not only which aspects of this culture were new, but also if there are elements that reflect a continuation of the preceding period. The subsistence strategy of the Corded Ware period is one such continuation, as it largely corresponds with that of the directly preceding period. The so-called Vlaardingen Culture also had a subsistence that can be characterised as “*an extended broad spectrum economy*”, which is a combination of keeping domesticated animals, growing crops, fishing, fowling and gathering wild plants (Louwe Kooijmans, 1993: p.102). Evidence for the use of the plough was found on Corded Ware sites as well as on older Vlaardingen and Funnel Beaker sites (Theunissen *et al.*, 2014: p.264, Goossens, 2009: p.67, Kortekaas, 1987, Overeem, 2001, Drenth and Lanting, 1997: p.56-57). The Corded Ware period has been linked with surplus production. Feasting debris may indicate such surplus production (section 5.2.2, Koch, 2003: p.15, Iversen, 2014: p.208). The gathering of people from different sites at Keinsmerbrug to slaughter large amounts of ducks can thus be an indication for surplus production (Smit *et al.* 2012: p.222).

If the economies of communities from other parts of the Corded Ware area are compared it becomes clear that in different regions the Corded Ware people adopted different subsistence strategies, which were adapted to local conditions (Klassen, 2005b, Ebbesen, 2006, Rasmussen, 2013). While in some regions pastoralism was indeed important, in other regions growing crops and/or hunting

played a more important part (Klassen, 2005b, Ebbesen, 2006, Rasmussen, 2013). Evidently, there was no single or dominant template for Corded Ware subsistence; rather, it is shown considerable regional variability.

6.3.1.2 Confronting Childe on subsistence

Childe (1958: p.141) proposed that an economy combining pastoralism, hunting and the growing of crops could be found in all Corded Ware regions. Analysis of settlement remains, however, shows that in different Corded Ware regions communities employed different subsistence strategies. Childe (1929, 1958) further proposed discontinuity from the preceding period. While discontinuity cannot be ruled out, in many regions—including Noord-Holland—there is strong continuity with the directly preceding period. Models in which economic changes, such as the introduction of the plough (Fokkens, 1998: p.487) or an extreme growth in the importance of cattle breeding (e.g. Heyd, 2013), are seen as the impetus behind the spread of the Corded Ware Culture thus cannot be confirmed.

Childe proposed that during the Neolithic new technologies allowed for the production of a surplus (Childe, 1950a: p.6, Childe, 2004g (1954): p.160). This surplus was important in Childe's narrative of the Corded Ware communities because it started a gradual process that led to more exchange, (marital) mobility and the rise of specialists (Childe, 1950a: p.7). The production of surplus is very difficult to prove with archaeological data. It is indeed correct that during the Corded Ware period techniques that *could* increase production, such as the plough, were present. However, the plough is not new to the Corded Ware period, nor can the total agricultural production or consumption (necessary for any substantiated estimate of agricultural surplus) be calculated (see section 5.2.2). Several authors have proposed that feasts (generally involving conspicuous consumption) can be seen as evidence for surplus production (Koch, 2003: p.15, Iversen, 2014: p.208). The gathering of various groups at Keinsmerbrug to catch large numbers of ducks can indeed be interpreted as evidence for such a feast (Smit *et al.* 2012: p.222). Increased exchange is seen by Childe (1950a: p.7) as a result of surplus production. The current research shows that, although exchange systems of comparable scale were in use during earlier periods as well, it was indeed very important to participate in such large supra-regional networks during the Corded Ware period. Evidently, whilst surplus production remains difficult to prove, Childe's notion that this period is one of intensive contacts—possibly facilitated by more intensified production—remains plausible.

6.3.1.3 New ideas: The rise of supra-regional contacts

Childe's ideas (1951 (1936): p.74) on the gradual increase of exchange and mobility during the Neolithic seem to fit the new data very well. The Corded Ware Culture may reflect an important step in the process towards the emergence of full-time specialists. The presence of a comparable set of (grave) goods, including battle axes and cord- and spatula-decorated beakers, across a large part of Europe, is a strong indication for contacts and exchange (see section 5.3.5; Furholt, 2014a: p.16). In Noord-Holland, the supra-regional beaker types are argued to have been produced locally (Beckerman, 2013). In addition to these local beakers, new thin-walled, medium-thick-walled and thick-walled wares are found on all Corded Ware settlements as well. Comparable vessels have been found on middle and late Vlaardingen sites (see section 3.2.3; Beckerman and Raemaekers, 2009: p.73). These new vessels, therefore, reflect a regional tradition. Although large-scale migrations cannot be ruled out for other parts of the Corded Ware area, it is not likely that the presence of Corded Ware material culture in Noord-Holland is the

result of such migrations. The presence of continuous regional traditions renders large-scale migrations unlikely (see section 5.3.5). A conquering of the region by violent Corded Ware groups does not seem likely because indications for violence are almost completely lacking and because no social differences on and between sites have been found (see section 5.3.3; Haak *et al.* 2008: p.18229, Chenery and Evans, 2011a: p.32, 2011b: p.87).

The presence of likely locally produced beakers similar to those found in other parts of the Corded Ware area reflects far-reaching contacts. The Corded Ware supra-regional exchange network was evidently used to exchange ideas, technology, goods and skills. Furthermore, the network could also have driven or facilitated the movement of specific individuals. In recent years, isotope research has provided evidence for this (see section 5.3.5; Haak *et al.* 2008). The ceramics themselves, alas, do not provide direct evidence for mobility. Yet the uniformity of the cord- and spatula-decorated beakers may have resulted from a combination of frequent supra-regional contacts and the movement of individuals (see section 5.3.3; Salanova, 2001: p.91, Ebbesen, 2006: p.237).

Other Corded Ware regions show a comparable pattern: beakers are a new element, but the thicker-walled wares reflect older regional traditions. For example, in large parts of the Corded Ware region, but not in Noord-Holland, amphorae are very common. These amphorae can be seen as a continuation and a further development of the older amphorae of the Globular Amphora Culture and the Złota-group (Furholt, 2003a: p.19, Larsson, 2009: p 61). The Corded Ware Culture evidently presents a mosaic of regional groups with different older traditions, as well as different subsistence strategies.

Although there is clear diversity, there is also clear uniformity. The various Corded Ware groups share material culture traits, including cord-decorated and spatula-decorated beakers. If one applies Childe's model, different regional groups may have had different subsistence strategies, but they all took part in a large network, exchanging goods, ideas and possibly people (Childe, 1950a: p.6, Childe, 2004g (1954): p.160). These exchanges involved such luxuries as amber, battle axes and Grand Pressigny flint daggers (Ebbesen, 2006: p.236-238).

Exchange is not a phenomenon that started during the Corded Ware period. However, the Corded Ware period does reflect a phase of intensive contacts, which builds on the exchange of goods and ideas in preceding periods.

6.3.2 *The superstructure: "Martial folk who plunder or trade to secure products of distant lands"?*

The mode of production, the economic base, is the materialist starting point for Childe (1929: p.145-160, 1958: p.134-135, 140-141) in his reconstructions of the Corded Ware Culture. From this economic base arises the superstructure, that is, the social organisation and ideology of society (Marx, 1999 (1859): p.4, McNairn, 1980: p.35, Patterson, 2005: p.43). The superstructure can, in turn, also influence the economic base (McNairn, 1980: p.151, Shanks and Tilley, 1987: p.167). In the following sections Childe's ideas on the Corded ware superstructure will be tested.

6.3.2.1 New results: Ceramics and their use

Beakers, the vessel shape that is characteristic of the Corded Ware Culture, are found in funerary contexts across a large area and are often used to establish chronologies (e.g. Furholt, 2014a). Despite the fact that beaker vessels themselves are often studied, their presence in settlements and their usage have only rarely been studied. This study aimed to fill this gap in our knowledge. A macroscopic

analysis of the use of ceramics on 7 settlement sites from Noord-Holland as well as a macroscopic analysis of 96 beakers from funerary contexts from sandy parts of the Netherlands was presented. Furthermore, the charred residues from 57 vessels from Keinsmerbrug, Mienakker and Zeewijk were studied through a combination of archaeobotanical analysis (with use of SEM microscopy) and chemical analysis (by means of DTMS) (see section 5.3.6; Oudemans and Kubiak-Martens, 2012, 2013, 2014). This analysis revealed some very interesting results. At the settlements, beakers were most frequently used for cooking. More than half (56%) of the cord-decorated sherds have charred residues. At Keinsmerbrug, the vessels were used to prepare only one type of meal: emmer porridge with fat (Oudemans and Kubiak-Martens, 2012). At Mienakker and Zeewijk, a variety of often well-processed meals were prepared (Oudemans and Kubiak-Martens, 2013, 2014). Beakers are traditionally thought to be alcohol drinking cups (e.g. Childe, 1925, Sherratt, 1997a). However, no chemical or botanical evidence for alcohol was found in the studied Dutch examples. A much smaller proportion of the vessels from funerary contexts showed residues. This may be due to a difference in function and/or a less favourable preservation conditions. Nonetheless, nine beakers from funerary contexts—associated with both weaponry and ornaments—showed cooking residues.

Evidence for the use of beakers and other vessels from other parts of the Corded Ware area is extremely sparse. The beaker found in a grave in Refshøjgård (Denmark) was possibly used for alcohol (Westermann, 2007, Klassen, 2005a). Ceramics from the Corded Ware settlement site of Lötvreten (Sweden) and beakers from the funerary contexts at Amesbury (UK) show indications of having been used for cooking (Larsson, 2008: p.250, Mukherjee *et al.* 2001: p.154-156).

In addition to differences in the use of beakers, possible differences in social status were also studied. This was done by analysing the intra- and inter-site dispersion patterns of the ceramics, as well as by studying similarities and differences within and between sites in the characteristics of the ceramics. Because the majority of ceramics occurred dispersed throughout the sites, no spatial patterning for the different types could be observed. The spatial patterns thus do not show any indications for social differences (see section 5.3.3; Nobles, 2012, 2013a, 2014). Although the ceramic assemblages do show *functional* differences between the sites, no social differences within or between sites were found (see section 5.3.3). At all the sites studied, the supra-regional thin-walled types and the regional medium-thick-walled and thick-walled types are found in close association and share specific technological characteristics.

6.3.2.2 New ideas: Beakers as symbol of the importance of the supra-regional network

The present study proposes that cord-decorated and spatula-decorated beakers were the product of a large exchange network. Previous authors have suggested that beakers were the typical funerary vessels, whereas on settlements thick-walled wares are most common and beakers formed only a small minority of the assemblage (Van Heeringen and Theunissen, 2001: p.146, Drenth, Brinkkemper and Lauwerier, 2008: p.153). The present analysis, however, shows that thin-walled beakers not only were very numerous in settlements, but also were most often used for a very important daily activity: cooking. Beakers thus had an important functional role. However, this role does not seem to be connected with drinking, fighting or conquering warriors, as previously proposed by Childe (1925) and others (for example, Sherratt, 1997a). On the contrary, the beakers at settlements seem to reflect the important role played by the supra-regional network. The theoretical model by Childe provides important clues for reconstructing Corded Ware social organisation (Childe, 1950a: p.6, 2004g (1954): p.160, 1951 (1936): p.74). In

section 6.3.1.3 it was proposed that the Corded Ware period marks a phase of intensive exchange. The supra-regional exchange network was used to exchange goods, ideas and possibly people. In Childe's model of the Neolithic (1950a, 2004 (1954)) exchange and mobility also play an important role in shaping ideology and sharing ideas and knowledge. Beakers thus may have been more than just a product of supra-regional contacts; they came to symbolise the ideology of this supra-regional network (see section 5.4). The use of beakers with supra-regional affinities for daily tasks within settlements may indicate that this symbolic value was not restricted to an elite but, rather, pertained to society at large.

The thin-walled beakers may reflect the large supra-regional network, while the medium-thick-walled and thick-walled wares found in the Dutch coastal zone can be placed in a continued regional tradition. Other elements, such as the subsistence strategy, also indicate continuity. In other Corded Ware areas ongoing regional traditions can be observed as well (Furholt, 2003a: p.19, Larsson, 2009: p 61). Not just the supra-regional traditions but also the regional traditions may have played an important role in shaping Corded Ware ideology (see section 5.4).

Furthermore, in other regions, cord-decorated and spatula-decorated beakers were also used alongside other types, some of which were rooted in older regional traditions (see section 3.4). The question whether the beaker had the same functional and social role(s) in all Corded Ware regions cannot be answered. Few studies are available on the (technological) characteristics and the use of Corded Ware ceramics in either funerary contexts or settlements functions, and the roles of ceramics in different contexts and regions are difficult to establish and compare. Given the observed differences between different Corded Ware societies in, for example, subsistence, differences in the use and role of ceramics are to be expected. However, beakers are not a luxury product, and they are found across a large area. Beakers are the product of the extensive supra-regional exchange network and they may also be seen as a material/physical expression of the importance of this network, regardless of regionally specific additional functions or social meanings.

6.3.2.3 Confronting Childe on the superstructure

Gordon Childe proposed that during the Corded Ware period an increase in pastoralism lead to an increase in violence and to the rise of leaders and an elite (see section 6.2.6; Childe, 1929, 1958). This economic power was concentrated in the hands of males (1958: p.134). Beakers were said to have spread across Europe due to the migration of this plundering and trading martial folk and, to a lesser extent, the diffusion of their ideas (Childe, 1929: p.158). According to Childe, beakers were probably used for alcohol, providing a source of influence or even domination for their owners (Childe, 1925: p.223).

Although the new ideas on Corded Ware society may fit within the general ideas postulated by Childe on the Neolithic—such as the (growing) importance of exchange and mobility (1950a, 1951 (1936), 2004g (1954))—they do not fit his reconstructions of the Corded Ware superstructure. Although the use of beakers for alcohol cannot be ruled out, indications for their use as cooking vessels are far more numerous, and this evidence is found in both settlement and funerary contexts. The beaker is thus not connected to an ideology that marks the rise of leaders and an elite. On the contrary, it seems likely that the cord-decorated and spatula-decorated beakers are linked to an ideology reflecting the importance of the supra-regional exchange network (see section 5.4). Furthermore, the settlements studied did not yield any indications for either social stratification, the accumulation of wealth or gender-based differences in status.

6.3.2.4 New ideas on the Corded Ware superstructure

Many scholars have proposed that the Corded Ware period marks a time of significant changes. The idea postulated by Childe that this period was marked by gender divisions, individualization and the rise of elites has found wide support (Kristiansen, 1984, Vandkilde, 2004, Westermann, 2007, Müller *et al.*, 2009, Czebreszuk and Szmyt, 2013, Hofmann, 2013, Pelisiak, 2013). The majority of these reconstructions of Corded Ware social organisation and ideology are based on graves and grave goods. The graves, often burial mounds, were dubbed “*monument of the radical changes*” by Hübner (2005: p.738). The change from communal graves to single graves is seen as an argument for individualisation (see section 1.2.3.7; Westermann, 2007: p.22). Warrior equipment, such as battle axes and blades in graves, are used to signify different varieties of martiality (see section 1.2.3.8; Kristiansen, 1989, Fokkens, 1999, Ebbesen, 2006, Vandkilde, 2006). The presence of graves with greater numbers of grave goods or with supposed high-status grave goods are interpreted as evidence for the rise of an elite (section 1.2.3.7, Kristiansen, 1989, Hofmann, 2013, Czebreszuk and Szmyt, 2013). Differences between male, female and children’s graves are taken as an indication for social diversification and differences in status (see section 1.2.3.5; Turek and Černý, 2001: p.605, Turek, 2012: p.197). The validity of these ideas and models has been questioned and debated (Fokkens, 2005, Ebbesen, 2006, Vandkilde, 2006, Kolar, 2013).

Alternative models propose that Corded Ware communities lacked significant social differentiation (Ebbesen, 2006: p.240, Hübner, 2005: p.746). An argument against the rise of martiality is that the evidence for violence is very limited. A grave from Gjerrild (Denmark) contained a person who had been killed by an arrowhead perforating the breast bone (Ebbesen, 2006: p.241). Indications for violence were also found in the four closely related Corded Ware multiple burials from Eulau, Germany (Haak *et al.*, 2008: p.18227). Since evidence for violence is limited, the weaponry in graves could thus also reflect a different function, perhaps use in important tasks such as hunting and agriculture. Furthermore, several scholars have doubted the extent to which (rich) grave goods represent the deceased individual in the Neolithic (Turek and Černý, 2001, Kolar, 2013). A symbolic meaning for the weaponry in graves has been proposed (Fokkens, 2005: p.9-12, Vandkilde, 2006: p.410-417). Fokkens (2005: p.10) stressed the uniformity in the graves and grave goods of the Corded Ware period across large parts of Europe. These uniform grave goods, comprising weapons, are interpreted by Fokkens (2005: p.11) as symbols of the morals and values of the society, possibly linked to a stereotypical ancestor.

Childe’s (1958: p.134) hypothesis that there was an increased need to defend property can also be questioned. Childe (1958: p.134) proposed that the growing importance of cattle brought an increased risk of theft and that cattle thus needed to be defended. Yet while in some regions pastoralism may have been important, in regions in which well-preserved settlements have been found, other, often adaptive and diverse, subsistence strategies have been found (see section 6.3.1.1). Cattle were important in many regions, but not as important as was assumed by Childe. The need for defending mobile livestock was, in many regions, therefore also less important than Childe postulated.

Indications for interpersonal combat are few. Combined with the high uniformity of grave goods and the minor importance of pastoralism in large regions (and thus the lesser need for defensibility of property), this argues *against* interpreting graves and grave goods as direct reflections of the rise of martiality and elites. However, this study did not focus on graves and grave goods other

than ceramics and thus cannot provide a new model for Corded Ware grave sets. The study of cord-decorated and spatula-decorated beakers nonetheless showed that these beakers—which are found on settlements as well as in male and female graves—are not, or not only, alcohol drinking cups, because many show cooking residues. Furthermore, the beakers likely reflect the importance of the supra-regional network of which they were a product. Future research could focus on the presence and use of different types of grave goods to test the validity of the hypothesis of rising elites and martiality (table 6.1).

Status differences among the graves of men, women and children have often been observed in other areas (Turek and Černý, 2001: p.605, Turek, 2012: p.197). On the studied settlements in the Noord-Holland tidal area, however, no indications were found for a different role or status for women. The questions regarding differences between the sexes and how these should be interpreted can, therefore, also not be solved in the context of this study; a future study of the number and use of grave goods and their association with men, women and children could, however, significantly enhance our understanding.

Little is known of the social organisation of settlements. For several regions—including Central Europe and southern Scandinavia—it has been proposed that settlements of the Corded Ware period were smaller than those of the directly preceding cultures (Hecht, 2007, Müller *et al.*, 2009, Holmqvist-Saukkonen *et al.* 2013). While some authors stress that settlement size is merely a reflection of settlement function (Klassen, 2005b, Ebbesen, 2006, Rasmussen, 2013), others used the smaller size of Corded Ware settlements to argue for an increase in mobile possessions—namely, cattle—and wealth (Müller *et al.*, 2009: p.140). It should be noted that, in general, well-preserved settlements are rare. In several regions with preserved settlements, including Switzerland, the differences with preceding periods are few (Strahm, 1971: p.172-173). The Noord-Holland settlements also show continuity from the preceding period and do not show an decrease in size.

As noted above, Childe's (1950a, 1951 (1936), 2004g (1954), 2004h (1957)) general model for developments during the Neolithic proposes that the Neolithic offered the possibility of producing a surplus, which was used to exchange goods with other societies, which, in turn, led initially to marriage mobility and itinerant experts and later to full-time specialists who brought with them both goods and ideas (Childe, 1951 (1936): p.74). The studied Dutch datasets indeed show the importance of supra-regional contacts. This exchange led to new material cultural items, including cord-decorated and spatula-decorated beakers. Beakers are thus a product of supra-regional exchange, and the use of these beakers in daily life—for food preparation and consumption—can be seen as daily reminder of the importance of such supra-regional contacts. The supra-regional network could also have provided these settlements with new ideas and possibly new people. Unfortunately, it remains unclear whether wealth increased, how wealth was divided and how wealth was perceived. In addition to exchange and mobility, surplus production is an important element of Childe's model. The production of a surplus is, however, equally difficult to prove archaeologically. At Keinsmerbrug, gatherings were held to hunt large numbers of ducks, suggesting that the surplus production generally associated with the conspicuous consumption patterns at inter-communal feasts (section 5.2.2, Koch, 2003: p.15, Iversen, 2014: p.208) could be achieved within the region.

To conclude, the present study provides new ideas on social organisation of the Corded Ware communities in a tidal area in Noord-Holland. These communities had a subsistence strategy and material culture that were rooted in old regional traditions and that at the same time were part of larger supra-regional networks that led to an influx of new goods, ideas and possibly people and ideology. These

results cannot be extrapolated to other regions, and regional differences are to be expected. The results obtained with this study do, however, make clear that models in which in the whole Corded Ware Culture is equated with the start of gender differences, individualisation, martiality and elites need to be revised.

6.3.3 The chronology: “Conquering battle-axe wielders exerted a profound influence wherever they went”?

6.3.3.1 New results: The chronological developments in the coastal zone

In order to enhance our understanding of (1) the start of the Corded Ware period, (2) the changes during the Corded Ware period and (3) the end of the Corded Ware period and the start of the Bell Beaker Culture it is vital to study the changes that occurred in the coastal zone over time. The oldest site studied is Slootdorp-Bouwlust. The ceramics from this site are similar to those from Funnel Beaker settlement sites found to the east of the coastal zone (see section 3.2). The ceramics from Slootdorp-Bouwlust, however, share few characteristics with the ceramics from the younger sites studied (figure 6.1).

The ceramics from these younger sites, Zandwerven, Aartswoud, Keinsmerbrug, Zeewijk, Mienakker and Sijbekarspel-De Veken, all share characteristics with so-called Vlaardingen sites from the southern part of the coastal zone (figure 6.1). The Vlaardingen culture in the southern part of the coastal zone and Corded Ware Culture in the northern part of the coastal zone have previously been treated as very distinct cultures (Louwe Kooijmans, 1976: p.289, Drenth, 2005: p.335, Van Gijn and Bakker, 2005: p.304-305, Amkreutz, 2013: p.256). In contrast, this study showed that during Beckerman and Raemaekers' (2009: p.81) middle and late Vlaardingen phases the developments in both areas are very similar (figure 6.1).

The ceramics from a low layer at Zandwerven are similar to Vlaardingen ceramics of Beckerman and Raemaekers' (2009: p.81) middle phase. The vessels have a pronounced S-shape, and their decoration consists of perforations under the rim or knobs. Corded Ware decorative motifs made by cord impressions and/or spatula impressions are not present, but small vessels that resemble later beakers in form are (see section 4.4.1).

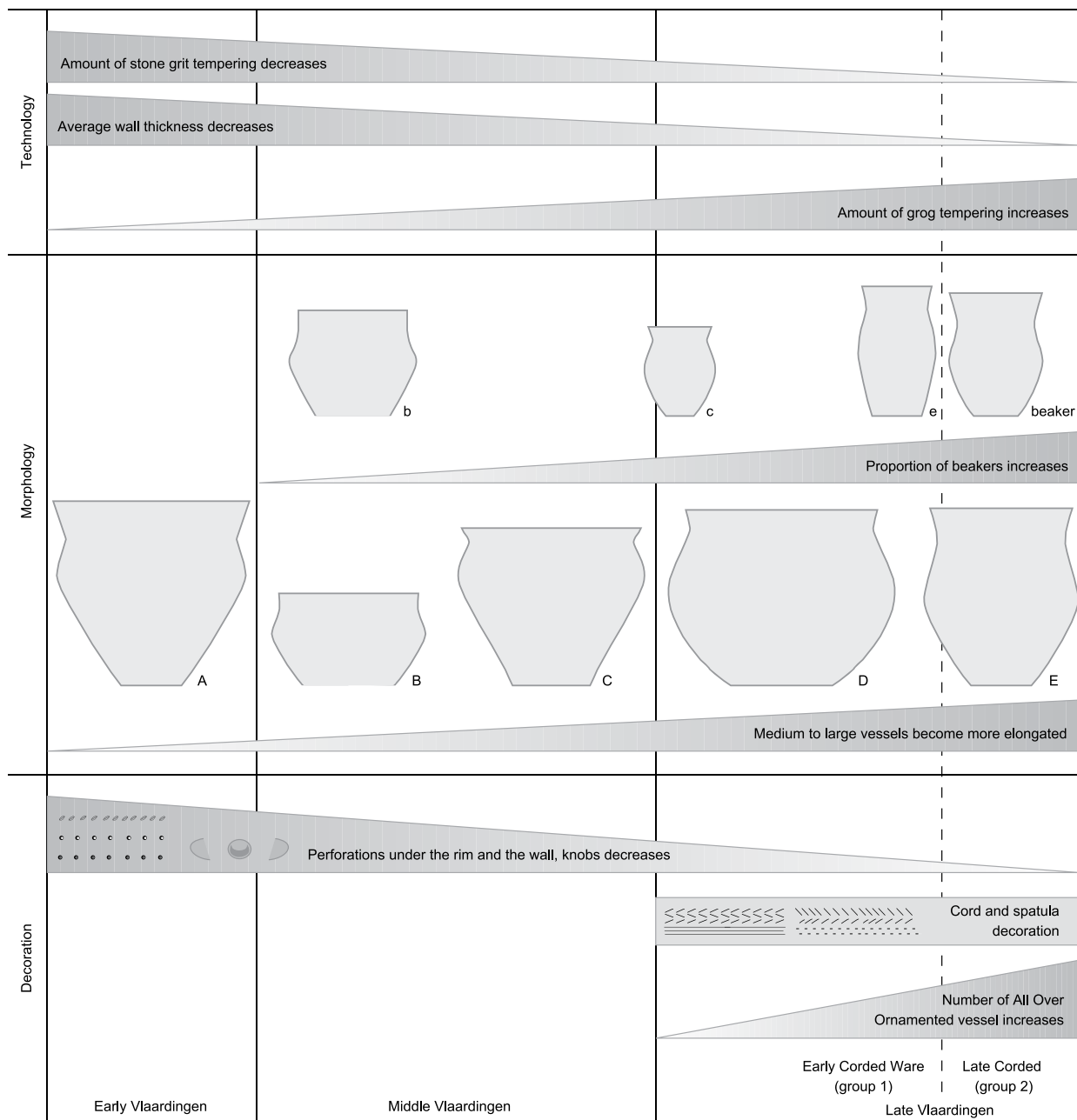
The younger ceramics from Zandwerven, as well as those from Aartswoud, Keinsmerbrug, Zeewijk, Mienakker and Sijbekarspel-De Veken, are comparable to Beckerman and Raemaekers' (2009: p.81) late Vlaardingen phase. The medium-thick-walled and thick-walled vessels of this period show a more elongated, enlarged beaker-like profile. The thin-walled vessels have a beaker shape and are often decorated with cord and spatula motifs. These decorated beakers are comparable to those found in Corded Ware funerary contexts in other parts of the Netherlands and in other parts of the Corded Ware area. The medium-thick-walled and thick-walled vessels are most often not comparable to those from sites outside the coastal region.

In the current study, two chronological groups were distinguished: Early Corded Ware (group 1) and Late Corded Ware (group 2). On the older, group 1 sites, the ceramics are more often tempered with stone grit, the average thickness is greater and decoration with spatula impression is most common (figure 4.6). On the younger, group 2 sites, ceramics are less often tempered with stone grit, are thinner on average and more often show cord decoration. All Over Ornamented Beakers occur more frequently on group 2 sites (figure 4.6).

Sijbekarspel-De Veken is the youngest site studied. This is the only site that has yielded sherds comparable to Glasbergen and Van der Waals's (1955) Maritime Bell Beaker type 21a and decoration made with a dentated spatula (section 4.4.2.3). However, the (technological) characteristics of the Sijbekarspel-De Veken ceramic assemblage overlap with those from Mienakker and the southern part of Zeewijk-West. The assemblage of Sijbekarspel-De Veken thus shows both ongoing older technological traditions as well as new decorative elements known from a large region.

All absolute dates for Vlaardingen, Corded Ware and Bell Beaker sites were analysed to study the possibilities of establishing a fine chronology. Unfortunately, a fine chronology could not be established because many dates suffer from problems (including problems with sample treatment and cleaning, "old wood" effect, and an uncertainty of association; see section 4.2). Moreover, the INTCAL09 calibration curve exhibits broad wiggles for this period. Furholt (2003a) assigned the letters A–H to the consecutive wiggles in the calibration curve. Applied to the

Figure 6.1 Chronological developments; Vlaardingen and Corded Ware in the coastal zone.



current study, the oldest site (Slootdorp-Bouwlust) dates to Furholt's plateau A and possibly plateau B (all dates at the 2 δ confidence level). The majority of the dates for Zandwerven as well as other middle Vlaardingen contexts fall within plateaus B–D, but plateaus A–E are also possible. The late Vlaardingen or Corded Ware phase dates to plateaus D–F, but several dates also can be placed within plateaus B–C. Group 1 (early Corded Ware sites) date to plateaus B–F, while group 2 (late Corded Ware) sites date to plateaus D–F. Sijbekarspel-De Veken, which is presumed to be the youngest site, dates to plateaus E–F. The proposed chronological ordering is in line with the results from the ¹⁴C dates, yet a large overlap is observed. Therefore dating the introduction or presence of specific characteristics of the ceramics, let alone establishing a fine chronology, is impossible due to the broad wiggles.

6.3.3.2 Confronting Childe on chronology

In the grand narrative compiled by Childe (1929, 1958), the Corded Ware Culture is the result of migration and to a lesser extent diffusion. These migrations were often violent in nature and led to the conquering of the people previously inhabiting the area (Childe, 1929: p.158). Childe saw the Corded Ware Culture not as a single culture but as a number of distinct cultures with (therefore) regionally specific chronologies (Childe, 1929: p.155, 1958: p.140). Childe proposed that at the start of the Corded Ware period there was more uniformity over large areas, while during later phases there was more regional variability (Childe, 1929: p.145). The subsequent Bell Beaker Culture was seen by him as the movement of small-scale migrations of “*well armed bands*” instead of large-scale migrations (Childe, 1929: p.196, 1958: p.144). In the current study area, the Corded Ware and Bell Beaker people were said by Childe to have fused, resulting in a mixed material culture (Childe, 1929: p.197, 1958: p.144, 148).

The current study shows no indications for mass migrations or (violent) conquest. On the contrary, the Corded Ware period shows a mixture of continued regional traditions and supra-regional exchange. This, again, does fit with the model Childe proposed for the Neolithic and the development of mobility and exchange (Childe, 1950, 1951 (1936), 2004g (1954), 2004h (1957)).

6.3.3.3 New ideas: Continued traditions and new networks

The start and spread of the Corded Ware Culture appears to be the most debated aspect. Following Childe, many authors have seen (large) migration as the (main) cause (Äyräpää, 1915, Buchvaldek, 1967, Edgren, 1970, Kempisty, 1978, Bloemers *et al.* 1981, Glob, 1969, Girininkas, 1988, Gimbutas, 1979, Kristiansen, 1989, Brodie, 2001). Diffusion as an explanatory device became popular in the second half of the previous century (Malmer, 1962, Neustupný 1969, Lanting and Van der Waals, 1976, Larsson, 1989, Damm, 1991, Larsson, 1991, Ebbesen, 1997, Lang, 1998, Hübner, 2005, Ebbesen, 2006, Włordarczak, 2009). More recently, a combination of migration and diffusion has also been proposed as a causal factor for the start and spread of the Corded Ware Culture (Thomas, 1991, Kosko, 1997, Larsson, 2006). Isotope analysis has provided evidence for this latter model (see section 5.3.5; Haak *et al.* 2008: p.18229, Chenery and Evans, 2011a: p.32, 2011b: p.87).

As was discussed in section 5.3.5, this study proposes that the Corded Ware Culture in the Dutch coastal zone is likely the result of diffusion, possibly combined with the movement of individuals. The continuation of older regional traditions, for example in the production of ceramics as well as in subsistence strategy, make large-scale migrations less likely. If large-scale migrations did occur,

it seems probable that local traditions would have been completely replaced. The presence of—presumably locally produced—cord- and spatula-decorated beakers that are similar to those found throughout the large Corded Ware area, is indicative of far-reaching contacts between people. Furthermore, there are direct (isotope and DNA) and indirect (ceramics) indications for the movement of individuals (see section 5.3.5, Haak *et al.* 2008: p.18229, Chenery and Evans, 2011a: p.32, 2011b: p.87, Salanova, 2001: p.91, Ebbesen, 2006: p.237).

Several authors have proposed that the Corded Ware Culture started with a ‘unity’ or ‘A-horizon’, during which the same vessels (cord-decorated and spatula-decorated A and C beakers and amphorae) and axes were present in all areas (Glob, 1945, Struve, 1955, Furholt, 2003). After this initial phase, the Corded Ware Culture is said to have become more diverse, showing regional differences (Glob, 1945, Struve, 1955). The idea of an A-horizon was refuted by scholars who believed that these items rarely occur together (Malmer, 1962, Neustupný, 1969, Behrens, 1997, Ebbesen, 2006). Furholt (2003a-b, 2014a) argues that, while comparable items are indeed found over a large area, they do not belong to one (unity) phase; rather, the items were incorporated into regionally diverse settings. Furholt’s view is supported by the current research: several elements belonging to the A-horizon have been found on the Noord-Holland settlements. These include cord-decorated beakers (A-beakers) and beakers with herringbone patterns applied with a spatula (C-beakers). However, amphorae and A-axes are not or only rarely found. These items of the proposed A-horizon, therefore, do not represent a unity horizon. Instead of reflecting a short period of radical change, the studied assemblages reflect a process of ongoing exchange and change. We see changes in the ceramics throughout the Corded Ware period. For example, the number of All Over Ornamented beakers increases over time. However, it is argued here that these changes do not reflect a culture that became more diverse and regional, but that, on the contrary, these types have a wide distribution area and thus reflect ongoing supra-regional exchange.

The present study shows that ongoing supra-regional contacts and exchange characterize not only the Corded Ware period but also the transition to the Bell Beaker Culture. Several different possibilities have been proposed in the past for the transition from the Corded Ware Culture to the Bell Beaker Culture. Lanting and Van der Waals (1976) postulated that the development from Corded Ware to Bell Beaker must have been continuous and that Bell Beakers were a local development in the middle and lower Rhine regions (Lanting and Van der Waals, 1976: p.4). Besse (2004: p.137-142) and Hübner (2005: p.750) both propose intra-regional variation in the transition to the Bell Beaker Culture. In the northern and eastern parts of the Bell Beaker distribution area, Corded Ware plays a major role in the emergence of the Bell Beaker Culture, yet in the southern part of the Bell Beaker distribution area the transition is more radical (Besse, 2004: p.142). Salanova (2001) proposed on the basis of ceramic analysis that there were movements of people. According to Salanova (2001), the fact that Bell Beakers with high uniformity in decoration are found all over Europe and are used together with many different local forms is an indication of potters moving into an area as well as ongoing traditions. The pattern observed by Salanova (2001) fits the pattern observed on the Noord-Holland sites with Corded Ware ceramics and those with Bell Beaker ceramics, because at both types of sites, regional types as well as supra-regional types were used and likely produced. The start of the Bell Beaker period is often linked with an important new technology: copper working (Brodie, 2001, p.487). Brodie (2001, p.487) postulated that copper working spread throughout Europe in a south-east to north-west direction and that Bell Beakers vessels may have tagged along. This corresponds with Childe’s (1925:

p.222, 1958: p.146) idea that the Bell Beaker people maintained communication and trade routes over large areas of Europe. Salanova (2001: p.100-101) proposes that Bell Beakers can be seen as an ideological instrument for consolidating the new economic alliances. Support for this hypothesis was found in the current study; the Corded Ware and Bell Beakers found in the study area can also be seen as a symbol for (new) economic relations.

6.4 Corded Ware Culture: A new narrative

“a wandering race of hunters and pastoralist. They appear as pre-eminently martial folk: yet, whether by plunder or trade, they were able to secure products of distant lands... These conquering battle-axe wielders exerted a profound influence wherever they went” (Childe 1929: p.158).

The quote by Childe has proven inconsistent with the observed situation, and should therefore be altered to read:

“communities of farmers, cattle breeders, fishers, hunters and gatherers. They appear as pre-eminently of local origin: yet exchanged products and ideas with those from distant lands... These beaker owners had regional traditions as well as a desire to locally express supra-regional affinities.”

Old models of the Corded Ware Culture stress the uniformity of the elements of this culture (Glob, 1945, Struve, 1955). In recent years, archaeologists sought to up-end the ‘totality’ and instead stressed regional variation (Furholt, 2014a, Hübner, 2005, Vandkilde, 2006, Ebbesen, 2006). The present study argues that the Corded Ware Culture is defined both by regional variation and by supra-regional similarities.

The study of ceramics from well-preserved Corded Ware settlement sites in a tidal area in Noord-Holland, in combination with the multi-disciplinary analysis of three of these sites, have led to important new results. The medium-thick-walled and thick-walled ceramics found on the Corded Ware sites are not, as was previously assumed, comparable to medium-thick-walled and thick-walled ceramics from other Corded Ware regions, but, rather, share similarities with Vlaardingen ceramics of Beckerman and Raemaekers’ (2009: p.81) late phase. In the Dutch coastal zone there evidently was a tradition of producing vessels with an S-shape, a shape that became less pronounced and more elongated over time. The decoration of the thin-walled ceramics, by contrast, is not rooted in older regional traditions. The beakers decorated with different motifs of cord impressions and/or spatula impressions found in the Dutch coastal zone are comparable to those found in large parts of Europe. Because the thin-walled ceramics, on the one hand, and the medium-thick-walled and thick-walled ceramics, on the other hand, share many technological characteristics, it is most likely that both wares were produced locally. The cord-decorated and spatula-decorated beakers played an important role in daily activities, as indicated by the fact that 58% of the cord-decorated beakers show signs of having been used as cooking vessels.

The traditions are not limited to the ceramics: the subsistence strategy of the Noord-Holland settlements also shows a continuation of an older system combining crop cultivation, cattle husbandry, hunting, fowling, fishing and gathering wild plants and shell fish (Theunissen *et al.*, 2014: p.260-261). The agricultural technologies applied, including the plough, also predate the Corded Ware period (Theunissen *et al.*, 2014: p.260-261).

Research question	Answer			Further research
	Local level (Noord-Holland)	Regional level (coastal zone)	Larger level (the Netherlands, and the supra-regional network)	
How does the Corded Ware Culture relate to previous cultures? Does the transition to the Corded Ware Culture represent cultural continuity or discontinuity or a combination of both?	The ceramic assemblages of the oldest site studied, Slootdorp-Bouwlust, share similarities with those found on Funnel Beaker settlement sites to the east. The number of characteristics shared with the younger (Corded Ware) assemblages is low. During Beckerman and Raemaekers, (2009: p.81) middle and late Vlaardingen phases, the developments in the coastal zone are very comparable. The Corded Ware assemblages have many characteristics already present during the preceding (middle Vlaardingen phase)		A detailed comparison of early Corded Ware and directly preceding cultures was not executed. The literature study revealed that just like in Noord-Holland, older traditions are still visible on Corded Ware sites.	A detailed analysis of the (young) Corded Ware assemblages and directly preceding inhabitants of regions might reveal information on continuity and discontinuity in different regions. In the Netherlands it would be interesting to study the transition in regions where the Corded Ware Culture was preceded by the Funnel Beaker Culture and compare the results to those from the coastal zone where the Corded Ware Culture is a continuation of Vlaardingen traditions.
How did the Corded Ware Culture spread? Is it the result of migration, diffusion or both?	A combination of diffusion and possibly (marriage) migration of potters.			
Where did the Corded Ware Culture start?	Unknown. Different traits that have contributed to the set of items with a supra-regional distribution may stem from different regions. It is unlikely that one place of origin can be found. Furthermore due to broad wiggles in the calibration curve it is difficult to decide which contexts are the oldest.			Sharing, integrating and discussing data collected by Corded Ware specialist from different regions will enhance our understanding.
Why did the Corded Ware Culture spread? Why did large areas of Europe become part of the Corded Ware Culture? What was the role of innovation, economic change, social change, climate change or other factors?	Being part of a supra-regional network through which goods, ideas, technology and presumably people were exchanged was beneficial for communities in a large area. These groups with different regional subsistence strategies and regional traditions all became part of the supra-regional network and expressed the importance of this network by using the supra-regional elements of this network.			A detailed regional analysis of Corded Ware and older sites might enhance our understanding of what made Corded Ware appealing to large number of communities and how it spread.
What changes occurred during the Corded Ware period? Is it possible to construct new typochronologies and absolute chronologies?	The ceramics are divided into two chronological groups. Early Corded Ware group 1 ceramics are often stone grit-tempered and more frequently thick-walled. The decoration often consists of spatula motifs. Type 1d beakers only occur on group 1 sites. Late Corded Ware group 2 sites have a ceramic assemblage that is less often tempered with stone grit and is more often thin-walled. The decoration is often applied with cords. All Over Ornamented Beakers are most frequently found on sites belonging to group 2. Types 21a and 21a have only been found on group 2 sites.	On many sites that date to Beckerman and Raemaekers (2009) late Vlaardingen phase, thin-walled beakers decorated with Corded Ware motifs are found. However, the technological characteristics of these assemblages as well as the ratios of the decoration motifs have not been published. A chronological subdivision can therefore not be made.	The majority of graves in which ceramics were found yielded just one beaker. Therefore, in regions where settlements are unknown, including the eastern Netherlands, establishing a chronology is difficult. Several associations of types are known from Dutch graves. These combinations are also found in association on the Noord-Holland settlements.	Previously chronologies were mainly based on decoration and –to a lesser extent– shape of Corded Ware vessels. To test chronological models, including the proposed one for the coastal zone, this research showed that 14C dates are too problematic for establishing a fine chronology. Combination of studying the technological and morphological characteristics in conjunction with the decoration of ceramics, including those from stratified sites, would offer new possibilities for establishing chronological trends. This type of analysis could be executed in other regions as well.
How did the Corded Ware Culture end and what is the relation to the Bell Beaker Culture? Were these developments continuous or are discontinuities discernable?	On the youngest site studied, Sijbekarspel-De Veken, All Over Ornamented type 21a and Bell Beaker type 21a with decoration applied with a dentated spatula are found. These types have not been found on the other sites. However, other (technological and morphological) characteristics and decoration of the ceramics do show similarities to those of late Corded Ware sites. The transition to the Bell Beaker Culture is thus a gradual process.	On several sites in the southern part of the coastal zone (Maritime) Bell Beakers are found. However, little is known of their characteristics. A chronology can therefore not be established.	Continuity is expected. The absolute dates for Bell Beakers overlap with the dates for Corded Ware types. Unfortunately, many dates are unreliable. Furthermore, little is known about the overlap of Corded Ware and Bell Beaker types on sites.	The analysis of a site on which both Bell Beaker as well as Corded Ware ceramics were found showed that there were both similarities and differences, likely caused by a continuous development. Unfortunately just one site with Bell Beaker material was included in this study. This analysis should be repeated in other regions and should include a comparison of the Corded Ware and Bell Beaker ceramics on settlement sites in the southern part of the coastal zone as well as from these ceramics for funerary contexts in the eastern part of the Netherlands.
Is the Corded Ware Culture one homogeneous culture or are there regional differences? Are there regional differences in the chronological developments?	The Corded Ware Culture is characterised both by uniformity and by diversity. Whether there were also regional differences in the chronology is not clear from this research.			A detailed analysis of the Corded Ware Culture in different regions may also enhance our understanding of the similarities and differences in the chronological developments in different regions.

Table 6.1 Research questions on the Corded Ware Chronology answered (suggestions further research).

Regional variation and the use of several characteristic supra-regional Corded Ware elements in combination with regional elements is demonstrated in other regions as well. Furthermore, in other regions the subsistence strategy also is adapted to the local possibilities rather than dictated by a Corded Ware template (Klassen, 2005b, Ebbesen, 2006: p.226, Rasmussen, 2013).

Childe's ideas on the Neolithic still hold important clues for reconstructing a *new* narrative for the Corded Ware Culture in both the Dutch coastal zone and in other regions. Childe proposed that the Neolithic food-producing economy rendered possible the production of a surplus (1950a: p.6, 1951 (1936): p.63). No society lived in isolation, and exchange with other societies was the rule rather than the exception. This exchange, in combination with the production of a surplus, started a gradual process that led to marriage mobility and itinerant experts at first, and later to full-time specialists (Childe, 1950a: p.7 and 1951 (1936): p.71). These specialists not only produced goods; they were also essential for creating the ideology and spreading new ideas between communities (Childe, 1951 (1936): p.74).

This study has shown that the Dutch coastal Corded Ware Culture represents a step in this process. The economic base shows an incorporation of relatively new techniques, such as the plough, and a strategy adapted to the regional circumstances. The Corded Ware period is marked, both in the Dutch coastal zone and in other regions, by a large supra-regional exchange network. These supra-regional contacts were used to exchange goods and ideas and possibly people. Cord-decorated and spatula-decorated beakers are both a product and a symbol of

Research question	Analysis of			Further research
	Local level (Noord-Holland)	Regional level (coastal zone)	Larger level (the Netherlands, and the supra-regional network)	
How can the Corded Ware period be characterised technologically, and was technological change the (only) motor behind other changes? Did such changes pertain to a (secondary products) revolution or were they more gradual?	The inhabitants of the coastal zone made use of the plough. This was not a new discovery; but it was already used during the preceding period. The plough could have enlarged the agricultural production. However, this cannot be proven.		In other parts of the Netherlands important inventions such as the plough and the wheel (likely) also predate the Corded Ware period (Drenth and Lanting, 1997).	The multi-disciplinary approach that was taken for the Odyssee research project has increased our knowledge on the inhabitants of the sites studied. This could be repeated to study (for example) a group of younger Bell Beaker sites in the southern part of the coastal zone.
What was the subsistence strategy of the Corded Ware Culture? Was there an increase in the importance of cattle ('cattle-isation')? Can the subsistence strategy be characterised as mixed farming? Was the subsistence strategy regionally specific?	The subsistence strategy was not dictated by a Corded Ware template but was adapted to the local circumstances. The subsistence strategy in the coastal zone comprises crop cultivation, herding cattle, hunting mammals, fowling, catching fish and gathering wild plants and shell fish.		In different regions the subsistence strategy was adapted to the local circumstances (Klassen, 2005, Ebbesen, 2006: p.226, Rasmussen, 2013)	
How was Corded Ware society organised, and was this organisation guided by economic, technological, subsistence and/or climate changes or the other way around? Is there evidence for the proposed gender division? Are patterns indicative of the emergence of martiality and elites visible? Is there evidence for the use of alcohol, often linked to these social changes?	The participation in supra-regional networks to exchange goods, ideas and possibly people was very important and was reflected by people's use of the symbols of this network. Beakers with cord and spatula decoration were not used to drink alcohol from; but were used for cooking and helped express the importance of and affiliation to the supra-regional network. However, indications for differences between the sexes or indications for the rise of individualisation, martiality and the rise of elites were not found.		The beakers found in funerary contexts in the Netherlands rarely show residues. They could either have a different function or the residues could have weathered due to less favourable preservation circumstances. However, residues indicating cooking were found on ten beakers from graves. Supra-regional evidence for the use of beakers for food (production) outnumber those for alcohol. Furthermore, beakers are found in both male and female graves making a link with (male) martiality, drinking and the rise of elites less likely.	The analysis of the technological and morphological characteristics and decoration of ceramics, combined with a macroscopic and microscopic study of the use of the ceramics, enhanced our understanding of the use and role of vessels as well as the societies as a whole. In order to enhance our understanding of other societies this study should be repeated. For example, the use of (Corded Ware) Beakers from funerary contexts should be studied.
How can the cosmology and ideology of Corded Ware communities be characterised?	The importance of the supra-regional exchange network as well as the importance of regional traditions was expressed in the ideology. The use of beakers for important daily tasks on settlements as well as in graves reflects the social role of beakers and the ideological role of the Corded Ware network. The use of medium-thick-walled and thick-walled vessels can be seen as an ideological symbol of the importance of regional traditions.		In large parts of the Corded Ware area similar items were used, these items may share an ideological value. At the same time in different regions different regional traditions persisted and the Corded Ware symbols may have had a slightly different use and meaning.	Ideology is difficult to study archaeologically. Ideology can be studied by studying the presence of and, especially, use of different items in different contexts and regions. A comparison of the ubiquity and use of beakers in different regions may enhance our understanding on their function(s) and symbolic role(s).
Is the Corded Ware Culture one homogeneous block or are there regional differences? Is the Corded Ware Culture one culture or even ethnicity, or is it a mosaic or network of regional groups? Is there one type of society or are there regional differences in social organisation?	The Corded Ware Culture is characterised both by uniformity and by diversity. A small number of items, including cord- and spatula-decorated beakers, are found over a large area. These items are the result of an increase in mobility and had a functional as well as a symbolic use. At the same time there is regional variability in both the economy, social organisation and likely the ideology. In different regions, different items, including medium-thick-walled and thick-walled ceramics, were used that were rooted in older regional traditions.			From a review of previous studies, it became clear to me that none of the Corded Ware regions possessed a material culture that consisted exclusively of types belonging to the supra-regional set of Corded Ware items. Corded Ware assemblages usually show a mixture of regional types and supra-regional types. Research studying both the presence and use of supra-regional as well as regional types will enhance our understanding of the homogeneity of the Corded Ware Culture and the differences within and between different regions.

Table 6.2 Research questions on the Corded Ware Society answered (suggestions further research).

this network. These novel beakers were not primarily used for alcohol and linked to the rise of martiality and elites, as has been previously proposed (Childe, 1925, Sherratt, 1997a), but, rather, were used for daily tasks—including cooking. And they were used together with ceramics that proved to be rooted in much older regional traditions. The use of beakers in settlements and graves reflects their important social role, as symbols of the importance of the supra-regional network.

No evidence was found for an increase in (social) differences between the sexes and the rise of individualisation, martiality and elites in the Dutch coastal zone. However, it is suggested here that not just beakers, but also other items currently associated with an ideology of warfare and social differentiation may, in fact, have had a different meaning. It is possible that the battle axe may not signal interpersonal combat, but, rather, important daily tasks in hunting or agriculture.

In different Corded Ware regions there are differences in the economic base as well as in social organisation and, presumably, ideology. However, in all regions, the importance of being part of the supra-regional exchange network is shared and expressed in daily life as well as in funerary and other rituals. The Corded Ware period is neither the first nor the last period in which such supra-regional exchange networks figured prominently. The emergence and (rapid) spread of new (pottery) types such as the Maritime Bell Beaker reflects this continuous tradition.

To conclude, Corded Ware ceramic assemblages in the Dutch coastal zone are characterised both by large vessels with an elongated profile and by cord-decorated and spatula-decorated beakers. The Corded Ware period in the Dutch coastal zone and other (Corded Ware) regions is characterised by a combination of ongoing older regional traditions and by a supra-regional network for the exchange of goods, ideas and people. The Corded Ware Culture is an economic alliance, a dynamic totality, a network linking regional groups, each with a distinct economic

base, material culture and ideology. These communities all partook in a vast supra-regional network that formed the platform for inter-community exchanges of goods, skills, ideas and possibly people. Participating in this supra-regional network was a vital aspect for all regional groups, and membership/affiliation to it was expressed by using a set of common traits, including cord-decorated beakers, which embodied both functional and ideological roles.

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Credits

English text editing: Suzanne Needs-Howarth, PhD

Figures:

Siebe Boersma (1.2, 2.1, 2.3, 2.4, 2.10-15, 3.2, 3.4, 3.6, 3.7, 3.8, 3.9, 4.1-3, 4.5-4.8, 5.1, 6.1)
Erwin Bolhuis (2.4, 2.10-2.15)
Sylvia Blomsma (2.2, 2.5-2.9)
Stijn Arnoldussen (1.1, 1.3, 3.1, 3.3, 3.5, 4.3, 4.5)
Sandra Beckerman (2.3, 2.4, 2.10-2.15, 3.2, 3.4, 3.6-3.9, 4.2-4.8, 6.1)

1.1 after: Milisauskas and Kruk, 2002
1.2 after: Furholt, 2014a: fig.2
1.3 after: Theunissen, 2014 and Vos and De Vries, 2013
1.4 after: Nobles in prep and Vos and De Vries, 2013
2.1 after: Van der Waals and Glasbergen (1955), as modified by Lanting and Van der Waals (1976)
3.1 after: Theunissen *et al.*, 2014 and Vos and De Vries, 2013
3.2, 3.6 and 3.7 after: Beckerman and Raemaekers, 2009
3.8 1-5 after: Beckerman and Raemaekers, 2009, 6 after: Louwe Kooijmans, 1976
4.1 after: Furholt, 2003a
5.1 after: Maier and Schlichtherle, 2011: fig. 2

Tables: Sandra Beckerman

Ceramic characteristics examined

Type sherd

1: Rim
2: Neck
3: Shoulder
4: Wall
5: Base
6: Grit
7: indet/younger
EB: empty bag

Technological characteristics

Tempering material

Quartz
Granite
Red granite
Mica
Hoorblend
Flint
Grog
Sand

Organic material

Grain
Shell
Bone

Tempering size

<1: under 1 mm
1-2: 1-2 mm
2-3: 2-3 mm
>3: over 3 mm

Amount of tempering material

Very little: 0-5 particles cm²
Little: 5-10 particles cm²
Average: 10-15 particles cm²
Many: over 15 particles cm²

Thickness

In mm
Classes: Thin-walled: 5-7.5 mm
Medium-thick-walled: 8-8.5 mm
Thick-walled: 9-10.5 mm

Construction

Coil built: Hb-joints
Coil built: U-joints
After Stilborg and Bergenstråhle, 2000

Firing method

Outside-Core-Inside
Li: light (fired in an oxygen rich fire)
Da: dark (fired in an oxygen poor fire)

Surface treatment outside

Smitten
Rough
Lightly smoothed
Smoothened
Polished

Surface treatment inside

Rough
Lightly smoothed
Smoothened
Polished

Decoration

Types according to the Van der Waals and Glasbergen typology
And: technique (Spatula, cord, fingertip impressions) and motifs

And

Weathering
Secondary burned
Flaked off
Rounded

Residues

Yes; location i=inside, o=outside
No

Repair holes/perforations

Type and location

Morphological characteristics

First step: sherd level

Shape of the pot: pot type (partite)

1partite
2partited
3partited

Shape of the rim

Round
FlatTriangular
Slanting inwards
Slanting outwards

Shape of the base

Protruding
Flat
Hollow

Shape of the ear

Strap handle
Plug

Second step: vessels

Diameter of the rim, greatest belly circumference and base in cm

Third step: vessels that are complete down to at least the smallest circumference

Metrical analysis: subdivision in one of the four main shapes:

- (1) vessel with an high upright or inward bending neck;
- (2) medium to large vessels with an pronounced S-shape;
- (3) medium to large vessels with an enlarged beaker shape;
- (4) beakers
- (5) other

Appendix 4.1

Corpus of ¹⁴C-dates

This catalogue presents all the ¹⁴C-dates for the beaker periods in the Netherlands. For every date basic information is given on the identification number, the site name, the type of site, the dated material, the culture, the associated ceramics and other finds and the literature in which the date is presented. Moreover, this catalogue presents the problems affecting the reliability of these dates.

Literature:

- LW = Lanting & Van der Waals, 1976
LP = Lanting & Van der Plicht, 1999/2000
L = Lanting, 2007/08
H = Hogestijn, 1997
DH = Drenth & Hogestijn, 2006
M = Müller *et al.*, 2008
B = Bulten *et al.*, 2002
C = Carmiggelt *et al.*, 2011

Colour codes:

Date= no problems

■ = one minus

■ = two minuses or more

Identification number: GrA-100
Date: 4130±30 BP
Site name: Molenkolk 2
Type of site: Settlement
Dated material: Charred reed
Culture: SGC
Associated ceramics: ?
Other associated finds: ?
Literature: LP: 78; H: 27
Problems with the date:
1. settlement ceramics: ■

Identification number: GrA-101
Date: 3890±70 BP
Site name: Portelwoid
Type of site: Settlement
Dated material: Charred reed
Culture: SGC
Associated ceramics: ?
Other associated finds: ?
Literature: LP: 78; L: 38; H: 27
Problems with the date:
1. settlement ceramics: ■

Identification number: GrA-103
Date: 3910±30 BP
Site name: Molenkolk 1
Type of site: Settlement
Dated material: Charred reed
Culture: SGC
Associated ceramics: ?
Other associated finds: ?
Literature: LW: 40-41; LP: 82-83; L: 38 and 53
Problems with the date:
1. settlement ceramics: ■

Identification number: GrA-104
Date: 4070±30 BP
Site name: Maantjesland
Type of site: Settlement
Dated material: Charred hazelnut shells
Culture: SGC
Associated ceramics: ?
Other associated finds: ?
Literature: LP: 78; H: 27
Problems with the date:
1. settlement ceramics: ■

Identification number: GrA-107
 Date: 3960±30 BP
 Site name: Sijbekarspel-De Veken
 Type of site: Settlement
 Dated material: Charred hazelnut shells
 Culture: SGC
 Associated ceramics: 2IIa/2Ia
 Other associated finds: ?
 Literature: LP: 78; L: 38; H: 27; DH: 72
 Problems with the date: none

Identification number: GrA-108
 Date: 4130±40 BP
 Site name: Hoogwoud-Mienakker
 Type of site: Settlement
 Dated material: Charred reed
 Culture: SGC
 Associated ceramics: ?
 Other associated finds: ?
 Literature: LP: 78-79; H: 27
 Problems with the date: —
1. settlement ceramics: —

Identification number: GrA-109
 Date: 4100±30 BP
 Site name: Hoogwoud-Mienakker
 Type of site: Settlement
 Dated material: Charred reed
 Culture: SGC
 Associated ceramics: ?
 Other associated finds: ?
 Literature: LP: 78-79; H: 27
 Problems with the date: —
1. settlement ceramics: —

Identification number: GrA-110
 Date: 4120±30 BP
 Site name: Hoogwoud-Mienakker
 Type of site: Settlement
 Dated material: Charred reed
 Culture: SGC
 Associated ceramics: ?
 Other associated finds: ?
 Literature: LP: 78-79; H: 27
 Problems with the date: —
1. settlement ceramics: —

Identification number: GrA-112
 Date: 4030±30 BP
 Site name: Zeewijk-west
 Type of site: Settlement
 Dated material: Charred reed
 Culture: SGC
 Associated ceramics: ?
 Other associated finds: ?
 Literature: LP: 79; H: 27; DH: 74
 Problems with the date: —
1. settlement ceramics: —

Identification number: GrA-114
 Date: 4140±40 BP
 Site name: Zeewijk-west
 Type of site: Settlement
 Dated material: Charred twigs
 Culture: SGC
 Associated ceramics: ?
 Other associated finds: ?
 Literature: LP: 79; H: 27; DH: 74
 Problems with the date: —
1. settlement ceramics: —

Identification number: GrA-116
 Date: 4320±60 BP
 Site name: Zandwervens
 Type of site: Settlement
 Dated material: Residue on sherd
 Culture: SGC
 Associated ceramics: ?
 Other associated finds: ?
 Literature: LP: 78; H: 27
 Problems with the date: —
1. reservoir effect: —

Identification number: GrA-118
 Date: 4220±30 BP
 Site name: Zandwervens
 Type of site: Settlement
 Dated material: Charred twigs
 Culture: SGC
 Associated ceramics: ?
 Other associated finds: ?
 Literature: LP: 78; H: 27
 Problems with the date: —
1. settlement ceramics: —

Identification number: GrN-318
 Date: 4435±320
 Site name: Schaarsbergen tumulus 1
 Type of site: grave
 Dated material: SGC
 Culture: Charcoal
 Associated ceramics: 1a
 Other associated finds: flint blade, flint axe
 Literature: LW: 40-41; LP: 82-83; L: 38 and 53
 Problems with the date: —
Abnormal date: —

Identification number: GrN-851
 Date: 4140±70 BP
 Site name: Anlo-veekraal grave B
 Type of site: Grave
 Dated material: Charcoal (charred coffin wall)
 Culture: SGC
 Associated ceramics: 2IIb
 Other associated finds: x
 Literature: LW: 40; LP: 79
 Problems with the date: none

Identification number: GrA-113
 Date: 4150±30 BP
 Site name: Zeewijk-west
 Type of site: Settlement
 Dated material: Charred reed
 Culture: SGC
 Associated ceramics: ?
 Other associated finds: ?
 Literature: LP: 79; H: 27; DH: 74
 Problems with the date:
1. settlement ceramics: —

Identification number: GrN-946
 Date: 3880±50 BP
 Site name: Eext-Schaapdijksweg, tumulus b
 Type of site: Grave
 Dated material: Charcoal (from the hill)
 Culture: SGC
 Associated ceramics: ZZ
 Other associated finds: GP dagger, H-hammer
 Literature: LW: 40; LP: 76
 Problems with the date:
1. t.a.q: —

Identification number: GrN-1676
 Date: 3775±55 BP
 Site name: Eext-Ketenberg
 Type of site: Grave
 Dated material: Charcoal (probably from bottom of coffin)
 Culture: BBC
 Associated ceramics: ?
 Other associated finds: ?
 Literature: LP: 94
 Problems with the date:
1. Old wood effect: —
2. No ceramics: —

Identification number: GrN-1855
 Date: 4420±55BP
 Site name: Anlo-veekraal grave E
 Type of site: Grave
 Dated material: Charcoal (from coffin)
 Culture: SGC
 Associated ceramics: 1a
 Other associated finds: x
 Literature: LW: 39; LP: 75
 Problems with the date:
1. Old wood effect: —

Identification number: UtC-1941
 Date: 3760±70 BP
 Site name: Schokland P14-grave 7
 Type of site: Grave
 Dated material: Dentine
 Culture: SGC
 Associated ceramics: x
 Other associated finds: x
 Literature: LP: 77
 Problems with the date:
1. Sample treatment: —
2. No ceramics: —

Identification number: GrN-939
 Date: 3885±65 BP
 Site name: Eext-Schaapdijksweg, tumulus b
 Type of site: Grave
 Dated material: Charcoal (from the hill)
 Culture: SGC
 Associated ceramics: ZZ
 Other associated finds: GP dagger, H-hammer
 Literature: LW: 40; LP: 76
 Problems with the date:
1. t.a.q: —

Identification number: UtC-1946
 Date: 3870±60 BP
 Site name: Schokland P14-grave 4
 Type of site: Grave
 Dated material: Bone
 Culture: SGC
 Associated ceramics: x
 Other associated finds: x
 Literature: LP: 77
 Problems with the date:
1. Sample treatment: —
2. No ceramics: —

Identification number: UtC-1948
 Date: 3740±50 BP
 Site name: Schokland P14-grave 3
 Type of site: Grave
 Dated material: Bone
 Culture: SGC
 Associated ceramics: x
 Other associated finds: x
 Literature: LP: 77
 Problems with the date:
1. Sample treatment: —
2. No ceramics: —

Identification number: UtC-1949
 Date: 3910±50 BP
 Site name: Schokland P14-grave 10
 Type of site: Grave
 Dated material: LP: 77
 Culture: SGC
 Associated ceramics: x
 Other associated finds: x
 Literature: LP: 77
 Problems with the date:
1. Bad sample quality: —
2. No ceramics: —

Identification number: UtC-1950
 Date: 3640±100 BP
 Site name: Schokland P14-grave 12
 Type of site: Grave
 Dated material: DBone
 Culture: SGC
 Associated ceramics: x
 Other associated finds: x
 Literature: LP: 79; H: 27 and 40-41
 Problems with the date:
1. Sample treatment: —
2. No ceramics: —

Identification number: UtC-1945
 Date: 4040±70 BP
 Site name: Schokland P14-grave 9
 Type of site: Grave
 Dated material: Bone
 Culture: SGC
 Associated ceramics: x
 Other associated finds: x
 Literature: LP: 77
 Problems with the date:
 1. Sample treatment: — —
 2. No ceramics: — —

Identification number: GrN-1967
 Date: 39655±50
 Site name: Anlo-veekraal, grave C
 Type of site: Grave
 Dated material: Charcoal (pit dug into grave)
 Culture: SGC
 Associated ceramics: 2I1b
 Other associated finds: x
 Literature: LW: 40; LP: 80
 Problems with the date:
 1. t.a.q: —

Identification number: GrN-2158
 Date: 3910±30
 Site name: Vlaardingen
 Type of site: Settlement
 Dated material: Charcoal (cult layer trench 9)
 Culture: BBC
 Associated ceramics: 2Ia
 Other associated finds: x
 Literature: LP: 78; L: L: 38; H: 27; DH: 73
 Problems with the date:
 1. Sample treatment: —




Identification number: GrN-2221
 Date: 4000±65 BP
 Site name: Zandwerven
 Type of site: Settlement
 Dated material: Charcoal (pit basis of cultural layer)
 Culture: SGC
 Associated ceramics: ?
 Other associated finds: ?
 Literature: LP: 78
 Problems with the date:
 1. Settlement ceramics: —




Identification number: GrN-1965
 Date: 4195±70
 Site name: Anlo-veekraal, grave A
 Type of site: Grave
 Dated material: Charcoal (charred coffin wall)
 Culture: SGC
 Associated ceramics: x
 Other associated finds: x
 Literature:
 Problems with the date: LP: 80
 1. No ceramics: — —




Identification number: GrN-2306
 Date: 4410±100 BP
 Site name: Vlaardingen
 Type of site: Settlement
 Dated material: ?
 Culture: SGC
 Associated ceramics: x
 Other associated finds: x
 Literature: LW: 39; LP: 78
 Problems with the date:
 1. Sample treatment: —
 2. No ceramics: — —
 3. Relation uncertain: —


Identification number: GrN-2388
 Date: 3910±55 BP
 Site name: Mander, tumulus 1958-I
 Type of site: Grave
 Dated material: Charcoal (from coffin)
 Culture: BBC
 Associated ceramics: x
 Other associated finds: x
 Literature: LP: 94
 Problems with the date:
 1. Old wood effect: —
 2. No ceramics: — —




Identification number: GrN-2419
 Date: 3910±100 BP
 Site name: Vlaardingen
 Type of site: Settlement
 Dated material: Charcoal (cultural layer)
 Culture: BBC
 Associated ceramics: 2Ia
 Other associated finds: x
 Literature: LW: 40-41; LP: 82-83; L: 38 and 53
 Problems with the date: none

Identification number: GrN-2303
 Date: 4330±60 BP
 Site name: Vlaardingen
 Type of site: Settlement
 Dated material: ?
 Culture: SGC
 Associated ceramics: x
 Other associated finds: x
 Literature: LW: 39; LP: 78
 Problems with the date:
 1. Sample treatment: 
 2. No ceramics: 
 3. Relation uncertain: 



Identification number: GrN-2304
 Date: 4250±75 BP
 Site name: Vlaardingen
 Type of site: Settlement
 Dated material: ?
 Culture: SGC
 Associated ceramics: x
 Other associated finds: A-hammer
 Literature: LW: 39; LP: 78
 Problems with the date:
 1. Sample treatment: 
 2. No ceramics: 
 3. Relation uncertain: 


Identification number: GrN-2487
 Date: 4280±100 BP
 Site name: Vlaardingen
 Type of site: Settlement
 Dated material: ?
 Culture: SGC
 Associated ceramics: x
 Other associated finds: A-hammer
 Literature: LW: 39; LP: 78
 Problems with the date:
 1. Sample treatment: 
 2. No ceramics: 
 3. Relation uncertain: 

Identification number: GrN-2969
 Date: 3660±55 BP
 Site name: Mander
 Type of site: Grave
 Dated material: Charcoal (from stone coffin)
 Culture: BBC
 Associated ceramics: x
 Other associated finds: x
 Literature: LP: 94; L: 66
 Problems with the date:
 1. No ceramics: 

Identification number: GrN-2480
 Date: 4410±100 BP
 Site name: Vlaardingen
 Type of site: Settlement
 Dated material: ?
 Culture: SGC
 Associated ceramics: x
 Other associated finds: x
 Literature: LW: 39; LP: 78
 Problems with the date:
 1. Sample treatment: 
 2. No ceramics: 
 3. t.a.g.: 

Identification number: GrN-2481
 Date: 3860±110 BP
 Site name: Vlaardingen
 Type of site: Settlement
 Dated material: Wood (outermost 5 rings of pole)
 Culture: BBC
 Associated ceramics: 2la
 Other associated finds: x
 Literature: LW: 40-41; LP: 82-83; L: 38 and 53
 Problems with the date: none

Identification number: GrN-4114
 Date: 4420±120 BP
 Site name: Vlaardingen
 Type of site: Settlement
 Dated material: charcoal (cultural layer, trench 9)
 Culture: BBC
 Associated ceramics: x
 Other associated finds: A-hammer
 Literature: LW: 39; LP: 78
 Problems with the date:
 1. No ceramics: 
 2. Relation uncertain: 

Identification number: GrN-4635
 Date: 3685±40 BP
 Site name: Haarlem-Schoterweg
 Type of site: Settlement
 Dated material: Peat
 Culture: BBC
 Associated ceramics: Bell Beaker and Neck Potbeaker (sherds)
 Other associated finds: x
 Literature: LP: 91; L: 54
 Problems with the date:
 1. Relation uncertain: 

Identification number: GrN-2982
 Date: 3620±70 BP
 Site name: Mander, tumulus 1958-I
 Type of site: Grave
 Dated material: Charcoal (from the grave)
 Culture: BBC
 Associated ceramics: x
 Other associated finds: Flint knife
 Literature: LP: 93; L: 66
 Problems with the date:
1. No ceramics: —

Identification number: GrN-2996
 Date: 3705±80 BP
 Site name: St.Walrick-tumulus I
 Type of site: Grave
 Dated material: Charcoal (grave 2 or 3)
 Culture: BBC
 Associated ceramics: x
 Other associated finds: x
 Literature: LP: 88-90
 Problems with the date:
1. No ceramics: —

Identification number: GrN-3097
 Date: 3850±50 BP
 Site name: Vlaardingen
 Type of site: Settlement
 Dated material: charcoal (cultural layer, trench 9)
 Culture: BBC
 Associated ceramics: 21a
 Other associated finds: x
 Literature: LW: 40-41; LP: 82-83; L: 38 and 53
 Problems with the date:
1. Sample treatment: —

Identification number: GrN-5131
 Date: 3665±40 BP
 Site name: Molenaarsgraaf
 Type of site: Grave
 Dated material: Collagen (femur)
 Culture: BBC
 Associated ceramics: Veluwe, 21f
 Other associated finds: x
 Literature: LW: 41. LP: 85; L: 53
 Problems with the date: none

Identification number: GrN-5132
 Date: 3780±50 BP
 Site name: Molenaarsgraaf
 Type of site: Grave
 Dated material: Charcoal (from pit)
 Culture: BBC
 Associated ceramics: Two sherds
 Other associated finds: x
 Literature: LP: 91
 Problems with the date:
1. Old wood effect: —

Identification number: GrN-4908
 Date: 3980±60 BP
 Site name: Voorschoten-Boschgeest
 Type of site: Settlement
 Dated material: Charcoal (layer 10)
 Culture: Vlaardingen and SGC
 Associated ceramics: 1a, 1b, 1d, 211b (sherds)
 Other associated finds: x
 Literature: LW: 40; LP: 79
 Problems with the date: none

Identification number: GrN-4948
 Date: 4130±40 BP
 Site name: Vlaardingen
 Type of site: Settlement
 Dated material: ?
 Culture: SGC
 Associated ceramics: a-typical SGC amphora
 Other associated finds: x
 Literature: LP: 78
 Problems with the date:
1. t.a.q.: —

Identification number: GrN-5068
 Date: 3955±50 BP
 Site name: Odoorn-Eesserveld
 Type of site: Settlement
 Dated material: Charred grain
 Culture: SGC
 Associated ceramics: 1a, 1c, Wellenbandpot
 Other associated finds: x
 Literature: LW: 40; LP: 79
 Problems with the date: none

Identification number: GrN-5988
 Date: 5045±75 BP
 Site name: Swalemen-tumulus Bosheide 1
 Type of site: Grave
 Dated material: Charcoal (scattered from filling of ditch around grave)
 Culture: BBC
 Associated ceramics: 1d
 Other associated finds: Flint blade
 Literature: LW: 41; LP: 77
 Problems with the date:
1. Old wood effect: —

Identification number: GrN-6126
 Date: 3970±35 BP
 Site name: Hijkerfeld-grave V
 Type of site: Grave
 Dated material: Charcoal (from grave)
 Culture: SGC
 Associated ceramics: 1b
 Other associated finds: Flint axe, flint blade and E-hammer
 Literature: LW: 39; LP: 75
 Problems with the date:
1. Relation uncertain: —

Identification number: GrN-5295
 Date: 3930±50 BP
 Site name: Bornwerd
 Type of site: Settlement
 Dated material: Peat (covering prehistoric field)
 Culture: SGC
 Associated ceramics: SGC and TRB sherds
 Other associated finds: x
 Literature: LP: 79
 Problems with the date: none

Identification number: GrN-6127
 Date: 4055±555 BP
 Site name: De Eese tumulus IV, period 1
 Type of site: Grave
 Dated material: Charcoal (ditch around tumulus)
 Culture: BBC
 Associated ceramics: 2Ia
 Other associated finds: x
 Literature: LW: 40-41; LP: 83
 Problems with the date:
 1. Relation uncertain: —
 2. t.p.q: —

Identification number: GrN-5497
 Date: 3915±45 BP
 Site name: Vaassen
 Type of site: Settlement
 Dated material: Charcoal (dispersed under Celticfield)
 Culture: BBC
 Associated ceramics: Potbeaker (sherds)
 Other associated finds: x
 Literature: LP: 91
 Problems with the date:

Identification number: GrN-6127
 Date: 4055±555 BP
 Site name: De Eese tumulus IV, period 1
 Type of site: Grave
 Dated material: Charcoal (ditch around tumulus)
 Culture: SGC
 Associated ceramics: x
 Other associated finds: x
 Literature: LP: 76
 Problems with the date:
 1. No ceramics: —

1. Relation uncertain: —

Identification number: GrN-5705
 Date: 3635±60 BP
 Site name: Molenaarsgraaf
 Type of site: Settlement

Identification number: GrN-6128
 Date: 4035±55 BP
 Site name: Witrijt
 Type of site: Grave
 Dated material: Charcoal (presumably from charred pole in ditch around grave)
 Culture: SGC
 Associated ceramics: 2IIC
 Other associated finds: GP dagger
 Literature: LW: 40; LP: 80
 Problems with the date: none

Dated material: Charcoal (from pit)
 Culture: BBC
 Associated ceramics: Veluwe and other sherd
 Other associated finds: x
 Literature: LP: 91
 Problems with the date:
 1. Relation uncertain: —

Identification number: GrN-6129
 Date: 4165±55 BP
 Site name: Ede-Hotel Bosbeek
 Type of site: Grave
 Dated material: Charcoal (from grave pit)
 Culture: SGC
 Associated ceramics: 1a
 Other associated finds: Flint blade, hammer type 1
 Literature: LW: 39; LP: 75
 Problems with the date: none

Identification number: GrN-6212
 Date: 3630±35 BP
 Site name: Hazendonk (2)
 Type of site: Settlement
 Dated material: Peat (zone 5)
 Culture: BBC
 Associated ceramics: Veluwe and Barbed wire ceramics
 Other associated finds: x
 Literature: LP: 91
 Problems with the date: none

Identification number: GrN-6145
 Date: 3665±35 BP
 Site name: St. Warick-tumulus
 Type of site: Grave
 Dated material: Charcoal (from grave)
 Culture: BBC
 Associated ceramics: Veluwe, 2Ie
 Other associated finds: Schleifennadel
 Literature: LW: 41; LP: 88-90
 Problems with the date:
 1. t.a.q: —

Identification number: GrN-6225
 Date: 3705±35 BP
 Site name: Oudemolen, tumulus 13, period 2
 Type of site: Grave
 Dated material: Charcoal (from coffin)
 Culture: BBC
 Associated ceramics: x
 Other associated finds: x
 Literature: LP: 92; L: 58; DH: 53
 Problems with the date:
 1. No ceramics: —

Identification number: GrN-6146
 Date: 3725±35 BP
 Site name: Oudemolen-tumulus 13, period 1
 Type of site: Grave
 Dated material: Charcoal (from coffin)
 Culture: BBC
 Associated ceramics: Bell beaker (highly decorated sherds) and small undecorated beaker
 Other associated finds: x
 Literature: LP: 92; L: 58; DH: 53
 Problems with the date: none

Identification number: GrN-6152
 Date: 3945±35 BP
 Site name: Buinen
 Type of site: Grave
 Dated material: Charcoal (from surface directly under burial)
 Culture: BBC
 Associated ceramics: 2la
 Other associated finds: x
 Literature: LW: 40; LP: 82; L: 38 and 58
 Problems with the date:
 1. Sample treatment: —
 2. Relation uncertain: —

Identification number: GrN-6155
 Date: 3820±35 BP
 Site name: Bennekom
 Type of site: Grave
 Dated material: Charcoal (concentration in grave pit)
 Culture: BBC
 Associated ceramics: Veluwe 2le (two)
 Other associated finds: x
 Literature: LW: 41; LP: 85; L: 54
 Problems with the date: none

Identification number: GrN-6340
 Date: 3760±35 BP
 Site name: Eext-Kerkweg 3
 Type of site: Grave
 Dated material: Charcoal (from coffin)
 Culture: BBC
 Associated ceramics: x
 Other associated finds: Hammer type Emmen, small hammer with unfinished perforation
 Literature: LP: 93; L: 66
 Problems with the date:
 1. No ceramics: —

Identification number: GrN-6261
 Date: 3665±35 BP
 Site name: Hijken-Hooghalen, tumulus I
 Type of site: Grave
 Dated material: Charcoal (from coffin)
 Culture: BBC
 Associated ceramics: x
 Other associated finds: x
 Literature: LP: 94
 Problems with the date:
 1. No ceramics: —

Identification number: GrN-6295
 Date: 4495±60 BP
 Site name: Hijkerveld-grave I
 Type of site: Grave
 Dated material: Charcoal (dispersed, from post-hole in ditch around the grave)
 Culture: SGC
 Associated ceramics: 1a
 Other associated finds: Flint blade, A3 hammer, grinding stone
 Literature: LW: 39; LP: 75
 Problems with the date:
 1. Sample treatment: —
 2. Old wood effect: —
 3. Relation uncertain: —

Identification number: GrN-6332
 Date: 3790±35 BP
 Site name: Lunteren
 Type of site: Grave
 Dated material: Charred twigs (from ditch surrounding grave)
 Culture: BBC
 Associated ceramics: Veluwe, 2lf
 Other associated finds: Copper tongue dagger, wrist guard, arrowhead (seven), strike a light, iron stone
 Literature: LW: 41; LP: 85; L: 53; DH: 127
 Problems with the date: none

Identification number: GrN-6367
 Date: 3670±35 BP
 Site name: Eext-Kerkweg 2
 Type of site: Grave
 Dated material: Charcoal (from coffin)
 Culture: BBC
 Associated ceramics: Barbwire beaker
 Other associated finds: Triangular flat flint flake
 Literature: LW: 41; LP: 93; L: 66
 Problems with the date:
 1. Relation uncertain: —

Identification number: GrN-6349
 Date: 3945±40 BP
 Site name: Eext-Bergakkers
 Type of site: Grave
 Dated material: Charcoal (from coffin)
 Culture: SGC
 Associated ceramics: 1b
 Other associated finds: Heavy flint blade/flint knife
 Literature: LW: 39; LP: 75; DH: 82
 Problems with the date: none

Identification number: GrN-6368
 Date: 3935±35 BP
 Site name: Eext-Galgwanderveen, tumulus 3
 Type of site: Grave
 Dated material: Charcoal (from coffin)
 Culture: SGC
 Associated ceramics: 1d
 Other associated finds: GP dagger, flint axe, H-hammer
 Literature: LW: 39; LP: 75; L: 38
 Problems with the date: None

Identification number: GrN-6350
 Date: 3955±55 BP
 Site name: Stroe
 Type of site: Grave
 Dated material: Charcoal (from old surface under burial mound)
 Culture: SGC/BBC
 Associated ceramics: Late SGC sherds and Golfbandpot, or t.p.q for Veluwe style Bell Beaker
 Other associated finds: wrist guard, copper tongue dagger
 Literature: LW: 41; LP: 87-88; DH: 127
 Problems with the date:
 1. Sample treatment: —
 2. Relation uncertain: —
 3. t.p.q.: —

Identification number: GrN-6369
 Date: 4165±40 BP
 Site name: Vaassen-tumulus 1941-III
 Type of site: Grave
 Dated material: Charred branches (from ditch around grave)
 Culture: SGC
 Associated ceramics: 1a (sherds)
 Other associated finds: P2 (C/A) hammer, flint blade, probably green stone axe
 Literature: LW: 39; LP: 75; L: 38
 Problems with the date: None

Identification number: GrN-6351
 Date: 4005±30 BP
 Site name: Ermelose heide-tumulus 1
 Type of site: Grave
 Dated material: Charcoal (from concentration in ditch around grave)
 Culture: SGC
 Associated ceramics: 2IIb (two)
 Other associated finds: flint blade
 Literature: LW: 40; LP: 79
 Problems with the date: none

Identification number: GrN-6384
 Date: 3820±45 BP
 Site name: Ottoland-Kromme Elleboog
 Type of site: Grave
 Dated material: Grave
 Culture: BBC
 Associated ceramics: x
 Other associated finds: x
 Literature: LP: 91-92
 Problems with the date:
 1. No ceramics: —

Identification number: GrN-6352
 Date: 4290±45 BP
 Site name: Hijkerfeld, grave II
 Type of site: Grave
 Dated material: Charcoal (small pieces, postholes around grave)
 Culture: SGC
 Associated ceramics: 1a
 Other associated finds: Flint blade
 Literature: LW: 39; LP: 75
 Problems with the date:
 1. Sample treatment: —
 2. Relation uncertain: —

Identification number: GrA-6477
 Date: 3640±50 BP
 Site name: Oostwoud-De Tuithoorn, tumulus II
 Type of site: Grave
 Dated material: Collagen (secondary grave in mound)
 Culture: BBC
 Associated ceramics: x
 Other associated finds: x
 Literature: LP: 86-87; DH: 74
 Problems with the date:
 1. No ceramics: —

Identification number: GrN-6635
 Date: 3940±40 BP
 Site name: Eext-Galgwanderveen, tumulus 3
 Type of site: Grave
 Dated material: Charcoal (from coffin)
 Culture: SGC
 Associated ceramics: 1d
 Other associated finds: GP-dagger, flint axe, H-hammer
 Literature: LW: 39; LP: 75; L: 38
 Problems with the date: None

Identification number: GrN-6683C
 Date: 4385±75 BP
 Site name: Laren-'t Bluk, tumulus 6
 Type of site: Grave
 Dated material: Charcoal (from sod in the mound)
 Culture: SGC
 Associated ceramics: 1d
 Other associated finds: C-hammer
 Literature: LW: 39; LP: 75
 Problems with the date:
 1. Sample treatment: —
 2. t.p.q: —

Identification number: GrN-6643
 Date: 3870±35 BP
 Site name: Annertol-tumulus III, period 1
 Type of site: Grave
 Dated material: Charcoal (from foot of mound)
 Culture: BBC
 Low broad Bell Beaker, (Central grave: undecorated Bell Beaker, little Bell Beaker with Maritime like decoration and another beaker)
 Associated ceramics:
 Other associated finds: Amber
 Literature: LW: 40-41; LP: 83; L: 58
 Problems with the date: None

Identification number: GrN-6687C
 Date: 3870±35 BP
 Site name: De Eese-mound 1918 IV
 Type of site: Grave
 Dated material: Charcoal (from slope of primary mound)
 Culture: SGC
 Associated ceramics: 1e
 Other associated finds: Flint blade, H/R hammer
 Literature: LW: 39; LP: 75; L: 38
 Problems with the date:
 1. Relation uncertain: —

Identification number: GrN-6644
 Date: 4160±30 BP
 Site name: Emmen-Angelslo, mound VIII
 Type of site: Grave
 Dated material: Charcoal (from vertical piece of wood in mound)
 Culture: SGC
 Associated ceramics: 1e
 Other associated finds: x
 Literature: LW: 40; LP: 76
 Problems with the date:
 1. Old wood effect: —

Identification number: GrN-6688C
 Date: 4155±60 BP
 Site name: Ede-Ginkelse heide
 Type of site: Grave
 Dated material: Charcoal (from sod in mound)
 Culture: BBC
 Associated ceramics: 2Ib
 Tongue dagger, wrist guard, arrow heads, strike-a-lights
 Literature: LW: 41; LP: 83; DH: 126-127
 Problems with the date:
 1. Old wood effect: —
 2. t.p.q: —

Identification number: GrN-6650C
 Date: 3945±55 BP
 Site name: Oostwoud-De Tuithoorn, tumulus II
 Type of site: Grave
 Dated material: Collagen
 Culture: BBC
 Associated ceramics: Beaker in late maritime style
 Other associated finds: x
 Literature: LP: 86-87; DH: 74
 Problems with the date:
 1. Relation uncertain: —

Identification number: GrN-6711
 Date: 3735±35 BP
 Site name: Laaghalerveld-tumulus 1930-I
 Type of site: Grave
 Dated material: Charcoal (from coffin)
 Culture: BBC
 Associated ceramics: x
 Hammer type Zuidervelde, oval shaped flint knife
 Literature: LP: 93; L: 66
 Problems with the date:
 1. No ceramics: —

Identification number: GrN-6651
Date: 4040±80 BP
Site name: Hijkerveld-Grave IV
Type of site: Grave
Dated material: Charcoal

Culture: SGC
Associated ceramics: x
Other associated finds: Flint blade

Literature: LP: 76

Problems with the date:

1. Sample treatment: —

2. No ceramics: —

Identification number: GrN-6724
Date: 4210±40 BP
Site name: Noordbarge-Hoge Loo
Type of site: Grave
Dated material: Charcoal (from deepest 10 cm of grave pit)

Culture: SGC
Associated ceramics: 1d

Other associated finds: x

Literature: LP: 77

Problems with the date:

1. No ceramics: —

Identification number: GrN-6725
Date: 8070±75 BP
Site name: Emmen-Angelslo, flat-grave 15
Type of site: Grave

Dated material: Charcoal (filling of grave pit)

Culture: SGC

Associated ceramics: 1d

Other associated finds: x

Literature: LP: 77

Problems with the date:

1. Old wood effect: —

Identification number: GrN-6727
Date: 4145±30 BP
Site name: Eext-tumulus visplas 1937
Type of site: Grave

Dated material: Charcoal (from charred pole in ditch around the grave)

Culture: SGC

Associated ceramics: ZZ

Other associated finds: GP dagger, flint axe, P1 hammer

Literature: LW: 39; LP: 75

Problems with the date:

1. Old wood effect: —

Identification number: GrN-6712
Date: 4065±55 BP
Site name: Renkum-Kwadenoord, tumulus A
Type of site: Grave
Dated material: Charcoal (small pieces, from sod of mound)

Culture: SGC
Associated ceramics: SGC
Other associated finds: 1d

Heavy flint blade, flint axe, D-hammer

Literature: LW: 39; LP: 75

1. t.p.q: —

Identification number: UtC-6955
Date: 3685±37 BP
Site name: Puttershoek-Sportlaan
Type of site: Settlement

Dated material: Charcoal

Culture: BBC

Associated ceramics: Neck Potbeaker (sherds)

Other associated finds: Scrapers (two), flint flakes

Literature: LP: 91; L: 54

Problems with the date: None

Identification number: GrN-7099
Date: 3875±35 BP
Site name: Wageningen
Type of site: Grave

Dated material: Charcoal (charred shelves or bars on top of old surface)

Culture: BBC

Associated ceramics: (Other grave: Veluwe, 2lf)

Other associated finds: (Other grave: amber buttons)

Literature: LW: 41; LP: 85

Problems with the date:

1. No ceramics: —

Identification number: GrN-7802
Date: 4140±50 BP
Site name: Maarn-de Halm
Type of site: Grave

Dated material: Charcoal (concentration from bottom of ditch around grave)

Culture: SGC

Associated ceramics: 1a

Other associated finds: Flint axe, flint blade, E-hammer

Literature: LP: 75

Problems with the date: None

Identification number: GrN-6856
 Date: 3835±55 BP
 Site name: Mander-tumulus 1972-I
 Type of site: Grave
 Dated material: Charcoal (from shelf over grave)
 Culture: BBC
 Associated ceramics: x
 Other associated finds: Arrowhead, flint knife (other grave: flint knife)
 Literature: LP: 93; L: 66
 Problems with the date:
 1. Old wood effect: —
 2. No ceramics: —

Identification number: GrN-6899
 Date: 2935±55 BP
 Site name: Swalmen-tumulus Bosheide 1
 Type of site: Grave
 Dated material: Charcoal (concentration in mound)
 Culture: SGC
 Associated ceramics: x
 Other associated finds: x
 Literature: LP: 77
 Problems with the date:
 1. Abnormal dates: —
 2. No ceramics: —

Identification number: GrN-8247
 Date: 4040±90 BP
 Site name: Noordbarge-Hoge Loo, grave 1972-IV
 Type of site: Grave
 Dated material: Charcoal (scattered pieces from filing of the grave)
 Culture: SGC
 Associated ceramics: 1d
 Other associated finds: Greenstone axe, flint blade
 Literature: LP: 75; DH: 81
 Problems with the date:
 1. Sample treatment: —

Identification number: GrN-8253
 Date: 3750±80 BP
 Site name: Eext-Bergakkers
 Type of site: Grave
 Dated material: Charcoal (from concentration in top layers of flat-grave)
 Culture: BBC
 Associated ceramics: x
 Other associated finds: x
 Literature: LP: 93-94
 Problems with the date:
 1. No ceramics: —

Identification number: GrN-8254
 Date: 3930±45 BP
 Site name: Eext-Galgwandenvveen, tumulus 1
 Type of site: Grave
 Dated material: Charcoal (from concentration around the walls of pit next to grave)
 Culture: SGC
 Associated ceramics: 1e
 Other associated finds: Flint blade
 Literature: LP: 75; L: 38
 Problems with the date:
 1. t.p.q: —

Identification number: GrN-8232
 Date: 3965±35 BP
 Site name: Hazendonk
 Type of site: Settlement
 Dated material: Charcoal (from Hz6 layer)
 Culture: Vlaardingen and SGC
 Associated ceramics: x
 Other associated finds: x
 Literature: LP: 79
 Problems with the date:
 1. Settlement dates: —

Identification number: GrN-8233
 Date: 4000±25 BP
 Site name: Hazendonk
 Type of site: Settlement
 Dated material: Charcoal (from Hz9 layer)
 Culture: Vlaardingen and SGC
 Associated ceramics: x
 Other associated finds: x
 Literature: LP: 79
 Problems with the date:
 1. Settlement dates: —

Identification number: GrN-9133
 Date: 4015±30 BP
 Site name: Hazendonk
 Type of site: Settlement
 Dated material: Charcoal (from Hz8c2 layer)
 Culture: Vlaardingen and SGC
 Associated ceramics: x
 Other associated finds: x
 Literature: LP: 79
 Problems with the date:
 1. Settlement dates: —

Identification number: GrN-10345
 Date: 4270±70 BP
 Site name: Silvolde
 Type of site: Grave
 Dated material: Charcoal (small pieces, from postholes around a grave)
 Culture: SGC
 Associated ceramics: 1a
 Other associated finds: Big flint axe, hammer type 1, flint blade (probably)
 Literature: LP: 75
 Problems with the date:
 1. Sample treatment: —

Identification number: GrN-10463
 Date: 3760±35 BP
 Site name: Eext-Bergakkers
 Type of site: Grave
 Dated material: Charcoal (from partially charred coffin)
 Culture: BBC
 Associated ceramics: x
 Other associated finds: x
 Literature: LP: 94
 Problems with the date:
 1. No ceramics: —

Identification number: GrN-8801
 Date: 3530±25 BP
 Site name: Oostwoud-De Tuithoorn, tumulus II
 Type of site: Grave
 Dated material: Collagen
 Culture: BBC
 Associated ceramics: x
 Other associated finds: x
 Literature: LP: 86-87; DH: 74
 Problems with the date:
1. No ceramics: —

Identification number: GrN-9132
 Date: 4015±30 BP
 Site name: Hazendonk
 Type of site: Settlement
 Dated material: Charcoal (from Hz7b layer)
 Culture: Vlaardingen and SGC

Associated ceramics: x
 Other associated finds: x
 Literature: LP: 79
 Problems with the date:
1. Settlement dates: —

Identification number: GrN-11849
 Date: 3865±30 BP
 Site name: Hekelingen III, phase 4
 Type of site: Settlement
 Dated material: Charcoal (dispersed, from cultural layer)
 Culture: BBC
 Associated ceramics: Bell Beaker and Barbwire
 Other associated finds: x
 Literature: LP: 84; L: 53
 Problems with the date:
1. Relation uncertain: —

Identification number: GrN-11918
 Date: 4165±30 BP
 Site name: Annen-Holtkampen
 Type of site: Grave
 Dated material: Charcoal (from grave)
 Culture: SGC
 Associated ceramics: 1e and ZZ
 Other associated finds: x
 Literature: LP: 76
 Problems with the date:
1. Old wood effect: —

Identification number: GrN-11921
 Date: 4170±50 BP
 Site name: Eext-Bergakkers
 Type of site: Grave
 Dated material: Charcoal (from ditch around grave)
 Culture: SGC
 Associated ceramics: x
 Other associated finds: x
 Literature: LP: 76
 Problems with the date:
1. No ceramics: —

Identification number: GrA-11264
 Date: 3840±50 BP
 Site name: Rolde-Volmachtenlaan
 Type of site: Grave
 Dated material: Cremation
 Culture: BBC
 Associated ceramics: Epi-Maritime
 Other associated finds: x
 Literature: LP: 92; L: 58
 Problems with the date: None

Identification number: GrN-11295
 Date: 3860±60 BP
 Site name: Rechteren
 Type of site: Settlement
 Dated material: Charcoal (from pit)
 Culture: BBC
 Beaker with grooved lines and undecorated zones, thick walled vessels, large vessels with grooved lines and spatula impressions (all sherds)
 Associated ceramics:
 Other associated finds: Scraper (two), flint flakes
 Literature: LP: 92-93
 Problems with the date:
1. Old wood effect: —

Identification number: GrN-12015
 Date: 4055±40 BP
 Site name: Aartswoud
 Type of site: Settlement
 Dated material: Charcoal (scattered, hallway down 1m settlement material)
 Culture: SGC
 Associated ceramics: ?
 Other associated finds: ?
 Literature: LP: 78; DH: 78-80
 Problems with the date:
1. Settlement ceramics: —

Identification number: GrN-12268
 Date: 3770±60 BP
 Site name: Bennekom
 Type of site: Grave
 Dated material: Charcoal (from pole in ditch around grave)
 Culture: BBC
 Associated ceramics: Veluwe (two)
 Other associated finds: x
 Literature: LW: 41; LP: 85; L: 54
 Problems with the date: None

Identification number: GrA-12299
 Date: 3920±60 BP
 Site name: Puttershoek-sportlaan
 Type of site: Settlement
 Dated material: Residue on beaker
 Culture: SGC
 Associated ceramics: 1d
 Other associated finds: x
 Literature: LP: 79; L: 54; DH: 89
 Problems with the date:
1. Bad sample quality: —

Identification number: GrN-12013
 Date: 3990±40 BP
 Site name: Aartswoud
 Type of site: Settlement
 Dated material: Charred grain (under 1m settlement material)
 Culture: SGC
 Associated ceramics: ?
 Other associated finds: ?
 Literature: LP: 78; DH: 78-80
 Problems with the date:
1. Settlement ceramics: —

Identification number: GrN-12014
 Date: 3970±35 BP
 Site name: Aartswoud
 Type of site: Settlement
 Dated material: Charred hazelnut shells (under 1m settlement material)
 Culture: SGC
 Associated ceramics: ?
 Other associated finds: ?
 Literature: LP: 78; DH: 78-80
 Problems with the date:
1. Settlement ceramics: —

Identification number: UtC-13594
 Date: 3710±50 BP
 Site name: Akersloot-Klein Dorregeest
 Type of site: Settlement
 Dated material: Peat layer
 Culture: BBC
 Associated ceramics: Bell Beaker and Barbwire
 Other associated finds: x
 Literature: LP: 91-92
 Problems with the date:
1. t.a.q: —

Identification number: GrA-13602
 Date: 3880±50 BP
 Site name: Rolde-Volmachtenlaan A
 Type of site: Grave
 Dated material: Cremation
 Culture: BBC
 Associated ceramics: Epi-Maritime
 Other associated finds: x
 Literature: LP: 92; L: 58
 Problems with the date: None

Identification number: GrA-13614
 Date: 3940±50 BP
 Site name: Emmen-Angelso
 Type of site: Grave
 Dated material: Cremation
 Culture: BBC
 Associated ceramics: x
 Other associated finds: Arrow heads (fourteen, burned), flint flakes
 Literature: LP: 93
 Problems with the date:
1. No ceramics: —

Identification number: GrN-12384
 Date: 4005±60 BP
 Site name: Eexterhalte
 Type of site: Grave
 Dated material: Teeth (unburned)
 Culture: SGC
 Associated ceramics: x
 Other associated finds: Flint blade
 Literature: LP: 76
 Problems with the date:
1. No ceramics: —

Identification number: GrN-12387
 Date: 3740±65 BP
 Site name: St. Walrick-tumulus I
 Type of site: Grave
 Dated material: Molar surface
 Culture: BBC
 Associated ceramics: x
 Other associated finds: Schleifennadel
 Literature: LP: 88-90
 Problems with the date:
1. No ceramics: —

Identification number: GrA-14066
 Date: 3840±35 BP
 Site name: Meerlo
 Type of site: Grave
 Dated material: Cremation (?)
 Culture: BBC
 Associated ceramics: Veluwe
 Other associated finds: Arrow shaft grinders, arrowheads (three)
 Literature: LP: 84; L: 53
 Problems with the date: None

Identification number: GrA-14067
 Date: 3830±35 BP
 Site name: Hoog-Buurlo
 Type of site: Grave
 Dated material: Cremation
 Culture: BBC
 Associated ceramics: Veluwe, 2le
 Other associated finds: x
 Literature: LP: 85; L: 53
 Problems with the date: none

Identification number: GrN-14172
 Date: 4010±60 BP
 Site name: Voorschoten-De Donk
 Type of site: Settlement
 Dated material: Charcoal
 Culture: Vlaardingen and SGC
 Associated ceramics: ?
 Other associated finds: ?
 Literature: LP: 79
 Problems with the date:
1. Settlement date: —

Identification number: GrA-13617
 Date: 3910±50 BP
 Site name: Dalen
 Type of site: Grave
 Dated material: Cremation
 Culture: BBC
 Associated ceramics: Small Bell Beaker (vertical rows of paired fingertip impressions)
 Other associated finds: Wrist guard
 Literature: LP: 93; DH: 126
 Problems with the date: None

Identification number: GrN-13714
 Date: 3865±30 BP
 Site name: Epe-Klokbekerweg
 Type of site: Grave
 Dated material: Charcoal (pit under foot of mound)
 Culture: BBC
 Associated ceramics: Veluwe (like)
 Other associated finds: x
 Literature: LP: 91
 Problems with the date:

1. Old wood effect: —

Identification number: GrA-14840
 Date: 3850±40 BP
 Site name: Nijmegen
 Type of site: Grave
 Dated material: Cremation
 Culture: BBC
 Associated ceramics: Veluwe, 2lf
 Other associated finds: x
 Literature: LP: 85; L: 53; DH: 95
 Problems with the date: None

Identification number: GrA-14870
 Date: 3630±50 BP
 Site name: Meteren-Boog C-Noord, site 31
 Type of site: Settlement
 Dated material: Charred grain
 Culture: BBC
 Associated ceramics: Veluwe and Barbwire sherds
 Other associated finds: x
 Literature: LP: 91
 Problems with the date:

1. Relation uncertain: —

Identification number: GrA-14871
 Date: 3580±45 BP
 Site name: Meteren-Boog C-Noord, site 31
 Type of site: Settlement
 Dated material: Charred grain
 Culture: BBC
 Associated ceramics: Veluwe and Barbwire sherds
 Other associated finds: x
 Literature: LP: 91
 Problems with the date: none

Identification number: GrA-14564
 Date: 3690±40
 Site name: Eext-Ketenberg
 Type of site: Grave
 Dated material: Burned bone
 Culture: BBC

Associated ceramics: x
 Other associated finds: x
 Literature: LP: 94
 Problems with the date:

1. No ceramics: —

Identification number: GrA-14831
 Date: 3460±40 BP
 Site name: Meteren-Boog C-Noord, site 31
 Type of site: Settlement
 Dated material: Calcined bone debris
 Culture: BBC
 Associated ceramics: Veluwe and Barbwire sherds
 Other associated finds: x
 Literature: LP: 91
 Problems with the date: None

Identification number: GrA-15311
 Date: 4100±50 BP
 Site name: Molenaarsgraaf
 Type of site: Grave
 Dated material: Collagen
 Culture: BBC
 Associated ceramics: x
 Other associated finds: x
 Literature: LP: 92
 Problems with the date:

1. Reservoir effect: —

2. No ceramics: —

Identification number: GrN-15565
 Date: 3925±40 BP
 Site name: Zeewijk-west
 Type of site: Settlement
 Dated material: Bone
 Culture: SGC
 Associated ceramics: ?
 Other associated finds: ?
 Literature: LP: 79; L: 38; DH: 80
 Problems with the date:

1. Settlement dates: —

Identification number: GrA-15597
 Date: 3690±60 BP
 Site name: Oostwoud-De Tuithoorn, tumulus II
 Type of site: Grave
 Dated material: Collagen
 Culture: BBC
 Associated ceramics: x
 Other associated finds: x
 Literature: LP: 86-87; DH: 74 and 107
 Problems with the date:

1. No ceramics: —

Identification number: GrA-14965
 Date: 4065±45 BP
 Site name: Baarn-De Drie Eiken
 Type of site: Grave
 Dated material: Cremation (carbonate fraction from burned bone mineral)
 Culture: SGC
 Associated ceramics: 1e (two, burned)
 Other associated finds: Spindle whorl, bone awl (two)
 Literature: LP: 76; DH: 128
 Problems with the date: none

Identification number: GrA-14966
 Date: 4090±45 BP
 Site name: Molenaarsgraaf
 Type of site: Grave
 Dated material: Apatite
 Culture: BBC
 Associated ceramics: x
 Other associated finds: x
 Literature: LP: 92
 Problems with the date:
 1. Reservoir effect: —
 2. No ceramics: —

Identification number: GrA-15602
 Date: 3500±50 BP
 Site name: Oostwoud-De Tuithoorn, tumulus II
 Type of site: Grave
 Dated material: Collagen
 Culture: BBC
 Associated ceramics: x
 Other associated finds: x
 Literature: LP: 86-87; DH: 74
 Problems with the date:
 1. No ceramics: —

Identification number: GrA-15641
 Date: 4480±60 BP
 Site name: Loon-hunebed D15
 Type of site: Grave (?)
 Dated material: Cremation
 Culture: BBC
 Associated ceramics: Veluwe (style)
 Other associated finds: x
 Literature: LP: 93; DH: 121
 Problems with the date:
 1. Relation uncertain: —

Identification number: GrA-15696
 Date: 3890±50 BP
 Site name: Sijbekarspel-De Veken
 Type of site: Grave
 Dated material: Bone collagen
 Culture: SGC
 Associated ceramics: x
 Other associated finds: x
 Literature: LP: 76; DH: 72
 Problems with the date:
 1. No ceramics: —

Identification number: GrA-15598
 Date: 3660±50 BP
 Site name: Oostwoud-De Tuithoorn, tumulus II
 Type of site: Grave
 Dated material: Collagen
 Culture: BBC
 Associated ceramics: x
 Other associated finds: x
 Literature: LP: 86-87; DH: 74 and 107
 Problems with the date:
 1. No ceramics: —

Identification number: GrA-15601
 Date: 3520±60 BP
 Site name: Oostwoud-De Tuithoorn, tumulus II
 Type of site: Grave
 Dated material: Collagen
 Culture: BBC
 Associated ceramics: x
 Other associated finds: x
 Literature: LP: 86-87; DH: 74
 Problems with the date:
 1. No ceramics: —

Identification number: GrN-15921
 Date: 4050±60 BP
 Site name: Velsbroekpolder
 Type of site: Grave
 Dated material: Collagen
 Culture: BBC
 Associated ceramics: Veluwe
 Other associated finds: x
 Literature: LP: 85
 Problems with the date:
 1. Sample treatment: —

Identification number: GrA-16054
 Date: 3810±60 BP
 Site name: Molenaarsgraaf
 Type of site: Grave
 Dated material: Tooth enamel
 Culture: BBC
 Associated ceramics: x
 Other associated finds: x
 Literature: LP: 92
 Problems with the date:
 1. No ceramics: —

Identification number: GrA-16186
 Date: 5200±60 BP
 Site name: Schokland-P14, grave 7
 Type of site: GravDental enamele
 Dated material: Swifterbant?
 Culture: x
 Associated ceramics: x
 Other associated finds: LP: 77
 Literature:
 Problems with the date:
 1. Abnormal dates: —
 2. No ceramics: —

Identification number: GrA-15698
Date: 4010±50 BP
Site name: Hoogwoud-Mienakker
Type of site: Grave

Dated material: Bone
Culture: SGC
Associated ceramics: x
Other associated finds: x
Literature: LP: 76-77
Problems with the date:

1. No ceramics: —

Identification number: GrA-15919
Date: 3710±50
Site name: Ottoland-Kromme Elleboog
Type of site: Grave

Dated material: Bone
Culture: BBC
Associated ceramics: x
Other associated finds: x
Literature: M: 23
Problems with the date:

1. No ceramics: —

Identification number: GrN-18673
Date: 3930±55 BP
Site name: Dalen
Type of site: Grave
Dated material: Charcoal (from cremation)
Culture: BBC
Associated ceramics: Small Bell Beaker (vertical rows of paired fingertip impressions)
Other associated finds: Wrist guard
Literature: LP: 93; DH: 126
Problems with the date:

1. Relation uncertain: —

Identification number: GrA-18839
Date: 44360±50 BP
Site name: Emmeloord-Rijksweg
Type of site: Settlement
Dated material: Residue on sherd
Culture: BBC

Associated ceramics: Potbeaker
Other associated finds: x
Literature: B: 217
Problems with the date:

1. Reservoir effect: —

Identification number: GrA-16893
Date: 3635±30 BP
Site name: Velsbroekpolder
Type of site: Grave

Dated material: Wood (from coffin, youngest rings)
Culture: BBC
Associated ceramics: Veluwe
Other associated finds: x
Literature: LP: 85; L: 54
Problems with the date:

1. Sample treatment: —

Identification number: GrN-18488
Date: 3910±50 BP
Site name: Zeewijk-Oost
Type of site: Settlement

Dated material: Wood (from pole belonging to house, outermost 4-6 rings)
Culture: SGC
Associated ceramics: ?
Other associated finds: ?
Literature: LP: 77
Problems with the date:

1. Settlement dates: —

Identification number: GrN-25303
Date: 3740±25 BP
Site name: Oudemolen-tumulus 13, period 2
Type of site: Grave
Dated material: Charcoal (from coffin)
Culture: BBC

Associated ceramics: x
Other associated finds: x
Literature: LP: 92; L: 58; DH: 95
Problems with the date:

1.No ceramics: —

Identification number: GrN-25304
Date: 3800±30 BP
Site name: Oudemolen-tumulus 13, period 2
Type of site: Grave
Dated material: Charcoal (from coffin)
Culture: BBC

Associated ceramics: Bell beaker (highly decorated sherds) and small undecorated beaker
Other associated finds: x
Literature: LP: 92; L: 58; DH: 95
Problems with the date:

Problems with the date: none

Identification number: GrA-18835
Date: 4260±50 BP

Site name: Emmeloord-Rijksweg
Type of site: Settlement

Dated material: Residue on sherd
Culture: BBC
Associated ceramics: Potbeaker
Other associated finds: x
Literature: B: 217

Problems with the date:
1. Reservoir effect: —

Identification number: GrA-23570
Date: 3940±45 BP
Site name: Zutphen
Type of site: Grave
Dated material: Charcoal (from cremation)
Culture: SGC
Associated ceramics: x
Other associated finds: x
Literature: DH: 121

Problems with the date:
1.No ceramics: —

Identification number: GrN-24978
Date: 3750±50 BP
Site name: Nijmegen
Type of site: Grave
Dated material: Charcoal (from grave)
Culture: BBC
Associated ceramics: Veluwe, 2lf
Other associated finds: x
Literature: LW: 39; LP: 78
Problems with the date: none

Identification number: GrA-28356
Date: 3765±45 BP
Site name: Beuningen-Hogewald
Type of site: Grave
Dated material: Cremation
Culture: BBC
Associated ceramics: Veluwe, 2lf
Other associated finds: x
Literature: L: 53
Problems with the date: none

Identification number: GrA-28359
Date: 3695±35BP
Site name: Exlo-D30
Type of site: Grave
Dated material: Cremation
Culture: BBC
Associated ceramics: x
Other associated finds: x
Literature: L: 68
Problems with the date:
1.No ceramics: —

Identification number: GrN-25316
Date: 3805±30 BP
Site name: Oostwoud-De Tuithoorn, tumulus II
Type of site: Grave

Dated material: Charcoal (from settlement pit under grave)
Culture: BBC
Associated ceramics: x
Other associated finds: x
Literature: LP: 86-87; DH: 74

Problems with the date:
1. No ceramics: —
2. t.p.q: —

Identification number: GrN-25917
Date: 3870±50 BP
Site name: Barendrecht 2
Type of site: Settlement
Dated material: Residue on sherd
Culture: BBC
Associated ceramics: Veluwe, 2lc-2lf (sherds)
Other associated finds: x
Literature: C: 47-48 and 115

Problems with the date:
1. Reservoir effect: —

Identification number: GrN-26495
Date: 3830±20 BP
Site name: Emmeloord-Rijksweg A6/kavel J 97
Type of site: Settlement
Dated material: Wood (from pole of fish weir)
Culture: BBC
Associated ceramics: Neck Potbeaker (upperhalf)
Other associated finds: x
Literature: L: 54; B: 217
Problems with the date: none

Kustgemeenschappen van de Enkelgrafcultuur

Een reconstructie van samenlevingen in het derde millennium v. Chr. in Nederland door middel van aardewerkanalyse

S.M. Beckerman

1. Inleiding: hoe kunnen we samenlevingen van de Enkelgrafcultuur reconstrueren?

De Enkelgrafcultuur wordt gevonden in een groot gebied, van Rusland tot Nederland en van Scandinavië tot Zwitserland. Enkele elementen komen in dit hele gebied of grote delen ervan voor. Dit zijn bekers met touw- en/of spatelversiering, golfbandpotten en amforen, stenen strijdhamers, ornamenten van barnsteen en bot, vuurstenen bijlen, dolken en beitels (Furholt, 2014a). Ook een grafritueel met begravingen onder grafheuvels, doden in hurkhouding en per geslacht verschillende lijkhouding en bijgiften komt in grote delen van het gebied voor (Furholt, 2014a). De Nederlandse enkelgrafcultuur wordt gedateerd tussen c.2900-2300 v. Chr., maar regionaal zijn er verschillen in start- en einddatering (Drenth en Lanting, 1991, Lanting en Van der Plicht, 1999/2000, Furholt, 2003a, Włodarczak, 2009).

Gordon Childe publiceerde in 1929 een reconstructie waarin de Enkelgrafcultuur wordt voorgesteld als revolutionair en als een belangrijke schakel in de ontwikkeling van de Europese prehistorie. Childe's reconstructie is van grote invloed gebleven op latere interpretaties. De enkelgrafperiode wordt nog steeds vaak gezien als een periode met radicale veranderingen in materiële cultuur, economie en sociale organisatie (bijv. Fokkens, 1998, Larsson, 2009, Holmqvist-Saukkonen *et al.*, 2013). De opkomt van elites (Vandkilde, 2004, Westermann, 2007, Müller *et al.*, 2009, Pelisiak, 2013) en krijgers (Fokkens, 1999, Vandkilde, 2006) wordt eveneens in deze periode geplaatst. De in alle regio's voorkomende bekers worden vaak in verband gebracht met alcoholconsumptie (Childe, 1925, Sherratt, 1997a-b, Klassen, 2005a-b).

Veel synthetiserend onderzoek naar de Enkelgrafcultuur is gericht op graven. Nederzettingen zijn in veel regio's niet bekend of zijn minder goed onderzocht. Twee belangrijke thema's zijn leidend geweest in het onderzoek naar deze cultuur: 1) reconstructies van de chronologie en 2) reconstructies van de samenleving. Er is veel gedebatteerd over de herkomstregio en de oorzaak achter de verspreiding van de cultuur: was dit migratie, diffusie of een combinatie hiervan? Verschillende oorzaken zijn aangedragen als de motor achter de verspreiding:

klimaatverandering, sociale verandering, economische verandering, verandering in materiële cultuur of, wederom, een combinatie hiervan. Er is kortom nog veel onbekend over enkelgrafnederzettingen en de sociale organisatie, ideologie, bestaanswijze en gebruik van materiële cultuur van enkelgrafgemeenschappen. Nieuwe dateringsmethoden hebben de kennis van de chronologie van de Enkelgrafcultuur vergroot, maar het opstellen van precieze faseringen is nog onmogelijk door het ontbreken van dendrochronologische dateringen, problemen met de ¹⁴C dateringen (zoals plateaus in de kalibratiecurve en onzekere associaties) en het ontbreken van (bestudeerde) stratigrafieën.

Om deze kennislacunes op te vullen en een antwoord te formuleren op de bediscussieerde thema's, moest een dataset worden gekozen waarmee zowel de enkelgrafsamenlevingen alsmede hun chronologische ontwikkelingen konden worden gereconstrueerd. Enkelgrafaardewerk afkomstig van enkele goed bewaarde en eerder onderzochte nederzettingen in het Noord-Hollandse kustgebied is gekozen als primaire dataset. Nederland is gekozen als regio omdat er voor de Enkelgrafcultuur een grote en goed bestudeerde dataset is van grafcontexten, waarmee de nederzettingsgegevens vergeleken kunnen worden. Het goed bewaarde cluster van nederzettingen in West-Friesland herbergt een schat aan informatie die ontbreekt in andere datasets en regio's. Omdat vergelijkbaar aardewerk is gevonden in een groot gebied en er tegelijkertijd ook regionale en chronologische verschillen zijn, kan een aardewerkstudie zowel informatie opleveren over chronologie als samenleving.

2. Neolithisch aardewerk in Noord-Holland

Het aardewerk van zeven nederzettingen —Keinsmerbrug, Mienakker, Zeewijk, Aartswoud, Slootdorp-Bouwlust, Zandwerven en Sijbekarspel-De Veken— is geselecteerd voor analyse. De eerste drie nederzettingen zijn ook onderzocht door een breed team aan specialisten in het kader van een Odyssee-onderzoek getiteld: *“Unlocking Noord-Holland's Late Neolithic Treasure Chest: Single Grave Culture behavioural variability in a tidal environment”*. Zandwerven en Aartswoud zijn gekozen omdat het gestratificeerde nederzettingen betreft. Zandwerven is daarnaast interessant vanwege de aanwezigheid van vlaardingenaardewerk, dat chronologisch voorafgaat aan het enkelgrafaardewerk. Slootdorp-Bouwlust is geselecteerd als de waarschijnlijk oudste nederzetting in het gebied, blijkens de vondst van trechterbeker materiaal op die locatie. Sijbekarspel-De Veken is geselecteerd omdat daar ook klokbekerscherven zijn aangetroffen en het daarmee de jongste nederzetting is. De dataset aan gekozen nederzettingen omvat dus zowel grotere als kleinere woonplaatsen, met een brede chronologische spreiding.

Methodologie Al in 1955 werd de eerste type-indeling voor (Nederlandse) bекers gepresenteerd door Van der Waals en Glasbergen. Deze typologie, met latere aanvullingen, zal ook in dit onderzoek worden gebruikt. Aardewerkanalyse is lang gefocust geweest op decoratie en vorm. Door ook maakwijze, gebruik en depositie te bestuderen kan meer informatie worden verkregen. Nieuwe methodes zoals beschreven door Salanova (2001), Besse (2004), Furholt (2008) en Larsson (2008), zijn ook gebruikt binnen deze studie. De volgende kenmerken zijn bestudeerd: technologie (magering, wanddikte, bakwijze, constructie, wandafwerking), morfologie (metrische analyse en type, pot met hoge opstaande hals, S-vormige pot, beker, vergrote beker) versiering (techniek en patroon), gebruik (residuen), keramische artefacten, secundair gebruik (reparatie, hergebruik) en depositie (ruimtelijke analyse) en een vergelijking binnen en tussen verschillende vindplaatsen.

Het aardewerk van de mogelijke trechterbekernederzetting **Slootdorp-Bouwlust** is hoofdzakelijk met steengruis (hoornblende) gemagerd, dunwandig en nauwelijks versierd. De potten hebben hoge opstaande halzen. De weinige versierde scherven tonen indrukken van granen, *tiefstich*-motieven of (ronde) spatelindrukken. Met name de trechterbekerversieringen bevestigen dat de vindplaats een relatief oude datering kent.

Op de nederzetting **Zandwerven** is het aardewerk in twee lagen gevonden. Het aardewerk uit de onderste lagen komt sterk overeen met midden-vlaardingen-aardewerk, het aardewerk uit de bovenste lagen komt overeen met enkelgrafaardewerk. Aardewerk uit de onderste lagen is veelal met steengruis verschaald en heeft een uitgesproken S-vormig profiel. De versiering bestaat uit gaatjes, vaak geplaatst als rij onder de rand. Het jongere aardewerk uit de bovenste lagen is dunner en heeft een minder uitgesproken S-vorm. Als versiering komen spatel,- en/of touwindrukken en vingertopindrukken voor, soms in combinatie met verdikte banden (zogenaamde golfbandpotten).

Uit de aardewerkanalyse blijkt dat de nederzetting **Zeewijk** in drie delen (Zeewijk-oost, Zeewijk-west noord en Zeewijk-west zuid) verdeeld kan worden die gedurende verschillende fasen bewoond waren. Er zijn verschillen in het aardewerk uit de drie gebieden. Touwersiering komt bijvoorbeeld het meest voor op het zuidelijk deel van Zeewijk-west. Spatelindrukken zijn de meest voorkomende versieringstechniek in Zeewijk-oost. Versiering met vingertopindrukken komt bijna niet voor in het zuidelijk deel van Zeewijk-west maar komt in de andere gebieden wel veel voor.

Aartswoud is een gestratificeerde nederzetting. Er konden echter geen (chronologische) verschillen worden ontdekt in het aardewerk van de vijf verschillende lagen. Zowel bekers als vergrote bekers komen voor, veelal met potgruis en zand verschaald. In vergelijking met de andere nederzettingen zijn de versieringsmotieven gevonden op Aartswoud het meest divers. Het grootste deel van de versierde scherven heeft spatelindrukken.

Op de kleine nederzetting **Keinsmerbrug** is een klein aantal scherven gevonden, deze laten een grote variatie aan kenmerken zien; zeven mageringsmiddelen zijn gebruikt in 15 combinaties en zowel dunner als dikker aardewerk komt voor. Scherven zijn versierd met spatelindrukken in verschillende motieven, in mindere mate komt ook versiering met vingertopindrukken en touwindrukken voor.

Slechts 654 scherven van de nederzetting **Mienakker** konden worden geanalyseerd. Het assemblage laat een hoge mate van uniformiteit zien: bijna alle scherven zijn verschaald met potgruis en dunwandig aardewerk komt zeer veel voor. Zowel bekers als vergrote bekers zijn aangetroffen. Ook de versiering is uniform: het grootste deel van de versierde potten is versierd met touwindrukken, spatelindrukken komen ook voor, vingertopindrukken niet.

Op **Sijbekarspel-De Veken** zijn slechts 66 scherven gevonden. Deze laten kenmerken zien die zowel passen in de Enkelgrafcultuur als in de Klokbekercultuur. Opvallend is op deze vindplaats het voorkomen van aardewerk versierd met indrukken van een getande spatel. Deze versieringstechniek, toegeschreven aan de Klokbekercultuur, komt op de andere bestudeerde nederzettingen niet voor. Er komen echter ook met touwindrukken versierde scherven voor, vergelijkbaar met scherven van de andere nederzettingen.

3. Een regionale en supra-regionale vergelijking van Neolithische aardewerkassemblages

Om de chronologie van de Enkelgrafcultuur beter te begrijpen, wordt het aardewerk van de zeven bestudeerde nederzettingen in Noord-Holland vergeleken met elkaar en met het aardewerk van andere enkelgraf-, vlaarding- en trechterbekervindplaatsen uit verschillende regio's.

Er is variatie in het aardewerk gevonden op en tussen de verschillende nederzettingen.

Potten met een hoge opstaande hals en een bolle buik zijn enkel gevonden op de nederzetting Slootdorp-Bouwlust. Deze potten zijn te vergelijken met trechterbekerpotten van de nederzettingen P14 en Beekhuizerzand (Ten Anscher, 2012, Modderman *et al.*, 1976). Middelgrote en grote potten met een uitgesproken S-vorm zijn enkel gevonden op de vindplaats Zandwerven. Deze potten zijn vergelijkbaar met met potten uit de midden-vlaardingfase (Beckerman en Raemaekers, 2009: groep C). Op de nederzettingen Zeewijk, Keinsmerbrug, Mienakker en Aartswoud zijn potten met een vergrote bekervorm gevonden. Deze potten vertonen sterke overeenkomsten met de potten uit de laat-vlaardingfase (Beckerman en Raemaekers, 2009: groep E). Bekers zijn de meest voorkomende potvorm op de zeven onderzochte nederzettingen en komen voor op alle vindplaatsen met uitzondering van Slootdorp-Bouwlust en de oudste contexten op Zandwerven. Deze bekeraars komen ook voor in graven van de Enkelgrafcultuur, gevonden op de Pleistocene zandgronden (eg. Van der Waals en Glasbergen, 1955, Drenth, 2005, Drenth *et al.*, 2008). Ook op nederzettingen in het zuidelijk deel van het kustgebied, gelabeld als vlaardingennederzettingen, komen bekeraars voor (Modderman, 1953, Glasbergen *et al.*, 1967, Louwe Kooijmans, 1974 en 1976).

Op basis van de technologische kenmerken kan het aardewerk van de zeven onderzochte nederzettingen worden verdeeld in twee groepen. Op de nederzettingen Slootdorp-Bouwlust, Zandwerven, het noordelijk deel van Zeewijk-west, Zeewijk-oost, Aartswoud en Keinsmerbrug is het aardewerk vaak verschaald met steengruis en is het aardewerk dikker dan op de andere nederzettingen. Op Mienakker, Sijbekarspel-De Veken en het zuidelijk deel van Zeewijk-West is het aardewerk gemiddeld dunner en komt steengruismagering niet tot bijna niet voor. Slootdorp-Bouwlust wijkt af van alle andere nederzettingen doordat hier hoornblende is gebruikt als verschraling. Op vlaardingennederzettingen neemt het aandeel dunwandig aardewerk in de loop van de tijd toe, het aandeel steengruismagering neemt daarentegen af (Glasbergen *et al.*, 1967). Het aandeel dunwandig aardewerk op enkelgrafnederzettingen neemt eveneens toe in de jongere periode (Ten Anscher, 2012). De nederzettingen Mienakker, Sijbekarspel-De Veken en het zuidelijk deel van Zeewijk-West zijn typologisch dus vermoedelijk de jongste woonplaatsen.

Versiering met een rij indrukken of gaatjes onder de rand komt voor op de nederzettingen Zandwerven en Slootdorp-Bouwlust. Dit type versiering komt voor op zowel trechterbeker- als vlaardingenvindplaatsen (Modderman *et al.*, 1976, Ten Anscher, 2012, Glasbergen *et al.*, 1967). Versiering met touw- en spatelindrukken in verschillende motieven op de gehele pot of het bovenste deel daarvan, komt voor op alle nederzettingen met uitzondering van Slootdorp-Bouwlust en de oudste contexten van Zandwerven. Tussen de vindplaatsen zijn er verschillen in het aandeel van de versieringstypen van Van der Waals en Glasbergen (1955). Type 1b is alleen gevonden op Aartswoud en in de jonge contexten van Zandwerven. Geheel versierde ('AOO' [*all over ornamented*]) potten zijn het meest talrijk op Mienakker en het zuidelijk deel van Zeewijk-west. AOO type 2IIa en klokbeker type 2Ia zijn alleen gevonden op Sijbekarspel-

De Veken. Deze verschillende versieringsmotieven worden ook gevonden in andere enkelgrafnederzettingen en -graven. Voor aanvang van dit onderzoek werd verondersteld dat potten versierd met golfbanden en vingertopindrukken het meest voorkomende nederzettingsaardewerk van de Enkelgrafcultuur zouden zijn (Lanting en Van der Waals, 1976, Floore, 1991, Drenth, 2005). Potten met golfbanden en vingertopindrukken zijn echter alleen gevonden in Zandwerven en Aartswoud. Versiering met vingertopindrukken komt voor op de nederzettingen Zandwerven, het noordelijk deel van Zeewijk-west, Zeewijk-oost, Aartswoud en Keinsmerbrug en in lage aantallen op het zuidelijk deel van Zeewijk-West.

Omdat het enkelgrafgebied zeer uitgestrekt is —van Rusland tot Nederland en van Scandinavië tot Zwitserland— is het relevant om te bezien of er regionale verschillen zijn in het aardewerk en daarmee in de Enkelgrafcultuur. Dunwandige bekervormen versierd met touwindrukken of spatelindrukken, Glob (1945) A-bekers en C-bekers, komen ook in andere delen van het enkelgrafgebied veel voor (Furholt, 2003a, 2014a). Touwindrukken in horizontale lijnen, spatelindrukken in horizontale lijnen, schuine spatelindrukken in één of twee richtingen en zigzagmotieven zijn niet alleen het meest voorkomend in Noord-Holland maar komen ook in andere regio's veelvuldig voor (Glob, 1945, Furholt, 2003a, Hübner, 2005, Larsson, 2009). De golfbandpotten en amforen komen in delen van het enkelgrafgebied veelvuldig voor (Becker, 1955, Furholt, 2014a), maar zijn erg schaars in Noord-Holland. Het in Noord-Holland gevonden dikwandige aardewerk met een uitgerekte bekervorm is niet gevonden in andere enkelgrafregio's.

4. Chronologie

Er zijn verschillende chronologieën opgesteld voor specifieke regio's van de Enkelgrafcultuur. Deze zijn gebaseerd op aardewerk en/of bijlen, gecombineerd met absolute dateringen (eg. Glob, 1945, Struve, 1955, Malmer, 1962, Buchvaldek, 1976, Lanting en Van der Waals, 1976, Hübner, 2005). Nederland kent twee concurrerende modellen.

Het **unilineaire** model is gebaseerd op de idee dat de ontwikkeling van half versierde standvoetbekers via geheel versierde bekervormen (AOO) en maritieme klokbeekers naar klokbeekers van het veluwe type een doorgaande continue ontwikkeling was. Nieuwe typen zijn niet het gevolg van migratie maar van lokale ontwikkeling (Lanting, 1973, Lanting en van der Waals, 1976). Er zijn verschillende versies van dit model (van der Waals en Glasbergen, 1976, Lanting, 1973, Drenth en Lanting, 1991, Lanting en van der Plicht, 1999-2000, en Lanting, 2007-08). De verschillende soorten bekervormen zijn weer verder onderverdeeld in subtypen waarvoor eveneens (verschillende) chronologische indelingen zijn gemaakt.

Drenth en Hogestijn (1999, 2006) stelden een andere ontwikkeling voor. Hun model is eveneens gebaseerd op een doorgaande continue ontwikkeling maar niet over één maar over **twee sporen**. Centrale aanname in dit model is dat zowel gedurende de late fase van de Enkelgrafcultuur als gedurende de klokbeekperiode en de vroege bronstijd er een groep van geheel en een groep van half versierde bekervormen zijn. Ook hebben Drenth en Hogestijn (1999 en 2006) kritiek op het unilineaire model; het idee dat er een maritieme fase was en de decoratieve ontwikkeling van klokbeekers (de zone contractie fase) wordt door hun bekritiseerd.

De **¹⁴C dateringen** die gepresenteerd zijn door met name Lanting en Van der Waals (1976) en Lanting en van der Plicht (1999-2000) alsmede de chronologische aannames die worden gedaan op basis van deze dateringen zijn meermalen bekritiseerd (Kinnes *et al.* 1991, Salanova, 1998, Furholt, 2003a). Er zijn verschillende problemen met de ¹⁴C dateringen. Deze problemen kunnen worden verdeeld in technische en archeologische problemen. Technische problemen zijn:

slechte kwaliteit van het monster, een reservoir-effect, verkeerde behandeling van het monster en contaminatie van het monster. Archeologische problemen zijn: een oud hout-effect en een slechte of onbekende associatie tussen monster en cultureel materiaal. Een bijkomend probleem is de kalibratiecurve. Doordat er in deze periode brede plateaus zijn, krijgen alle gekalibreerde dateringen een lange mogelijke ouderdom. Furholt verdeelde de kalibratiecurve voor deze periode in verschillende fasen overeenkomstig met de plateaus: A 3350-3090 cal BC, B 3090-2920 cal BC, C 2920-2880 cal BC, D 2880-2580 cal BC, E 2620-2480 cal BC en F 2460-2200 cal BC. Alle ¹⁴C dateringen zijn voor deze studie opnieuw beoordeeld. Hieruit blijkt dat er problemen zijn met de dateringen: bijna de helft (73, 46%) kent ernstige archeologische of technische problemen en kan niet worden gebruikt voor het opbouwen van een chronologie, 50 dateringen (32%) kennen mogelijke problemen en slechts 35 dateringen (22%) zijn probleemvrij.

De verschillende aannames waarop het unilineaire en het twee sporen model zijn gebaseerd zijn getest met behulp van de 35 dateringen zonder aantoonbare problemen. Doordat de modellen beide voornamelijk zijn gebaseerd op aardewerk uit grafcontexten zijn associaties van verschillende types of gelaagde contexten zijn (bijna) geheel afwezig. De belangrijkste aanname waarop het twee sporen model is gebaseerd, dat er tussen de late fase van de Enkelgrafcultuur en de Vroege Bronstijd altijd een groep geheel en een groep half versierd aardewerk is geweest, kan niet worden onderbouwd met absolute dateringen.

De ¹⁴C dateringen tonen aan dat de veronderstelde ordening van standvoetbekers naar geheel versierde bekens (AOO) naar klokbekeers correct is. De positie van de geheel versierde (AOO) bekens is onduidelijk. Het gezamenlijk voorkomen van beide typen in graven en nederzettingen toont overlap in tijd aan (Lanting en Van der Waals, 1976, Drenth en Hogestijn, 2006). De aanname van Furholt (2003a) dat deze bekens even oud zijn als de standvoetbekens lijkt niet logisch, gezien de aanwezigheid van de laatste en de afwezigheid van de eerste groep op Zandwerven en de diepste lagen van Aartswoud. Welk type het langst bleef bestaan kan niet worden bepaald aan de hand van ¹⁴C dateringen. Een maritieme fase met enkel maritieme klokbekeers blijkt niet uit de ¹⁴C dateringen die een mogelijke periode van overlap met zowel de standvoetbekens en geheel versierde bekens als andere klokbekeers laten zien. De veronderstelde ordening van de verschillende subtypes kan door de brede plateaus in de kalibratiecurve niet worden onderbouwd met absolute dateringen.

Op basis van het nieuwe onderzoek kunnen **nieuwe ideeën over de chronologische ontwikkeling in de enkelgrafperiode** worden geformuleerd. Van de zeven bestudeerde nederzettingen zijn 29 ¹⁴C dateringen beschikbaar. Ook deze dateringen kampen met de geschetste problemen, met name onzekere associaties en brede plateaus in de kalibratiecurve.

Gedurende de trechterbekerperiode werd het noordelijk kustgebied gebruikt door een groep mensen met aardewerk dat weinig tot geen overeenkomsten vertoont met het aardewerk van de latere bewoners. Gedurende de midden-vlaardingensperiode was Zandwerven bewoond. Dit aardewerk vertoont wel overeenkomsten met dat van de latere enkelgrafperiode. We kunnen daarom concluderen dat de start van de Enkelgrafcultuur in Noord-Holland niet het resultaat was van grootschalige migraties en vervanging van oudere materiële cultuur maar dat er sprake is van continuïteit.

Het enkelgrafaardewerk van de verschillende nederzettingen kan verdeeld worden in twee groepen. Groep 1 (de hoogste lagen van Zandwerven, Zeewijk-oost, het noordelijk deel van Zeewijk-west, Aartswoud en Keinsmerbrug) heeft relatief dik aardewerk, meer steengruismagering, en versiering die vaker bestaat uit met een spatel aangebrachte motieven. Het aardewerk van groep 2 (het zuidelijk deel

van Zeewijk-west, Mienakker en Sijbekarspel-De Veken) is gemiddeld dunner en minder vaak verschaald met steengruis en vaker gedecoreerd met touwindrukken. Ook komen geheel versierde (AOO) bekervakkers vaker voor op deze nederzettingen. Het aardewerk van groep 1 is vermoedelijk ouder dan het aardewerk van groep 2. Door de brede plateaus in de kalibratiecurve kan deze bewering niet met zekerheid worden onderbouwd met ¹⁴C dateringen.

Op de jongste nederzetting, Sijbekarspel-De Veken zijn enkele typen gevonden die niet op de andere vindplaatsen voorkomen (Van der Waals en Glasbergen 2IIa en maritieme klokbekeertype 2Ia). Er zijn ook veel overeenkomsten met het aardewerk van de andere nederzettingen. Het materiaal van deze nederzetting lijkt daarmee de veronderstelling te onderbouwen dat de overgang van de Enkelgrafcultuur naar de Klokbekeercultuur een continue ontwikkeling was.

Vóór dit onderzoek werden de Vlaardingencultuur en de Enkelgrafcultuur als verschillende culturen met een eigen ontwikkeling gezien (Louwe Kooijmans, 1976, Drenth, 2005: p.335, Van Gijn en Bakker, 2005, Amkreutz, 2013). Dit onderzoek laat zien dat in het gehele kustgebied in zowel de midden-vlaardingenfase als de laat-vlaardingenfase/enkelgrafperiode dezelfde ontwikkeling in het aardewerk zijn waar te nemen.

Het dunwandige aardewerk versierd met touw-, en/of spatelindrukken gevonden op de nederzettingen in Noord-Holland is onderdeel van een supra-regionale chronologische traditie en vergelijkbaar met dunwandige bekeeraardewerk gevonden in andere delen van Nederland en ver daarbuiten. Het dikwandige aardewerk uit het kustgebied laat geen supra-regionale traditie maar een regionale chronologische traditie zien. Het vóór dit onderzoek dominante beeld dat op enkelgrafnederzettingen vooral veel dikwandige potten, zoals golfbandpotten, en veel minder bekervakkers zouden worden gevonden klopt niet (contra Lanting en Van der Waals, 1976, Floore, 1991, Drenth, 2005, Ten Anscher, 2012).

5. Enkelgrafsamenlevingen

Indithoofdstuk wordt een reconstructie gepresenteerd van de enkelgrafsamenlevingen en hun technologie (welke technieken werden gebruikt), bestaanswijze (wat werd er gegeten), economie (de organisatie van technologie en bestaanswijze), de sociale organisatie, de veronderstelde opkomst van individualisatie en elites en de religie en ideologie.

Er zijn grote overeenkomsten in de **bestaanswijze en technologie** op de iets oudere nederzettingen gelabeld als Vlaardingencultuur in het zuidelijk deel van het kustgebied en de enkelgrafnederzettingen in het noordelijk deel; op nederzettingen van beide culturen werd gekozen voor een op de omgeving aangepaste strategie en een combinatie van veeteelt, akkerbouw, jagen, vissen en/of verzamelen (Louwe Kooijmans, 1993, Brinkkemper *et al.*, 2010, Amkreutz, 2013). De technologie en bestaanswijze van de enkelgrafsamenlevingen in zowel het Nederlands kustgebied als in andere gebieden zoals Jutland en Scania (Klassen, 2005b, Ebbesen, 2006, Rasmussen, 2013) werden niet gedictieerd door een enkelgrafsjabloon, maar waren gebaseerd op de regionale mogelijkheden.

De ploeg wordt vaak gezien als (belangrijke) nieuwe uitvinding in deze periode (Sherratt, 1997a, Van der Waals, 1984). Aanwijzingen voor het gebruik van de ploeg zijn inderdaad aangetroffen (Kleijne *et al.*, in prep.), maar zijn ook gevonden op oudere trechterbekeer- en vlaardingenvindplaatsen (Kortekaas, 1987, Drenth en Lanting, 1997, Overeem, 2001, Drenth *et al.*, 2008, Goossens, 2009, Ten Anscher en Bosman, 2010). De start van de productie van wol wordt eveneens in deze periode geplaatst (Sherratt, 1997a: p.385). Hoewel op verschillende nederzettingen spinsteentjes zijn gevonden, zijn er meer aanwijzingen dat deze

zijn gebruikt voor het spinnen van vlas (Kubiak-Martens, 2013 en 2014, Gracia Diaz, 2013, Kleijne *et al.*, 2013, Zeiler persoonlijke communicatie).

De Enkelgrafcultuur wordt veelal gezien als een (revolutionair) nieuwe levensstijl, gecombineerd met een nieuwe materiële cultuur (Glob, 1969, Kristiansen, 1989). Het bestudeerde dunwandige aardewerk van de Enkelgrafperiode is nieuw en past in een supra-regionale traditie, het dikwandige aardewerk laat continuïteit zien met de voorgaande periode. Dit aardewerk past in een regionale traditie. Er is dus sprake van verandering en continuïteit en niet van een totale omwenteling.

De enkelgrafperiode wordt gezien als een overgangperiode waarin de traditionele groepsgeoriënteerde en egalitaire samenlevingen worden vervangen door **geïndividualiseerde samenlevingen met een elite** (Westermann, 2007, Pelisiak, 2013, Vandkilde, 2004, Müller *et al.* 2009). Nederzettingen zouden kleiner zijn dan in de voorgaande periode, bewoond worden door één nucleaire familie en verspreid van elkaar liggen (Hübner, 2005, Hecht, 2007, Müller *et al.* 2009). Het onderzoek op de enkelgrafnederzettingen in Noord-Holland toont echter aan dat er grote en kleine nederzettingen zijn, waarvan sommigen meer permanent worden bewoond, terwijl er ook plaatsen zijn die worden gebruikt voor tijdelijke samenkomsten (Keinsmerbrug). Dit nederzettingssysteem laat continuïteit zien met de voorgaande (midden-) vlaardingenperiode. De verspreiding van het aardewerk laat geen verschillen in rijkdom op of tussen nederzettingen zien en de bestudeerde nederzettingen leveren geen aanwijzingen op voor het kleiner worden van nederzettingen, noch voor het meer geïndividualiseerd worden van de samenleving en de opkomst van privé-eigendom en elites. Een vergelijking met enkelgrafnederzettingen in andere gebieden laat zien dat er in sommige regio's verschillen zijn met de voorgaande periode terwijl in andere regio's overeenkomsten domineren (Nielsen, 1997, Klassen, 2005a-b, Hecht, 2007, Kadrow, 2008, Larsson, 2009). Er kan daarom geconcludeerd worden dat ondanks dat in het hele enkelgrafgebied vergelijkbare elementen –zoals bekers en hamers– voorkomen er ook grote verschillen in nederzettingssysteem en bestaanswijze tussen groepen zijn.

Eén van de meest bediscussieerde aspecten van de Enkelgrafcultuur is de verspreiding door **migratie, diffusie of een combinatie** van beiden. Omdat er duidelijke overeenkomsten zijn tussen het aardewerk van de enkelgrafperiode en voorgaande (midden-vlaardingen) periode lijkt grootschalige migratie niet te hebben plaatsgevonden. Dit zou immers leiden tot een geheel nieuwe aardewerktraditie. De Enkelgrafcultuur in Noord-Holland –en andere regio's– is vermoedelijk het resultaat van diffusie, mogelijk in combinatie met migratie van individuen of kleine groepen. De enkelgrafbewoners van het kustgebied hebben sterke wortels in deze regio. Het dikwandige aardewerk weerspiegelt continuïteit ten opzichte van de voorgaande periode. Het dunwandige aardewerk dat past in de supra-regionale enkelgraftraditie is het gevolg van deelname aan een uitwisselingsnetwerk dat zorgde voor de verspreiding van nieuwe ideeën, technologieën, materiele cultuur en mogelijk mensen.

De met touw- en spatelindrukken versierde bekers van de enkelgrafperiode worden vaak gezien als drinkbekers voor **alcohol** (Childe, 1925, Sherratt, 1997a-b). Martialiteit, individualisatie en de opkomst van elites zijn gekoppeld aan het drinken van alcohol, en drinken is gekoppeld aan de versierde bekers (Sherratt, 1997a). Hoewel de alcoholhypothese al uit 1925 stamt en veel navolgers kent, is er nog weinig bekend over het daadwerkelijk gebruik van bekers. Op slechts één enkelgrafvindplaats —Refshøjgård (Jutland) — zijn aanwijzingen voor alcohol aangetroffen (Westermann, 2007, Klassen, 2005). De enkelgrafbekers gevonden op de nederzettingen in Noord-Holland zijn gebruikt om in te koken; meer dan de helft van de met touwindrukken versierde scherven heeft kookresten

(56%). Residuanalyse door middel van SEM en geochemische analyse (Kubiak-Martens en Oudemans 2012, 2013 en 2014) heeft aangetoond dat de potten op Keinsmerbrug werden gebruikt voor het bereiden van vispap, terwijl op Mienakker en Zeewijk verschillende soorten maaltijden in de potten werden bereid. Lipidenanalyse heeft aangetoond dat enkelgrafaardewerk uit Lötvreten (Zweden) ook gebruikt is voor voedsel (Larsson, 2009: p.250). Negen bekers uit grafcontexten uit Oost-Nederland hebben aankoeksels. Deze bekers komen uit zowel mogelijke mannen- als vrouwengraven en zijn gevonden in combinatie met zowel ('mannelijke') wapens als met ('vrouwelijke') sieraden. Bekers zijn dus niet, zoals eerder werd verondersteld, het symbool van macht en van een periode met grote economische en sociale verandering waarbij alcohol functioneerde als sociaal glijmiddel (Childe, 1925, Sherratt, 1997a). Het gebruik van bekers in een belangrijke dagelijkse activiteit –koken– geeft het belang weer van de bekers en het supra-regionale uitwisselingsnetwerk waarvan zij het product zijn. Het gebruik van bekers in graven benadrukt eveneens de belangrijke rol van het supra-regionale netwerk.

Het gebruik van dikwandig aardewerk met een regionale traditie en dunwandig aardewerk met een supra-regionale traditie is niet enkel praktisch maar ook **ideologisch** betekenisvol: hiermee werd zowel het belang van de eigen wortels en regionale verbanden als de supra-regionale connecties uitgedrukt.

Geconcludeerd kan worden dat er niet één soort enkelgrafsamenleving is. Tussen c.2900 en 2200 BC hadden de mensen die woonden in het gebied van Rusland tot Nederland en van Scandinavië tot Zwitserland een regionaal specifieke bestaanswijze en economie. In verschillende gebieden waren de samenlevingen verschillend georganiseerd. Ook zijn er regionale verschillen in de materiële cultuur en in de nederzettingen en graven. Tegelijkertijd hadden de verschillende groepen enkele gedeelde elementen, zoals het gebruik van bekers met touw-, en spatelversiering. De supra-regionale contacten werden gebruikt voor de uitwisseling van goederen, ideeën, technologie en mogelijk mensen. Meedoen aan dit netwerk werd als erg belangrijk gezien en dit belang werd tot uitdrukking gebracht door bekers te gebruiken in dagelijkse activiteiten zoals koken en in het grafritueel.

6. Conclusie

De reconstructie van de Enkelgrafcultuur door Gordon Childe (1925, 1929) is van grote invloed geweest op latere reconstructies. Ook in hedendaagse modellen worden zijn ideeën vaak nog verwerkt. Het is daarom interessant om de theorie en de reconstructie van Gordon Childe te testen. Childe baseerde zijn archeologische reconstructies op een **Marxistisch concept van de geschiedenis**. Het historische proces wordt door Childe gezien als een dialectisch proces waarbij gebeurtenissen met elkaar in verband staan en een patroon vormen (Childe, 1979). De loop van de verleden was volgens Childe niet lineair of vooraf bepaald, in tegendeel: de mens maakt zijn eigen geschiedenis (Childe, 1951 en 2004g (1958)). Childe (1979) ging hiermee uit van een Marxistisch, historisch materialistische benadering van het verleden: het verleden als het verhaal van de daden van individuen, handelend binnen de gegeven materiële omstandigheden. Agency is een (Marxistisch) theoretisch concept dat in huidige postmoderne archeologie vaak gebruikt wordt om de daden van deze individuen te beschrijven. Childe betreft met zijn dialectische concept van agency ook de omstandigheden en sociale relaties van individuen (McGuire en Wurst, 2002, McGuire, 2012). Hoewel Childe voor een materialistische benadering koos, paste hij dit niet deterministisch toe en erkende dat mensen niet altijd zo handelen als wij, gezien hun omstandigheden, zouden verwachten (Childe,

1950c). Een laatste begrip dat in Childe (1958) zijn theoretische concept van belang is, is dat van totaliteit, gebruikt om de bovenregionale eenheid van culturen te beschrijven. Voor Childe (2004a (1935), 2004c (1947)) was het reconstrueren van de economie en de productiemiddelen en productieverhoudingen essentieel voor het begrijpen van voorbije samenlevingen. De economie vormt de basis van de samenleving. De bovenbouw bestaat uit de ideologie en de sociale, gerechtelijke en religieuze organisaties (Marx, 1999 (1859)). Gedurende zijn carrière verandert Childe zijn concept van cultuur van normatief naar functioneel (Trigger, 1980). Tegenstellingen in de productiemiddelen en de productieverhoudingen waren volgens Childe vaak de motor achter verandering (Patterson, 2005, Trigger, 1980). Verandering, nieuwe ideeën, technieken, en materiële cultuur konden zowel van buiten komen als lokaal ontstaan (Trigger, 1980).

Childe's reconstructie van het **Neolithicum** begint bij de (reconstructie van de) economische basis. De verandering van voedsel verzamelen naar voedsel produceren was volgens Childe (2004g (1954)) het belangrijkste aspect van de Neolithische Revolutie. De productie van een surplus en de uitwisseling tussen samenlevingen leidden tot een langzaam proces dat zorgde voor veranderingen in de bovenbouw. De eerste stappen waren huwelijksmobiliteit en rondreizende specialisten, later kwamen er voltijdspecialisten (Childe, 1950a, 1951 (1936)). Deze specialisten produceerden niet enkel goederen, maar verspreiden ook nieuwe ideeën en ideologie (Childe, 1951 (1936)).

Migratie en geweld in combinatie met diffusie werden door Childe (1929, 1958) als start van de Enkelgrafcultuur gezien. De economische basis bestond volgens Childe uit het houden van vee in combinatie met het verbouwen van gewassen en de jacht (Childe, 1958). Belangrijke elementen van de bovenbouw zijn de opkomst van elites en individualisatie (Childe, 1958: p.134). Het economische systeem maakt de accumulatie van welvaart mogelijk maar zorgde tegelijkertijd ook voor de noodzaak tot verdediging (Childe, 1958: p.134). Er zijn regionale verschillen, maar alle groepen delen enkele materiële kenmerken waaronder de met touw-, en spatelindrukken versierde bekers (Childe, 1929 en 1958)

De reconstructie van de Enkelgrafcultuur gemaakt door Childe is getoetst aan de hand van nieuw onderzoek. De bestaanswijze bestaat niet enkel uit akkerbouw, veeteelt en jacht, zoals verondersteld door Childe (1958), maar is regionaal verschillend. Niet overal zijn er grote veranderingen ten opzichte van de voorgaande periode. Het vaststellen of er een surplus werd geproduceerd is archeologisch lastig, technologieën die de productie konden verhogen, zoals de ploeg, waren inderdaad aanwezig maar zijn niet nieuw. Feesten kunnen eveneens duiden op surplusproductie (Koch, 2003, Iversen, 2014). Keinsmerbrug lijkt te zijn gebruikt als samenkomst- of feestlocatie. Hoewel surplusproductie lastig is aan te tonen, is Childe's idee dat dit een periode is van intensieve contacten — wellicht mogelijk gemaakt door een intensivering van de productie— aannemelijk. Childe's (1951 (1936)) model met een geleidelijke toename van uitwisseling en mobiliteit gedurende het Neolithicum past ook goed bij de bestudeerde data. De enkelgrafperiode markeert mogelijk een belangrijke stap in het proces richting het ontstaan van full time specialisten. De set van supra-regionale elementen, waaronder de versierde bekers, zijn een sterke aanwijzing voor contacten en uitwisseling. Grootschalige migratie, zoals verondersteld door Childe (1929, 1958), is niet aannemelijk gelet op de culture continuïteit met de voorgaande periode. Ook de aanname dat gedurende de enkelgrafperiode een toename van geweld, de opkomst van leiders en een elite plaatsvindt, is niet bevestigd met het huidige onderzoek (Childe, 1929, 1958). Bekers werden volgens Childe (1925) gebruikt voor alcohol. Deze drank gaf een bron van invloed of macht aan de bezitters ervan. Zowel de bekers uit de nederzettingen als uit graven laten echter

sporen zien die erop duiden dat ze gebruikt zijn als kookpot. Bekers zijn dus niet verbonden met een ideologie die de opkomst van leiders en een elite symboliseert.

Conclusie De analyse van aardewerk van goed geconserveerde enkelgrafnederzettingen in een getijdengebied in Noord-Holland, in combinatie met de multidisciplinaire analyse van drie van deze nederzettingen, hebben belangrijke nieuwe gegevens opgeleverd. Het dikwandige aardewerk was niet, zoals voorheen werd aangenomen, vergelijkbaar met dikwandig aardewerk van andere enkelgrafvindplaatsen maar komt overeen met vlaardingen-aardewerk. In het gehele kustgebied was er een traditie om S-vormige potten te maken die steeds uitgerechter van vorm werden. Niet enkel het aardewerk maar ook de bestaanswijze laat continuïteit met de voorgaande (midden-) vlaardingenperiode zien. Het met touw- en spatelindrukken versierde dunwandige aardewerk is nieuw en past in een supra-regionale traditie. Ook in andere enkelgrafregio's komt een combinatie voor van het gebruik van de supra-regionale enkelgrafelementen in combinatie met regionale (oudere) elementen. De ideeën van Childe (1925, 1929) bieden belangrijke aanknopingspunten voor de reconstructie van de enkelgrafsamenlevingen. Vooral zijn ideeën over hoe surplusproductie en contacten langzaam leiden tot meer mobiliteit en het ontstaan van specialisten zijn goed toepasbaar (Childe, 1950a en 1951 (1936)). Deze studie laat zien dat de enkelgrafperiode een stap is in dit proces. Deze periode wordt gekenmerkt door een groot supra-regionaal netwerk. Het netwerk werd gebruikt om goederen en ideeën uit te wisselen en mogelijk ook mensen. Bekers versierd met touw-, en/of spatelindrukken zijn een product van dit netwerk, maar symboliseren ook het belang ervan. Het gebruik voor belangrijke dagelijkse taken in nederzettingen én de depositie in graven in een groot gebied door groepen met een verschillende bestaanswijze en sociale organisatie, laten het belang van dit netwerk zien.

De enkelgrafsamenlevingen deden allen mee in een supra-regionaal netwerk dat een platform vormde voor uitwisseling van goederen, ideeën, en mogelijk mensen. Deelnemen aan dit netwerk was een belangrijk aspect voor al deze regionale groepen en deelname werd tot uiting gebracht door het gebruik van een set van gemeenschappelijke kenmerken, waaronder met touw-, en spatelindrukken versierde bekertjes, die zowel een functionele als ideologische rol hadden. De Enkelgrafcultuur was daarmee een economische alliantie, een dynamische totaliteit, een netwerk dat regionale groepen verbond.

Acknowledgements

When I was between 8 or 10 years of age I first visited the National Museum of Antiquities in Leiden. My dad had to show a group of history students around and I went along. Very clearly I remember that we all stood opposite a lacquer profile as my dad told the students that the Bronze Age predates the Iron Age. He also told them that Bronze is an alloy of copper and tin, both of which do not occur naturally in the Netherlands. As iron can be found in the Netherlands it is puzzling why bronze was used earlier than iron. I really wanted to solve the riddle and there and then I decided to become an archaeologist.

Years later I did become an archaeologist and I would like to thank everyone who has supported me along the way. First of all my parents whom have always encouraged me to do study this subject. This book is dedicated to them as they never stopped me in my enthusiasm for this profession. Even if my enthusiasm included large 'excavations' in the backyard, bringing home loads of finds including dogs skulls that needed boiling or the wish to study at a university at the other end of the country. Thank you.

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Curriculum Vitae

Sandra Beckerman was born in 1983 in the town of Veenendaal. Between 1995 and 2001 she attended secondary education at Rembrandt college Veenendaal. Beckerman started studying archaeology in 2001 in Groningen. During the two year research master in Art History and Archaeology she specialised in (Neolithic) ceramic analysis. With prof. Daan Raemaekers she published an article on the chronology of the Vlaardingen culture. She wrote her MA thesis on the ceramics from Funnel Beaker settlement sites. Part of this work was published in both a popular scientific journal as well as in a monograph published by the state service for archaeology (then RACM, now RCE). After graduation from university Beckerman worked for two commercial archaeology firms; between 2007-2008 for Archeo Specialisten (part of ADC) in Amersfoort and between 2008-2009 for ARCBv in Groningen. Her work as a prehistoric ceramic specialist resulted in a series of reports on the ceramics from sites dating to both the Neolithic, the Bronze Age and the Iron Age in different parts of the Netherlands. Between 2009 and 2014 she was a PhD student at Groningen University as part of the Odyssee project “Unlocking Noord-Holland’s Late Neolithic Treasure Chest: Single Grave Culture behavioural variability in a tidal environment”. This research of Corded Ware and other Neolithic ceramics as a means for reconstructing past societies resulted in the present dissertation.

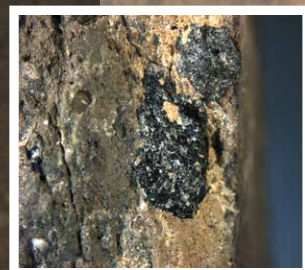


CORDED WARE COASTAL COMMUNITIES

The Corded Ware Culture (c. 2900–2300 BC) is found in a large area, from Russia to the Netherlands and from Scandinavia to Switzerland. Supra-regional elements include beakers decorated with cord and/or spatula imprints, battle-axes, and a funerary customs involving crouched inhumations under barrows with gender-specific placement of the body gender-specific funerary gifts.

Analysis of ceramics from well-preserved settlements from the Dutch coastal zone have provided very valuable new information on the Corded Ware chronology, social organisation, ideology, subsistence, and use of material culture. A critical review of the commonly applied chronological models shows that many of the underlying premises cannot be supported due to problems with (broad calibration and sample reliability of) ¹⁴C dates. This study shows that in the Neolithic Dutch coastal zone, the thin-walled ceramics reflect supra-regional (Corded Ware) affiliations, whereas the medium-thick-walled and thick-walled ceramics reflect persistent regional (Vlaardingen) traditions. The beakers decorated with cord and spatula impressions were used primarily for cooking; indications for the often proposed use of alcohol (and associated rise of individualisation and elites) were not found.

It is argued in this study that the Corded Ware Culture represents an economic alliance, a dynamic totality as well as a network linking regional groups – each with a distinct economic base, material culture and ideology. These communities all participated in a vast supra-regional network that was a platform for inter-community exchanges of goods, skills, ideas and possibly people. Affiliation to this supra-regional network was a vital aspect for all regional groups involved, and membership to it was expressed by using a set of common traits. Decorated thin-walled beakers act as symbols of these supra-regional networks and thus embody both functional and ideological roles.



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