

The agency factor in the process of Neolithisation – a Dutch case study¹

Leendert P. Louwe Kooijmans



Review data:
submission 11/12/2008
revision 19/1-2009
2nd submission 31/3/2009

available online at www.jalc.nl and www.jalc.be

Abstract

Multiple, detailed settlement excavations in the Delfland region in the Dutch coastal area have shown that local communities of the Hazendonk group (c. 3500 BC) chose to follow different trajectories in an advanced phase of the Neolithisation process. The Rijswijk community led a fully agrarian life, while the others extensively exploited the rich aquatic resources. The multi-household Schipluiden settlement shows us long continuity, up to the time when the dune on which it lay became submerged, and a strong sense of collectiveness represented by its fences and concentrated wells, whereas other house sites were short-lived and wide apart. This demonstrates that the Neolithisation as a whole should be seen as the outcome of small-scale interaction processes between the native population and the farming communities in the loess zone further south.

Keywords: Neolithisation, agency, wetland archaeology, Rhine-Meuse delta, Delfland

1 Neolithisation in the Low Countries

In the past few decades a long series of excavations has step by step enhanced our understanding of the Neolithisation process in the Lower Rhine area, the western part of the large fluvial plain to the north of the loess zone. We now have a picture of a long-lasting static frontier between farming communities on the southern loess soils and communities further north which very gradually, over a period of roughly two millennia, incorporated the new achievements into their own way of life in a trajectory ranging from the Late Mesolithic via the Swifterbant culture to the Hazendonk group (Louwe Kooijmans 2007). There was no case of any interruption in cultural development; quite the contrary – the whole process was characterised by marked continuity. It was no ‘package deal’, but a long succession of adoptions, beginning with technology in the form of ground stone woodcutting tools, pottery and large blade implements, followed by subsistence elements, first livestock, then cereals. This turned the Late Mesolithic subsistence system into what is known as an ‘extended broad-spectrum economy’. Other aspects changed, too. A new deposition tradition evolved, with depositions being made both near the settlements and out in the wilderness beyond them, and more attention was paid to the burial of the deceased in formal cemeteries. It is generally assumed that the population

became more sedentary in the context of the Neolithisation process, increased in size, and consequently became more socially differentiated. Until recently, however, we had only very little evidence of changes in the settlement system, and hence social organisation, in our study area. It would seem that Hodder's *domus-agrios* contrast (1988) does not hold for the communities in the Lower Rhine area.

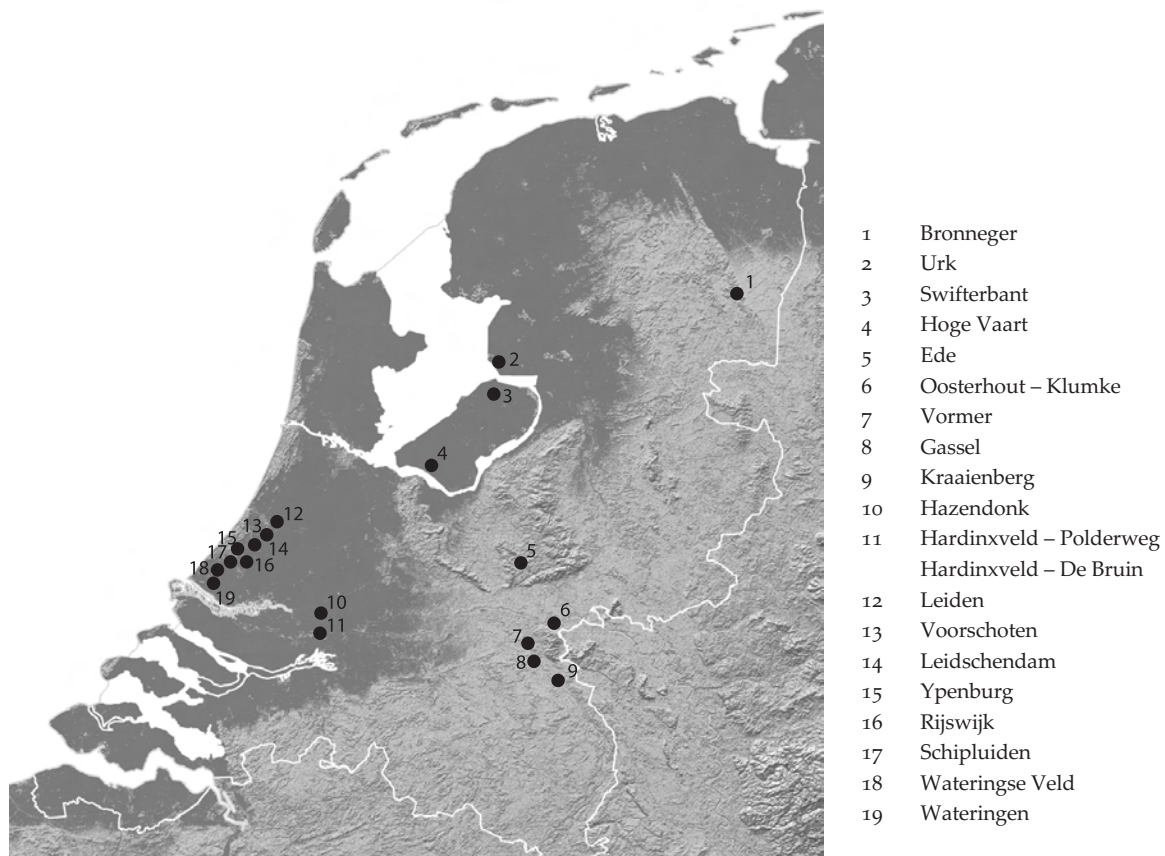


Fig. 1 Location of sites, referred to in the text.

1.1 The problem

It so happens that the grand narrative of the process of Neolithisation in the Lower Rhine area is based on detailed evidence on local communities obtained in excavations. This evidence is dominated by information provided by sites in the wetlands of the Rhine-Meuse delta, because those sites are so very well preserved, in marked contrast to sites on the surrounding sandy soils. The sites cover the entire expanse of the vast Dutch wetlands, are characterised by diverse palaeoecological conditions and most probably also had different functions. They enable us to follow the entire process in its spatial differentiation, in particular with respect to the introduction of stock keeping and crop cultivation. Two key questions, however, are how representative these sites are of the period from which they date and the area in which they lie, and what role the local communities played in the process. The Neolithisation process was after all not a sauce that was poured over the people, as it were, but a process of interaction involving the choices made by people living on either side of the frontline of the agricultural world. In pre-historic times, too, people did not just observe or express the rules that applied in their society in a stereotype manner – they were people of flesh and blood, with their own desires and pre-

ferences, who made choices within the margins applying in their community. Due to the restricted nature of our archaeological evidence those choices can usually not, or virtually not, be specified. Recent, concentrated and intensive research carried out within the limited area of the Dutch Delfland region however provided the conditions under which we were able to gain an understanding of rather unexpected differences in the adoption of various aspects of Neolithic life, different local 'practices' in the sense defined by Bourdieu (1977) – generally referred to as 'agency' in the archaeological literature – in relation to the general principle of Neolithisation. The concept of 'agency' is here used in an extended way, to apply to local groups rather than individuals. This can be justified by the notion that choices made by and in such a group, which will have consisted of a few households, will have been based on the consensus of a few individuals or even one dominant person. The stage of the Hazendonk group appears to be particularly suitable for such a study, because it coincided with a turning point in the Neolithisation process – in geographical terms between the Michelsberg culture of the southern loess belt and the (unknown) late Swifterbant of the northern sandy soils, and in chronological terms between the 'classical phase' of the Swifterbant culture, around 4000 BC, and the phase of the Vlaardingengroup. There are more than enough arguments for interpreting all the sites as permanent settlements of complete households. The sites all had the same basic function, so there is no case of any functional differentiation. Nevertheless, there are some conspicuous differences, in particular in settlement layout, in the composition of the faunal assemblages and in burial rites. Thanks to their wetland conditions, these sites are of high informational value: the sites were buried and have been preserved in a sealed state, as it were, including differentiated data on landscape and subsistence based on organic remains. And last but not least, the sites have been recently excavated according to the latest standards.

We now know of six sites (and 18 subsites) in Delfland with occupation remains that can on the basis of finds and ¹⁴C dates be attributed to the Hazendonk group. In the following discussion we will restrict ourselves mainly to the four excavated settlements, but we will incidentally also refer to the other sites. But before we start talking about fundamental differences between the individual sites we will first have to consider the uniformity of three important limiting conditions: landscape, evidence and chronology.

2 The Delfland region, the genesis of a landscape 4300-3300 BC (fig. 2)

The Delfland region forms part of the coastal area of the present Rhine-Meuse delta. Until the middle of the Atlantic period the balance of the former rapid rise in sea level and the deposition of sediment from the sea and by the major rivers caused the coastline to continually move inland, with the coastal deposits constantly being turned over. In the intracoastal plain behind the narrow, multiply interrupted coastal barrier of those days was a large area of tidal flats. If people ever lived in this landscape, the chances of their occupation remains having survived are minimal. Indeed, no such remains whatsoever have been found in this area. At a certain stage the coastline however stabilised, the process reversed, and the coast steadily expanded on the seaward side. This was the result of fluctuations in the complex balance between the supply of sand along the coast, sedimentation in the basins aligning it and the progressively decreasing rise in sea level (Beets *et al.* 2000).

For a long time it was assumed that the row of Older Dunes between Hoek van Holland and Leiden represented the oldest surviving coastal barrier, with a date of around 3800 cal BC. In the 1980s, however, a number of deep pits dug during road-construction and urban-expansion projects revealed the sediments of an earlier phase of coastal development buried beneath younger deposits in the Delfland region, implying that this 'coastal expansion' actually began a few centuries earlier. The development of the landscape of this area can be followed in considerable detail (fig. 1; Van der Valk 1992, 1996; Cleveringa 2000; Mol 2006).

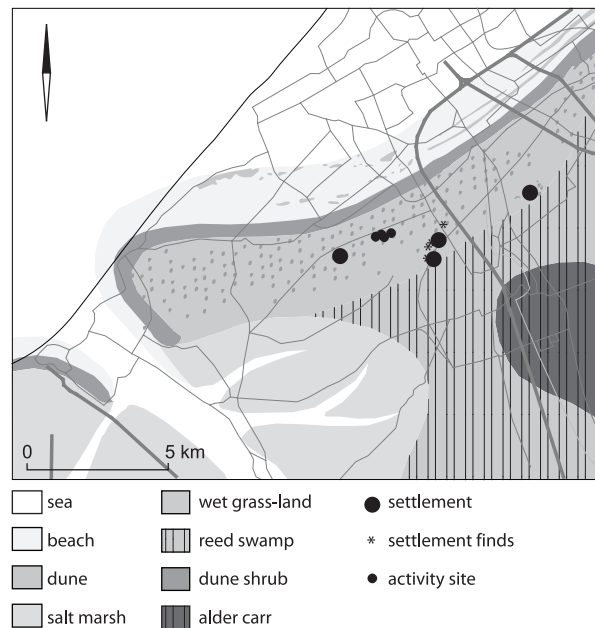


Fig. 2 Palaeogeography of the coastal area of Delfland around 3500 cal BC.

The oldest coastal barrier in Delfland has been dated around 4350 BC. It extended between an area of shallow water in the coastal plain and the open North Sea. On its seaward side a beach plain with a width of several kilometres then formed, while wash-over deposits were laid down behind it during high tides (Mol 2006). Sand was blown over this plain from the new coastline, resulting in the formation of flat, free dunes.

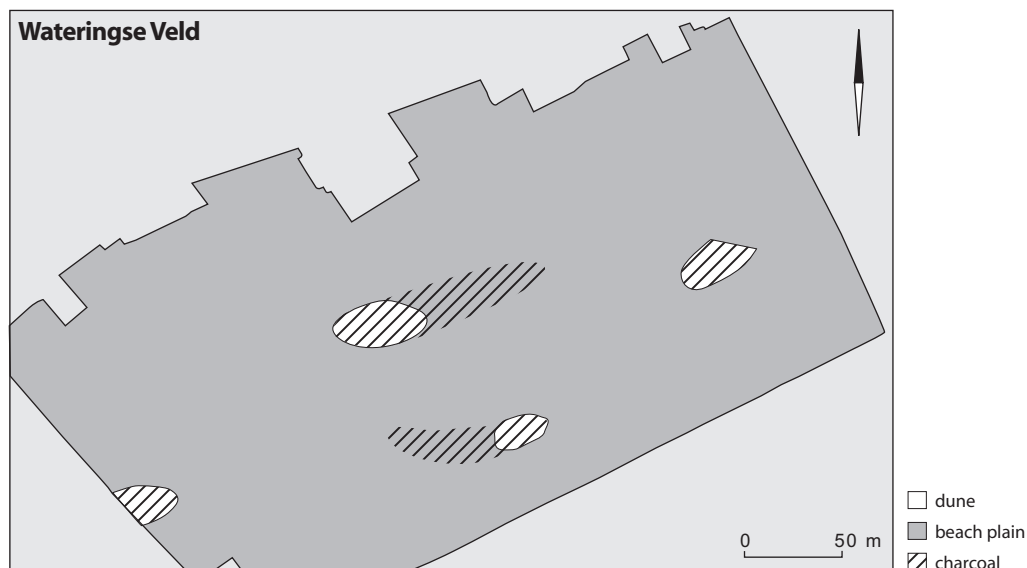


Fig. 3 Map of an area of around 8 ha in the dune landscape in the strand plain near Wateringse Veld showing four small dunes that were not occupied but were used for unknown purposes. Scale 1:4000. Redrawn after Oude Rengerink 1996.

Our understanding of the layout of these landscape elements, which were on the whole relatively small, but very important for occupation, is limited because they are buried deep beneath the present-day surface. Incidental observations aside, they have actually been mapped in only three fine-meshed detail maps, two of which were made in the context of excavations (Oude Rengerink 1996; Cleveringa 2000, 30; Mol 2006). The dunes were very flat and low, only a few dozen metres wide and not more than 1 to 2 m high. They were relatively small in the west

(fig. 3) and somewhat larger in the east, culminating in the dune of Ypenburg, measuring 100 x 750 m.

At first, the sea still had free access to this plain containing the low dunes, but around 3800-3700 BC another coastal barrier with low dunes must have formed along the coast, protecting the plain from the sea. This is the aforementioned line from Hoek van Holland to Leiden. Even so, marine ingressions frequently occurred in these early days, with the salty sea water penetrating the plain from the Meuse estuary in the south or via interruptions in the coastal barrier. In spite of the continuing rise in sea level, the hinterland subsequently became less saline as a result of the closing of the coastline. From then onwards the old coastal plain was for several centuries an accessible and attractive landscape for the Hazendonk communities, between the coast in the west and the vast swamps in the east, between the estuaries of the Meuse in the south and the Rhine in the north, with the dunes affording suitable settlement areas that were dry, if not that high. Occupation came to an end when conditions throughout this area became wetter around the transition from the Hazendonk to the Vlaardingen group, around 3350 BC.

The expansion of the coast with beaches and rows of dunes continued after 3300 BC, and the successors of the Vlaardingen communities were to exploit the new landscapes in a comparable manner, but that is beyond the scope of this article (Groenman-van Waateringe *et al.* 1968).

The developments outlined above led to the fossilisation in the soil of the Delfland region of a Neolithic landscape that existed for only a short period of time: from around 4000 to 3350 BC. Before that time the landscape consisted of open coast, after that time it changed into swamps. Within this period the natural conditions changed from those of open salt marshes, via grasslands of a 'green beachplain' to a reed swamp. From around 3700 BC onwards low dunes afforded suitable settlement areas for people exploiting the rich natural resources in this area.

3 The sites

Each time that large-scale digging activities were carried out in the past fifteen years, remains of Neolithic occupation on the buried dunes came to light – eighteen sites in total, comprising four microregions: Wateringen, Wateringse Veld, Schipluiden-Rijswijk and Ypenburg, implying intensive use of the young landscape. In some cases separate subsites were distinguished. Some of the sites were merely reported, but four have actually been excavated.

The first remains to come to light, during an investigation of the trench dug for the A4 motorway in 1984, were a concentration of some bones and broken stone. Unfortunately, almost the entire site had been disturbed (Van der Valk, pers. comm.; ARCHIS national archaeological database).

Nine years later, when work on the A4 continued near Rijswijk, the trench was found to intersect several dunes. On one of those dunes (site 1) a narrow strip of a settlement was excavated. The research on the other dunes was restricted to observations. The excavation was too limited to allow any statements to be made about the size of the dune and the settlement (Koot 1994).

In 1994 another dune with occupation remains was discovered in the trench of a road bypassing Wateringen. This site was called 'Wateringen 4' to distinguish it from other – Iron Age – sites nearby. The excavation that was carried out here in 1995 revealed the remains of a small settlement that were accurately recorded (Raemaekers *et al.* 1997). The dune was found to represent a single-house site that was used for only a short period of time.

Yet another year later 25 hectares of the area known as Wateringse Veld, between Rijswijk and Wateringen, was explored by means of coring prior to the construction of an urban district. That area was also found to contain relatively small dunes, four in total (sites 5-8), all covered with a top layer coloured black by finely distributed charcoal (Oude Rengerink 1996).

In 1997 a large new residential area was built at the site of the former military airport Ypenburg. Within a period of four years, occupation remains and a spectacular cemetery were excavated across a large dune complex. Seven concentrations of postholes with associated wells and pits were found (Koot *et al.* 2008).

What is at present the last settlement came to light at the site of a new wastewater purification plant in the former municipality of Schipluiden. This site was excavated almost in its entirety in 2003. It is a compact settlement with a high density of finds whose occupants intensively exploited the entire dune right up to its peripheries and also the surrounding zone for a period of more than two centuries (Louwe Kooijmans & Jongste 2006).

	Schipluiden	Wateringen 4	Ypenburg		
			C/3	K/11	total
dune l, b	50 x >120 m	40 x > 80 m	150 x 750 m		
orientation	SW - NE	W - E	SW - NE		
top below MSL	-3.0 m	-3.5 m	-2.4 m		
height	1.5 m	0.8 m	2.2 m		
culture	Hazendonk	Hazendonk	Hazendonk		
date cal BC	3630 - 3380	3625	3860-3435		
duration	200 - 300 jaar	< 100 jaar	c. 425 year		
excavation	c. 5500 m ²	c. 2400 m ²	c. 40.000 m ²		
site dimension(s)	70 x 120 m	45 x > 60 m	60 x 80	50 x 50	-
			40 x 40	50 x 60	-
			50 x 70	70 x 90	-
			60 x 70		-
houses	-	1 (11 x 4 m)	2	1	4
post traces	4120	97	364	385	1044
fences	3	-	-	-	-
pits	275	19	65	80	186
wells	145	17	48	32	111
hearth pits	56	1	6	2	21
deposition pits	1	-	-	-	2
graves	5 (6 ind)	0	31 (42 ind.)		
human remains	N = 36, MNI = 9	-	-	-	N = 9
pottery	155 kg	50 kg	57 kg		
flint	53 kg	5 kg	25 kg		
stone	48 kg	7 kg	26 kg		
bonen	162 kg	?	62 kg		

Table 1 Delfland, Hazendonk group, survey of the settlements, features and finds in figures.

4 Chronology ²

All the Neolithic settlements in Delfland belong to the Hazendonk group, a cultural unit at the end of the Swifterbant culture, restricted to the southern part of that culture's distribution area, and extending into the Dutch and Belgian provinces of Limburg (Louwe Kooijmans 2006a; Amkreutz & Verhart 2006). The chronology, in particular that of the Hazendonk stratification, shows that this group covers a relatively short period, from 3800 until 3400 BC.

The ¹⁴C dates of the Delfland sites all fall within the aforementioned range of 3800-3400, with one possible exception. On the basis of the ¹⁴C dates, the earliest phases (2/B-3/C) of Ypenburg should coincide with the Hazendonk 2 stratum. With its S-profiled pots with widely everted rims, the Hazendonk 2 assemblage is however clearly a Swifterbant assemblage (Raemaekers 1999, 65-70), whereas Ypenburg C/3 with its straight-walled types morphologically belongs to

the Hazendonk group, and must hence be later. On the basis of these considerations we may not date the beginning of occupation at Ypenburg any earlier than c. 3800.

As for the end dates, a single sherd with an everted, perforated rim at both Ypenburg and Schipluiden means that, at these sites, occupation continued just up to the Vlaardingen tradition, as indeed suggested by the ^{14}C dates.

The chronologies of the sites can be further subdivided on the basis of the local natural stratigraphies in which the archaeological remains were embedded. At Schipluiden those stratigraphies are aquatic deposits (clay, peat) next to the dune, on the basis of which the (continuous) occupation can be subdivided into four phases and dated in absolute terms to 3630-3380 BC.

During its period of occupation, drifting sand was regularly deposited on the large dune of Ypenburg, which resulted in a succession of layers of virtually sterile dune sand alternating with soils or vegetation horizons formed in phases of vegetation development – some more distinct than others – of the kind also known from the later Older Dunes. A few finds and features show that the dune was visited by humans shortly after its formation (phase 2B). Most occupation remains however date from two main phases of stability, soil formation and vegetation development referred to as phases 3/C and 11/K. The dates of these two phases together lie between 3850 and 3450 BC, but those dates both involve a high degree of uncertainty, due largely to the wiggles in the calibration curve. Phase 3/C lies somewhere at the beginning of this range and phase 11/K entirely at the end. The succession of layers of drift sand and the vegetation horizons formed in them imply a substantial hiatus. Incidental evidence of human presence however indicates a certain continuity in the use of the site.

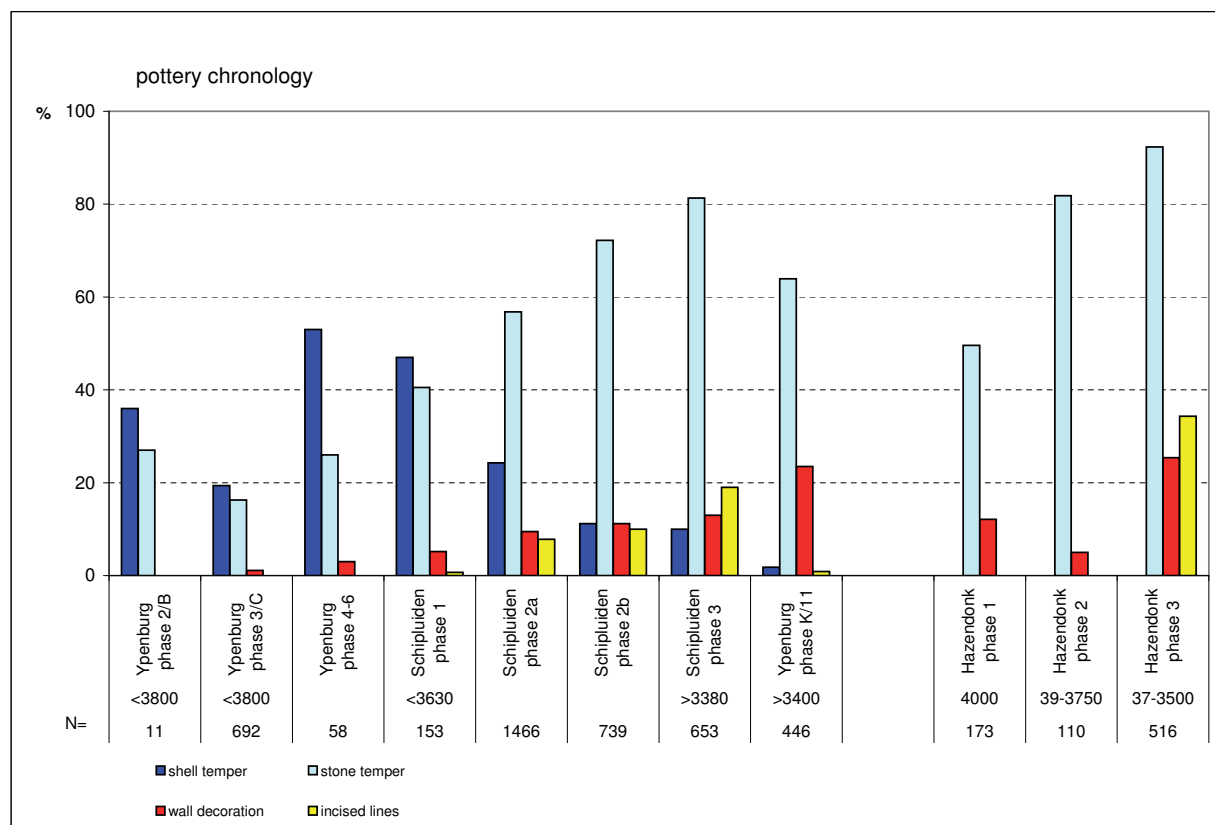


Fig. 4 Trends in four chronologically sensitive earthenware features of the combined sequences of Ypenburg and Schipluiden, and the sequence of Hazendonk for comparison. The Haz 1 and Haz 2 assemblages from Hazendonk are classed as belonging to the Swifterbant culture. Data from Raemaekers 1999, 2008; idem & Rooke 2006.

The two local chronologies can be linked on the basis of stratigraphically verified series of ^{14}C dates and the calculated margins using the Oxcal program. Closer examination of this correlation reveals some chronologically sensitive variables in the pottery (fig. 4). The pottery of the Hazendonk group is simple and devoid of any pronounced stylistic features. Nevertheless, two variables can be used: temper and wall decoration. At both Ypenburg and Schipluiden the crushed shell that was initially used to temper the clay was gradually replaced by ground quartz, and the amount of wall decoration increased. We observe the same trends in the more general Hazendonk sequence.

The following general chronology, comprising two main phases, can be inferred from the data and considerations outlined above (fig. 5):

1. a phase characterised by a beach plain and salt marshes with frequent marine ingressions coinciding with Ypenburg phases 2B and C/3, Schipluiden phases 1 and 2a and Wateringen 4, 3800-3500 BC,
2. a phase characterised by a development towards wetter conditions and swampy grasslands coinciding with Ypenburg phase K/11 and Schipluiden phases 2b and 3, 3500-3400 BC.

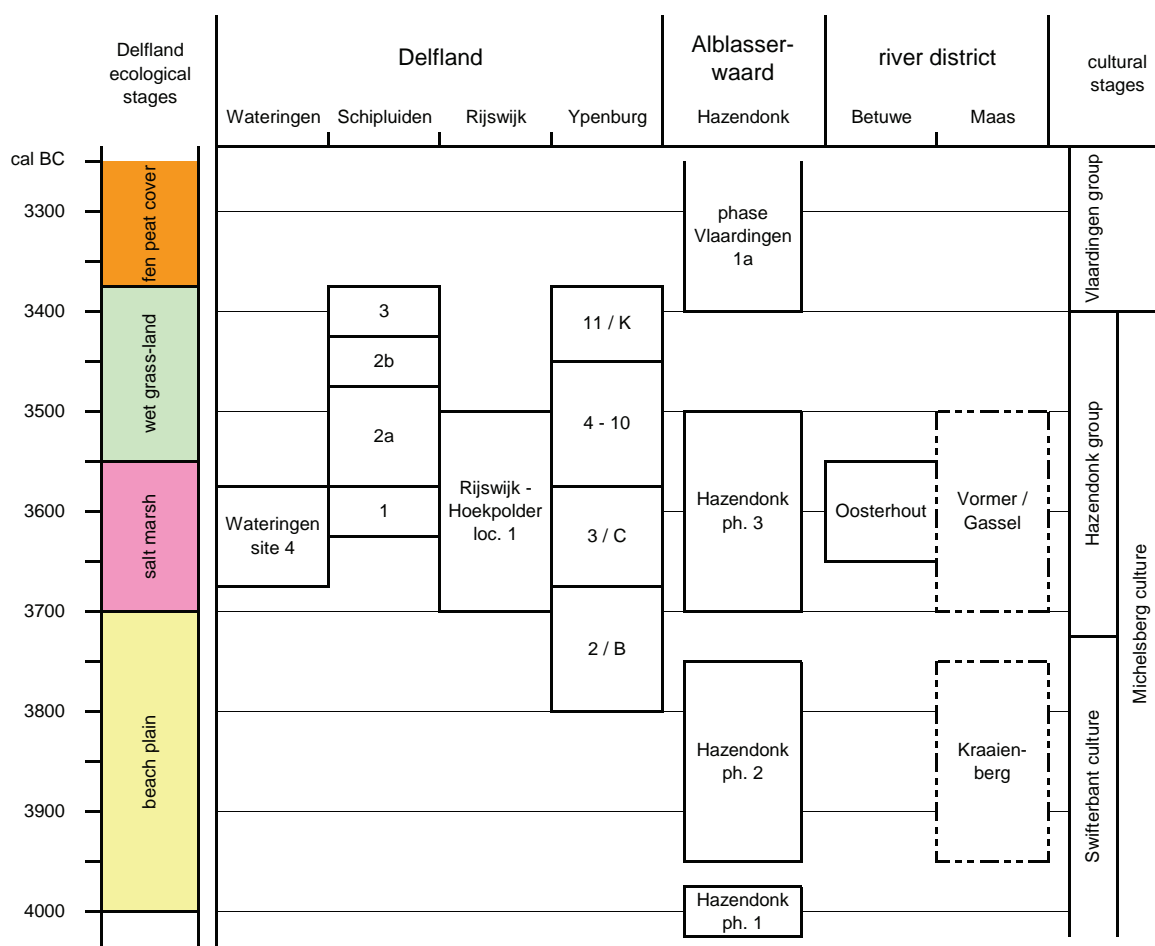


Fig. 5 Chronology of the Hazendonk sites in Delfland compared with the chronologies of the Alblasserwaard region and the river area based on direct $\text{C}14$ dates (boxes with solid lines) or pottery typology (dashed boxes).

Now that the sites' landscape and chronological contexts have been defined, we may turn to the question what they have in common and in what aspects they differ from one another. To what extent had these local communities continued to adhere to old traditions, and what new elements had they by this stage incorporated into their way of life?

5 The settlement system

The three sites differ considerably in size and layout. The differences between Wateringen 4 and Ypenburg can be explained by the substantial difference in size between the dunes in the west and the east of the plain. At Schipluiden on the contrary, the people made a distinctly different, more Neolithic choice in the layout of their settlement.

5.1 Wateringen 4 and Wateringse Veld

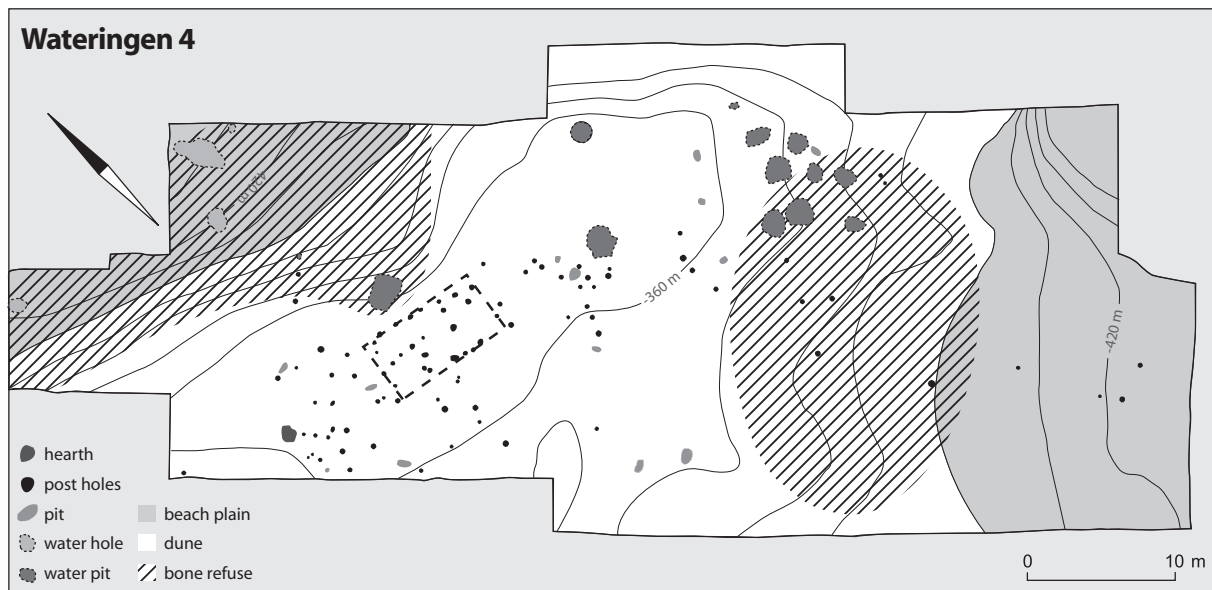


Fig. 6 Wateringen 4, schematic plan. Scale 1:500. Redrawn after Raemaekers *et al.* 1997.

The simplest site with the most straightforward layout is Wateringen 4 (fig. 6). Although it hasn't been excavated in its entirety, the site can still be well characterised (Raemaekers *et al.* 1997). On top of a relatively small, low dune was a concentration of around 90 postholes measuring approximately 12 x 25 m, within which a two-aisled houseplan of 4 x 11 m was distinguished. Remains of the wooden posts (alder and juniper) had survived in the features, showing that the water level had risen substantially by that time and implying that the site will have been abandoned shortly after. The other postholes may have belonged to one or two previous buildings. At the foot of the dune were a few pits. In view of their situation and the fact that they apparently became filled with clean sand fairly soon it is assumed that they represent temporary sources of drinking water. Settlement refuse was found mainly across the entire old dune area, but some refuse, in particular bones, was also found in the dune's surroundings, which were bogs at the time. So the site's dimensions more or less coincide with the dimensions of the dune: 35 x 50 m, based on the distribution of the wells, or 45 x 60 m based on the distribution of the artefacts. Wateringen 4 was unmistakably a single-house site that was used for the duration of at most three successive houses ('house generations'), or 50 to 75 years. This does not necessarily mean that the occupants deliberately chose to use the site for such a relatively short period of time; they simply won't have foreseen the rise in water level – when they settled here the dune will have seemed to afford a high and dry place for them to live. The house need not have been entirely isolated either; it may well have formed part of a settlement along with other houses on similar dunes nearby. This option is unfortunately not supported by the sites in Wateringse Veld, where four similar dunes were used by humans, but not as settlement sites (Bakker & Burnier 1997).

5.2 Wateringen 4 versus Ypenburg



Fig. 7 Ypenburg, schematic plans, phases 3/C (top) and 11/K (bottom). Scale 1:5000. N.B. the cemetery cannot be dated to any of the phases. Redrawn after Koot *et al.* 2008.

The occupation remains on the large dune of Ypenburg can be regarded as representing a multiple of Wateringen 4 (Koot *et al.* 2008). The entire dune complex originally measured 100 x 750 m, but the eastern half later disappeared due to erosion by a younger tidal channel. Two main occupation phases were distinguished, separated by a period of frequent sand drifts. Seven concentrations of postholes were found on the surviving part – three dating from phase 3/C and four from phase 11/K – with dimensions ranging from 20 x 20 m to 30 x 40 m (fig. 7). In four cases the plan of a small, rectangular, two-aisled house measuring at most 4.5 x 10 m could be made out. Many wells were found in association with these concentrations of postholes/house sites. Most had been dug next to the houses, in groups at the periphery of the dune, allowing us to distinguish activity areas with diameters between 50 and 80 m. Not clear is whether the concentrations of postholes dating from each of the two phases represent several contemporary or successive houses. Arguments favouring the first option are that the plans lie at fairly regular distances from one another – centre-to-centre distances of 100-150 m – and that they are separated by areas with very few features and finds. This holds for the plans from both occupation phases.

In terms of numbers of features – postholes, pits, wells – Ypenburg is roughly ten times the size of Wateringen, which is in accordance with the theory that the seven concentrations plus the features that have not been dated to either one of the two phases coincide with the same number of 'Wateringens'. Considering the number of features and the identifiability of the plans, the Ypenburg concentrations will likewise represent only a few house generations. The comparison however falls short when it comes to the numbers of finds. This is attributable to differences in the archaeological formation processes: burial, preservation and disturbance.

5.3 Wateringen 4 and Ypenburg versus Schipluiden

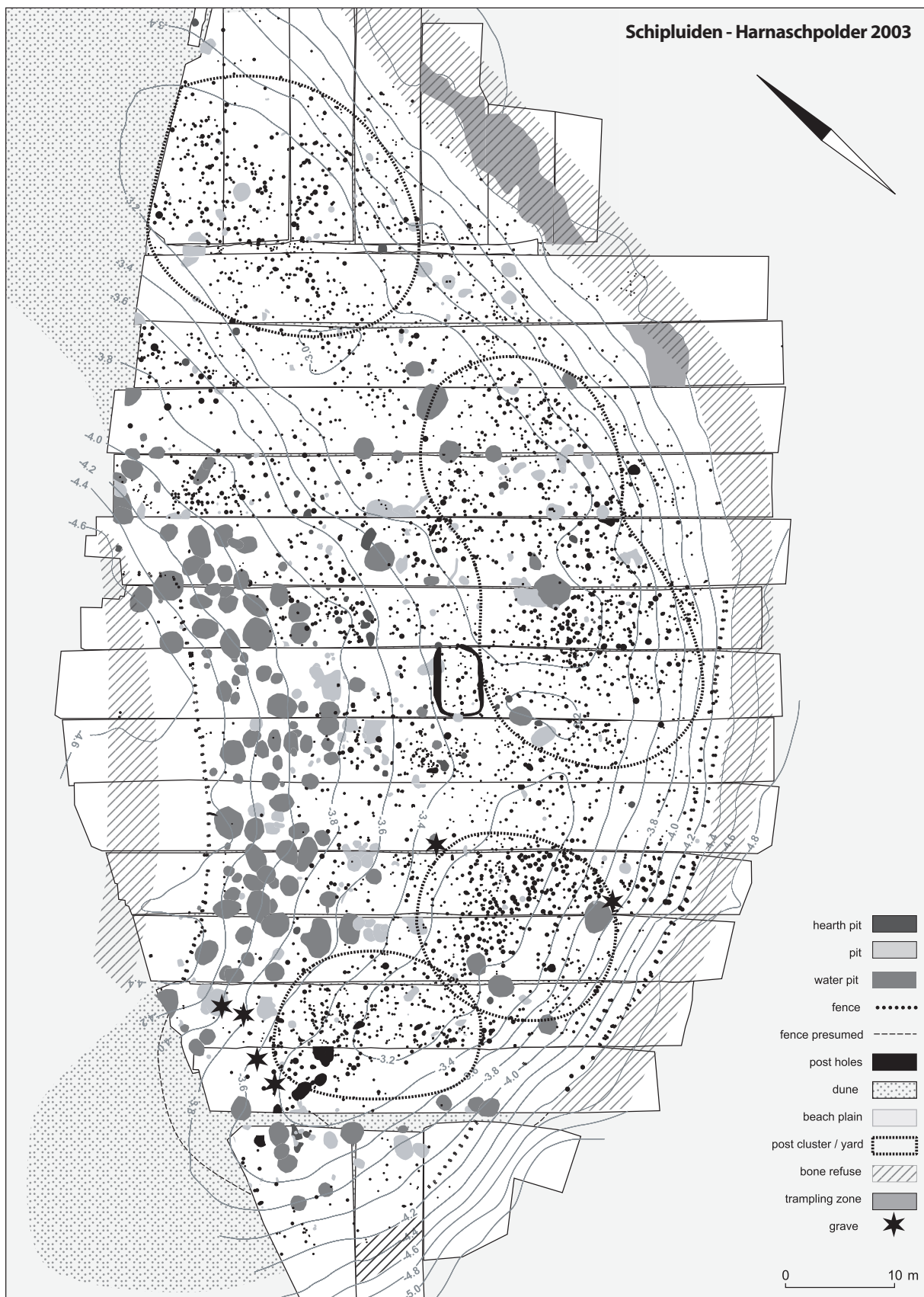


Fig. 8 Schipluiden, schematic plan. Scale c. 1:1000. Redrawn after Louwe Kooijmans & Jongste 2005.

With its finds and features covering a distribution area of 70 x 120 m, Schipluiden (fig. 8) is quite a bit larger than Wateringen 4 and the individual concentrations of Ypenburg (Louwe Kooijmans & Jongste 2006). The site has a very high density of features, covering the entire dune area, but especially the highest part. In the course of the occupation period, but above all in the earliest phases, an impressive number of 145 wells were dug on the northern side and to a lesser extent in other parts of the dune. At some stage the occupants enclosed their entire settlement with a fence erected precisely at the boundary between their site and the surrounding aquatic deposits. This fence was replaced by a new structure on two occasions, each time a little higher up the slope due to the rising water level (fig. 9). On the basis of the posthole concentrations and the distribution of finds in the adjacent long refuse zone, and the continuity in the deposition of that refuse throughout the four distinguished phases, it is assumed that the site represents the permanent settlement of four or five households over a period of roughly 250 years. The fact that no unmistakable house plans can be made out in the posthole concentrations is assumed to be attributable to long-term use of the same house sites.



Fig. 9 Schipluiden. Features of one of the fence enclosures. After Louwe Kooijmans & Jongste 2005.

The number of pits and wells found at Schipluiden is one-and-a-half times that found at Ypenburg and thirteen times the number at Wateringen. This agrees well with the differences in intensity of use. Schipluiden had four to five times as many households as Wateringen and was occupied for a period three to four times as long. It also agrees with the view that Ypenburg was occupied by three or four households in two phases that will together not have exceeded the period of occupation of Schipluiden. So in these respects the evidence presents a consistent picture and the three sites do not seem to differ materially from one another. The greater number of postholes at Schipluiden (a factor of four greater), however, cannot be attributed to such factors as differences in preservation or the employed excavation methods. It must imply a considerably greater number of structures at this settlement – most probably fences. There are some substantial differences in the ratios of the different categories of finds and features. For example, in comparison with Schipluiden, a relatively large amount of pottery was found at Wateringen. This can be attributed to differences in deposition and erosion between the two sites. At both sites the pottery was concentrated around the settlements; this was particularly evident at Wateringen. At Schipluiden the distribution pattern had been severely disturbed by the erosion of the top part of the dune, which led to the disappearance of many remains. When we add to this the destructive effect of trampling during the intensive occupation of Schipluiden the differences between the sites are largely explained. The ratios of the flint

and stone objects will have suffered less disturbance because erosion and trampling will have had a much lesser impact in the case of these categories.

5.4 *Structure and agency*

It would seem that we may regard Wateringen, Ypenburg and Schipluiden as representing varying local expressions of a single settlement form. On the basis of Schipluiden we assume that the local community consisted of a number of cooperating households that chose to settle on the dunes in the beach plain. On the large dune of Ypenburg there was enough space for 3-4 clearly distinct yards. We assume that Wateringen was not an isolated settlement, but that the small dunes in that area led to the establishment of separate farmsteads on the individual dunes. The occurrence of house remains, the ranges of artefacts and the (semi-)agricultural subsistence system together allow little room for doubt concerning the permanent character of the settlements for a period of more than one house generation. So in this respect they are purely Neolithic and comparable with what is known from other countries (the British Isles, Denmark) from this period (Darvill & Thomas 1996; Grogan 2004).

Schipluiden clearly presents a different picture. Here, four or five households settled at a site that did not afford the same amount of room as was used at the other sites. Why this site's occupants made this choice is not clear, especially as there was a much larger dune immediately to the north of the site that was only extensively used. From the Rijswijk-Hoekpolder site we however know that the territory of another group lay only a short distance away. So maybe the occupants of Schipluiden did not have that much choice after all. Whatever the case, the Schipluiden group developed a much greater collectivity than the other two groups. In the first occupation phases the sources of freshwater for the entire community were concentrated in one area on the northwest side of the dune. Later, in the two last phases, the entire settlement was enclosed by a fence, which was kept up. This upkeep was clearly a collective action of the entire community. In the context of the tentative Neolithisation of the plain to the north of the loess belt this is quite remarkable. It represents the physical isolation of a domestic space from its surroundings, carried out by a collective group, and not an individual household. The fence most probably had a practical function, for example to keep the livestock out of the settlement, and its erection may also have been partly prompted by the wetter conditions in the site's surroundings and the occupants' and animals' competition for the scarce dry areas. Nevertheless I do not believe that we may assume that the people were *forced* to make this effort by the local conditions. The decision to enclose the settlement in this way was a primary choice, made by the occupants themselves. In this respect Schipluiden is more Neolithic than the other two sites. This is also reflected by the permanence of occupation at the same site, from the very beginning until further occupation became impossible because the site's surroundings changed into a peat bog and the dune was swallowed by the expanding bog. Abandoning a settlement meant relinquishing all the investments made in the site, breaking an ancestral tradition and in the long term possibly surrendering the territory. That was a consequence that the people who chose to live in such a dynamic landscape had possibly not foreseen.

6 Subsistence

Does the subsistence system show any site-specific aspects that cannot be attributed to differences in ecological conditions and/or chronology, and may hence be assumed to represent deliberate choices of the local group? That's a question we can ask because we have such detailed information on the diversity of the landscape and the subsistence strategies thanks to the wetland conditions of all the sites. From botanical and zoological analyses we know that the sub-

sistence system was highly differentiated at all sites and can be characterised as an 'extended broad spectrum economy' (Louwe Kooijmans 1993), by which we mean a combination of the 'new' (Neolithic) elements of crop cultivation and stock keeping and the 'old' (Mesolithic) exploitation of a broad range of natural resources. This way of life may be regarded as the 'habitat' of society in an economic sense. If we assume a conventional site catchment area, with a radius of action of 5-10 km, all the ecological zones – the coast and the freshwater swamps, the estuary and the major rivers – will have been accessible to everyone. The only uncertainty is the extent to which the occupants of Ypenburg had access to estuarine resources. It would seem that the closing of the tidal inlet in this area was well under way by 3700 BC. That would have made the Meuse estuary the most important, and Wateringen and Schipluiden will then have been more favourably situated than Ypenburg. Apart from this there do not seem to be any palaeoecological reasons to assume any substantial differences.

It is impossible to present an accurate description of the composition of the entire subsistence system, let alone to compare the systems of different sites. This is due to the diverse, incomparable sources on which our understanding of crop cultivation, fishing, hunting and stock keeping is based. The different elements of the subsistence system will therefore be discussed separately below. Differences in the employed methods (especially collection methods) and analyses make it even more difficult to arrive at a detailed, quantitative comparison of the archaeozoological basic evidence. They will be discounted for better or worse.

6.1 *Hunting and stock keeping*

As our understanding of both hunting and stock keeping is based on large bones that are collected by hand, we are able to assess the ratios of these two elements of the subsistence system – contrary to those of other elements. Nevertheless there are quite a few problems concerning these two elements, too.

For a uniform understanding of hunting and stock keeping a number of uniform choices must be made concerning certain aspects. The most important is the distinction between wild boar and pig, which can be made in only a few percent of all identifications. Most bones that cannot be identified to species level (pig/wild boar) are proportionally divided between pig and wild boar, and in this process a substantial error margin is unfortunately introduced – certainly in cases of small numbers of bones. But there is no alternative. This procedure was followed for Wateringen and Rijswijk supplementary to the publications (Zeiler 2006b).

Secondly, for more reliable results it is best to leave (red deer) antler out of consideration, to avoid a bias towards red deer in assessing remains. Because antler is still readily identifiable even among highly fragmented remains, this problem affects sieved fractions in particular. This aspect was not considered in the publication of Wateringen 4 either (Paalman 1996; *id.* in Raemaekers *et al.* 1997).³

Thirdly, remains of dogs should be left out of consideration, too, because dogs were not consumed and moreover regularly became buried as (parts of) cadavers (see below). And finally, remains of small furbearing animals (martens, polecats, wild cats, foxes, etc.) should be ignored because those animals will not have been shot primarily for consumption and will moreover have provided only very little meat. Being represented in only small quantities, such remains are incidentally usually fairly insignificant.

All this means that we may well use the ratio of large wild animals and livestock, or the ratio of the main meat suppliers (red deer and cattle) as 'Neolithisation indices', at least as far as meat supplies are concerned. All other animals will have contributed towards the diversity of the diet, but are of quantitatively minor importance.

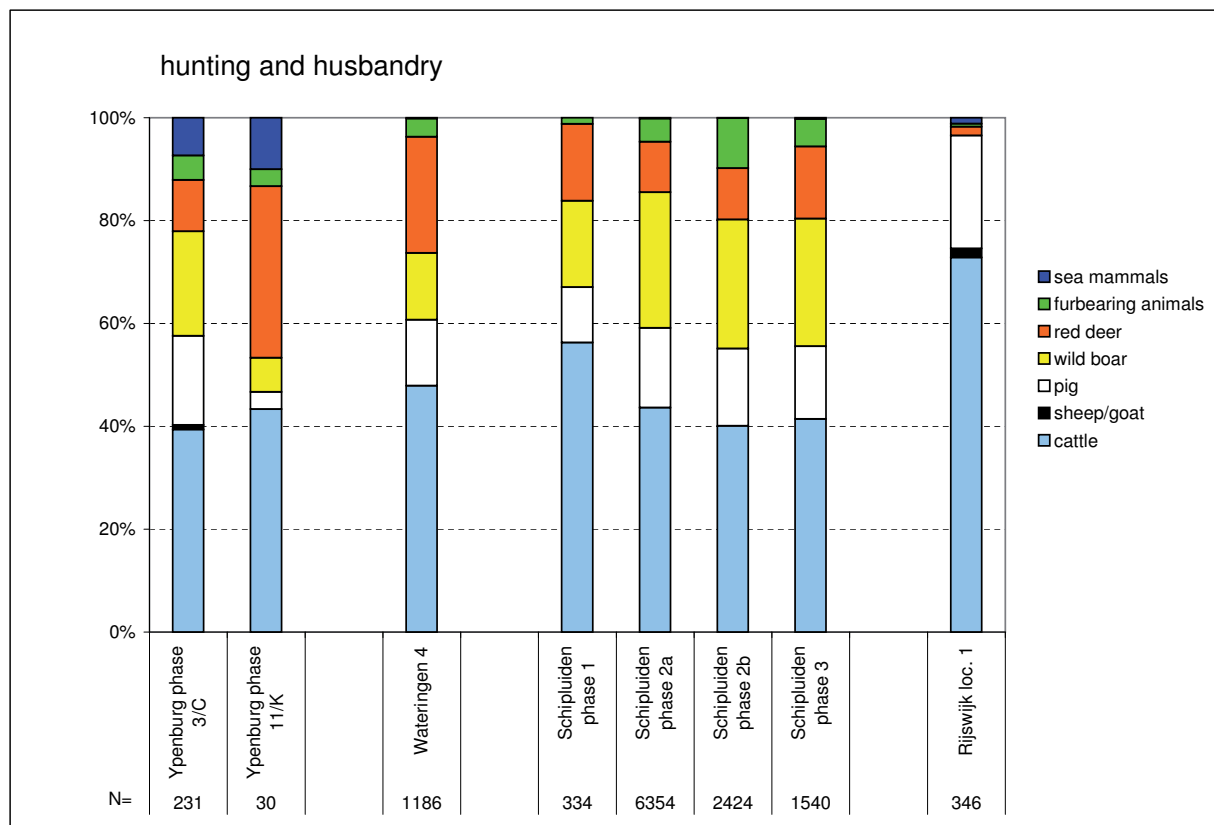


Fig. 10 Composition of the mammal remains from Ypenburg, Wateringen, Schipluiden and Rijswijk-Hoekpolder. After De Vries 2004 and De Vries in Koot et al. 2008; Paalman in Raemaekers et al. 1997 and Zeiler 2006b; Zeiler 2006a; Laarman 2004 and Zeiler 2006b, respectively. Represented are the numbers of identifications to species level, excluding small rodents, excluding dogs and excluding (red deer) antler, of the remains collected by hand.

With due allowance for the above considerations, eight faunal assemblages of the Hazendonk sites in Delfland have been compared (fig. 10). Apart from Ypenburg phase 11/K, all the assemblages were large enough for such comparison. The comparison revealed close similarities, except at one site (Rijswijk). Cattle accounted for 40-60% of the total numbers of bones, sheep/goat were largely or completely absent from all the assemblages, and pig, wild boar and red deer were well represented at all the sites. Only the assemblage from Ypenburg contained a substantial proportion of remains of marine mammals, in particular porpoise, bottle-nose dolphin and grey seal. The Ypenburg assemblage also differed in the complete absence of remains of beaver – an animal that accounted for some 40% of all the bones of furbearing animals at the other sites (fig. 11). Such differences are traditionally attributed to differences in local ecological conditions, but in this case there is little evidence to support such an assumption, as already explained above. We believe the differences instead reflect different preferences for supplementary hunting – at Ypenburg along the coast and at Schipluiden and Wateringen in the swamps. These differences in specialised, supplementary hunting however pale before the most remarkable faunal spectrum of Rijswijk-Hoekpolder, site 1 (Laarman 2004), which is completely agricultural. Hunting was of no importance whatsoever at this site, which was evidently inhabited by a small local community living less than a kilometre from Schipluiden, which had made its own, deliberate choice in favour of a completely agricultural way of life, at least as far as stock keeping is concerned.

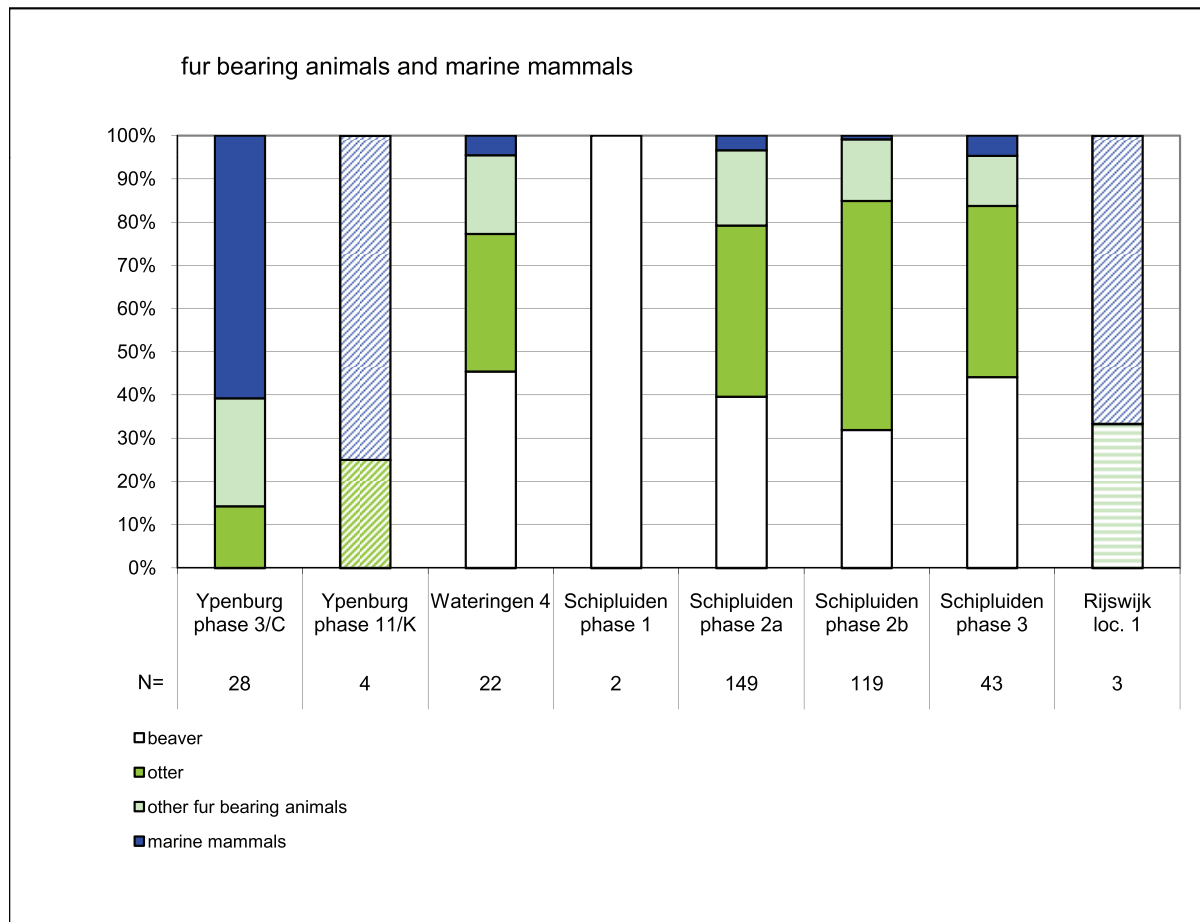


Fig. 11 Ratios of the remains of furbearing animals and marine mammals. Assemblages that were too small are hatched. See the caption of fig. 9 for the sources.

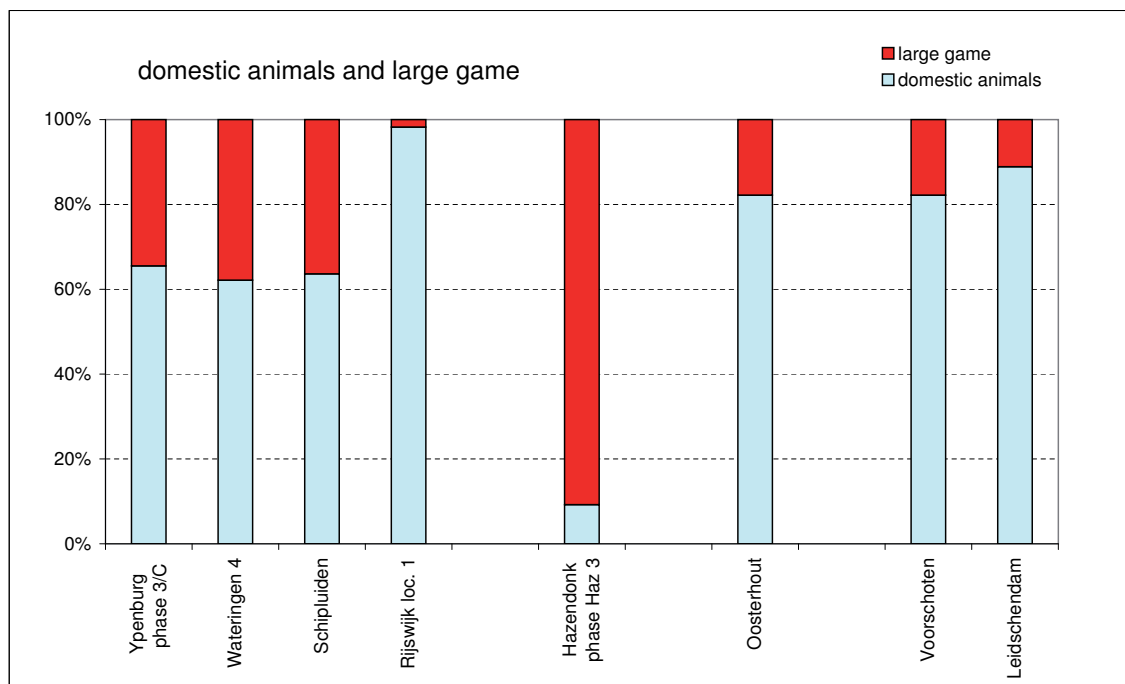


Fig. 12 Ratios of the remains of domestic animals and large wild animals (top) and those of cattle and red deer (bottom) as measures of the ratios of the amounts of meat produced via stock keeping and hunting, respectively. Hatched: Vlaardingenculture. See the caption of fig. 9 for the sources.

So how do the choices that were made in Delfland relate to those made elsewhere around the same time? To answer this question we will compare the two 'Neolithisation indices' with those of two contemporary assemblages from the Dutch river area (fig. 12). The assemblage of Oosterhout-t Klumke (near Nijmegen), which is unfortunately rather small (N=59), shows only a modest hunting component (Zeiler in Ball & Van den Broeke 2007). It forms a marked contrast with that of the Hazendonk site, with its extremely low percentage of bones of domestic animals and very high beaver scores. The ratios at Oosterhout show that we are to envisage a society entirely dependent on farming there, but also on the adjacent sandy soils, around 3600 BC. This makes Hazendonk (Zeiler 1997) even more incongruous than it already appeared in a previous comparison (Louwe Kooijmans 1993), when most of the data used here were not yet available. In combination with the site's position on a small sand outcrop in the swamp, the faunal spectrum would even more clearly than before seem to represent a special activity site focusing on the hunting of beavers and otters. The alternative is a local community with an entirely different way of life based largely on trapping and fishing. We find it rather unlikely that there was such a great diversity in ways of life within such a relatively small area (Hazendonk lies 40 km from Delfland and 75 km from Oosterhout) and within a single cultural tradition, especially when we consider that this pattern continued into the last occupation phase at Hazendonk, around 2700 BC, a time in which such a way of life would have been even more incongruous.

The Neolithisation indices can also be compared with assemblages from the subsequent period, from two Vlaardingen sites on slightly younger dunes in the same coastal area: Voorschoten and Leidschendam (Groenman-van Waateringe *et al.* 1968). The modest diachronic differences can be understood within the context of a continuing Neolithisation process.

We must realise that we are comparing numbers of bones of animals of varying dimensions and meat supplies. This is however not important in comparing individual sites with one another. Fish and birds are for this reason – and because of substantial differences in preservation – however a different story.

6.2 Fowling

On the basis of the number of identifications it would seem that fowling was far more important in Delfland than at other Meso- and Neolithic sites in the delta. Comparison of the weights of the bones of birds and mammals (a better way of assessing the animals' roles in meat supply) however shows that large mammals were dominant in absolute terms (see the tables in Zeiler 2006a). It is nevertheless interesting to consider what choices were made.

We have only remains collected by hand to assess the importance of fowling. At all three sites duck hunting was evidently a prominent activity (fig. 13). It focused on wild ducks and teal. The range of birds hunted at Ypenburg was however far more diverse than that at the other sites, including more geese, swans, cormorants and white-tailed eagles, and a conspicuously high percentage of cranes. Cranes were evidently systematically hunted: quantities of crane bones were found associated with all the house sites. In the early phases (1-2a) of Schipluiden, too, the aforementioned species were hunted more than in later times, but still to a much lesser extent than at Ypenburg. Attributing these differences to local ecological conditions and then making statements based on these differences in hunted species would be oversimplifying things. In the first place, many of the differences are not very environmentally specific and, secondly, we would find ourselves caught up in circular reasoning. Such explanations are plausible only if unrelated data sets (for example mammals, birds and fish) show parallel trends, and if those trends are in accordance with palaeogeographic evidence obtained in a different manner. For the time being we attribute the differences – in particular the high crane scores at Ypenburg – to local preferences.

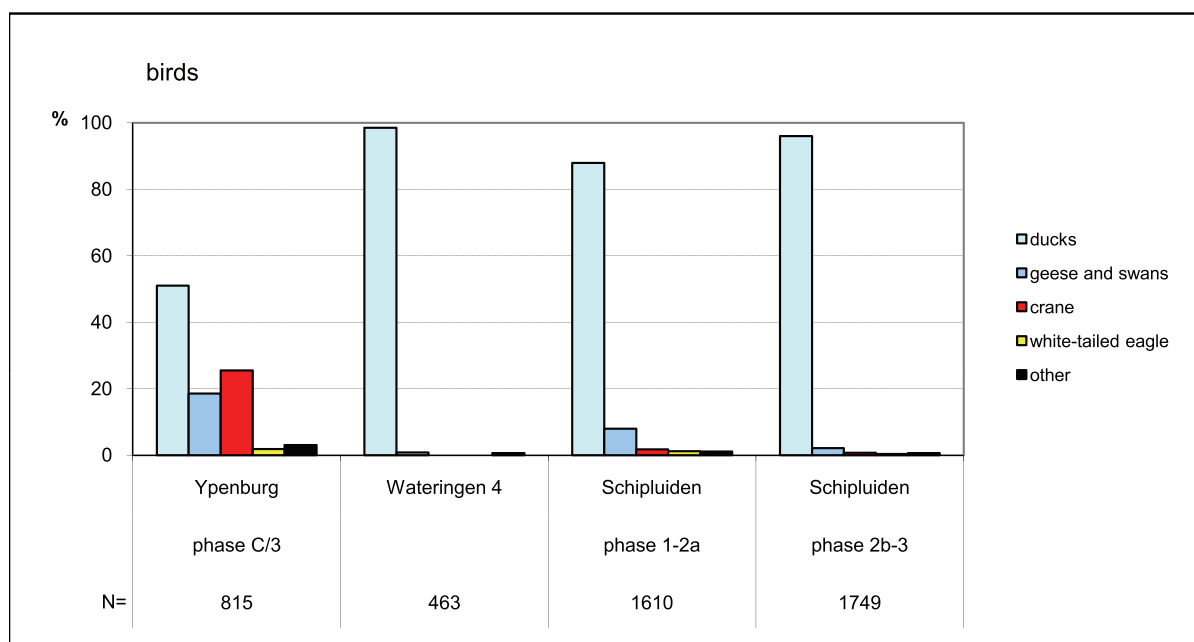


Fig. 13 Ratios of the numbers of remains of birds in four sufficiently large assemblages. See the caption fig. 9 for the sources.

6.3 Fishing

It is far more difficult to compare information on fishing due to differences in the collection of the remains concerned. The differences relate to both the mesh width of the employed sieves and the sampling strategy. Sturgeon is a case apart on account of its many readily identifiable but vulnerable dermal plates. At sites with fairly poor preservation conditions such large quantities of sturgeon fragments result in high scores. Concentrations of fish remains may represent a single deposition and a very limited range of species, showing that fishing focused specifically on certain species. That is interesting and understandable in itself, but it does mean that we may not add up samples representing different species. Only randomly collected remains provide a picture of fishing that is to some extent representative (see Brinkhuizen 2006).

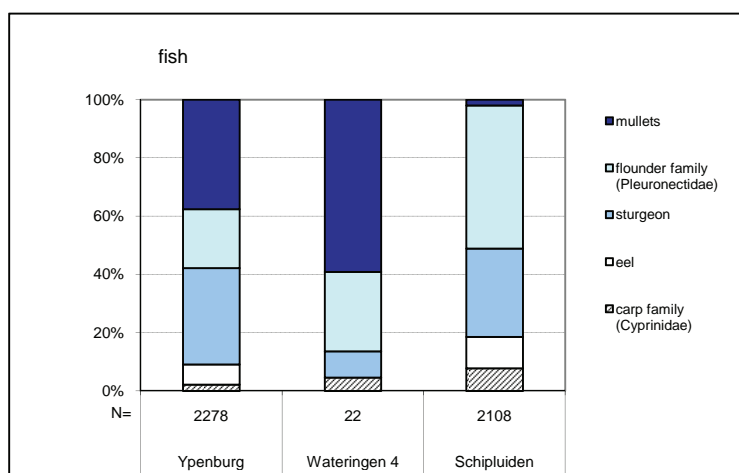


Fig. 14 Ratios of the fish remains from Ypenburg, Wateringen (both collected by hand) and Schipluiden (4-mm sieve).

In this respect there are major differences between the three sites: in all three cases remains were collected by hand, at Ypenburg the soil was also sieved through a 2-mm mesh, at Schipluiden through 4-, 2- and 1-mm meshes, and at Wateringen only one concentration from a pit fill was sieved through a 2-mm mesh. This does however not adequately explain the differences in the sites' archaeological fish spectra (fig. 14). Flatfish (flounder), eel and Cyprinidae (carp family) were caught at all the sites. Sturgeon and grey mullet were however definitely the most important, not only in numbers of remains, but – considering the fishes' dimensions – also in economic terms, and precisely in the case of these two species we observe substantial differences: sturgeon was the dominant species at Schipluiden, grey mullet at Wateringen, and Ypenburg occupies an intermediate position in this respect. It is unfortunately difficult, if not impossible, to interpret the numbers of remains of sturgeon (which were up to 3.5 m long at Schipluiden) and grey mullet (up to 60 cm long) in terms of their relative economic importance. An average sturgeon may have yielded 100 times as much meat as a grey mullet, but also produced vast quantities of easily identifiable remains. In this case, too, the differences cannot be attributed to any subtle differences in the sites' situation and their access to the different ecozones, nor to differences in age. They again reflect real choices made by people in the past.

6.4 *Arable farming and gathering*

No comparative research has been done in the field of the vegetable component of the diet, mainly for practical reasons such as lack of time and insufficient data. Carbonised remains of chaff and grains of naked barley and emmer were found at all the sites. This, combined with carbonised seeds of marsh plants (which are assumed to have been field weeds) and especially the occurrence of silica gloss on some flint knives showing that they were used as sickles, is at Schipluiden taken to be a strong argument in favour of local crop cultivation. It is plausible that crops were cultivated at Wateringen, too, though this site yielded less evidence to support such an assumption. Sickle gloss was also observed on a few tools at Ypenburg. The absence of ard marks may not be taken as a counterargument: the settlements predate the earliest ard marks so far found in the Netherlands (Louwe Kooijmans 2006b), it is far from clear precisely where the fields lay, so also whether any parts of fields may have been included in the excavated area, and the soil conditions were not favourable for the preservation of any ard marks.

Besides practising crop cultivation, the sites' occupants also gathered produce in nature: onions, tubers, root vegetables, nuts, berries, fruits. Most prominent among the archaeological remains are the remains of sloes, which evidently grew in the dune shrubs all over the place.

6.5 *Conclusion*

The ranges of food remains described above show that all the local communities in principle engaged in more or less the same activities: exploitation of natural resources combined with stock keeping, except at Rijswijk-Hoekpolder, where natural resources seem to have been insignificant. Stock keeping was more important than hunting at all the sites, fowling focused almost entirely on waterfowl, in particular ducks, and different forms of fishing were practised. The ecology of the species shows that the hunting and fishing territory of all the sites included both the freshwater and the brackish zone, and both stagnant water and river (estuarine) water. This extended broad-spectrum economy is to be seen as the economic habitat of this society. There are however conspicuous differences between the individual sites concerning certain aspects of this economy. The occupants of Ypenburg hunted furbearing animals, but no beavers. There, marine mammals and various large birds (swans, geese, cranes) were far more important than at the other sites, though still generally of subordinate importance. The fishing strate-

gies of the occupants of Schipluiden focused on sturgeon – they caught very few grey mullets – and they killed more beavers. The differences – especially those between Ypenburg and the other sites – may be partly attributable to differences in ecological conditions, though we have no concrete evidence to support such an assumption, but even then they imply distinct intra-regional differentiation and different local practices.

7 Treatment of the dead

A third aspect in which we observe pronounced differences between the sites is the treatment of the dead. On a supraregional level and in a long diachronic perspective there was a wide range of options for the treatment of the dead in the Lower Rhine area throughout the entire Meso- and Neolithic (Louwe Kooijmans in press b). It has now also been found that there was a lot of freedom in this field on a local level, too – the same level of freedom as observed above in the fields of settlement layout and subsistence. A broad range of rituals is observable in Delfland. The deceased were either treated in a way that resulted in only scattered skeletal elements mixed with refuse, or they were formally buried. The latter took place in or near the settlement. The deceased were usually buried in a tightly flexed position on their sides (fig. 15), but other burial positions have also been observed, including a prostrate position. Multiple burials of different types have also been found.



Fig. 15 Schipluiden, burial 2, oriented west-east, the body in a tightly contracted position and a flint flake in front of the face (arrow).

At Schipluiden the ‘informal’ treatment of the dead was dominant and the ritual of the dead only rarely ended with formal burial. The positions of the sparse burials suggest that formal burial was practised by only one of the households. The burials concerned are of a few (by no means all) relatively old men and two children. The special treatment of relatively old men can be seen to imply the selection of persons who played a special part in the local community. In one case the special position of the deceased was underlined by a strike-a-light of exotic materials as a grave good. The household from which the old men all seem to derive may have had a leading position within the local group.

At Ypenburg there was a cemetery at the middle of the dune. Unfortunately it cannot be attributed to any of the occupation phases or associated with any of the concentrations of features and postholes due to the recent disturbance, but that is not so relevant with respect to what we are considering here. The cemetery contained 34 graves, arranged in two clusters, in which both sexes and all ages are represented. It would seem that all the deceased of either two

contemporary households or two phases of a single household were systematically buried there. No graves associated with the other households were found. Either they lay elsewhere – outside the excavation trenches – or those households did not formally bury their dead. Some stray skeletal elements of at least two individuals, including some milk teeth, were found in association with one of the concentrations of postholes at the other (western) end of the dune.

A most striking difference is the incidental formal burial at Schipluiden as opposed to the creation of a formal cemetery for all members of society at Ypenburg, at least in one phase. This may be 'explained' in a functionalistic way by a need of the latter, less settled community to manifest itself and its settlement site, whereas no such need was felt in the case of Schipluiden in view of the prominent appearance of the settlement itself, not to mention the lack of space there. At both of the aforementioned sites formal burial seems to have been associated with a single (dominant?) household, so the individual households differed, but at Ypenburg this was more prominently expressed than at Schipluiden. Only at Schipluiden was a sex- and age-based distinction made within that single household. It is tempting to take this to reflect a (slightly) greater social differentiation within this more complex settlement.

No burials whatsoever were found at Wateringen. This could be attributable to the small size and short period of occupation of this site. However, the complete absence of stray human remains, too, is incongruous in view of the quantities of remains of all the other find categories, and therefore significant. Even if only 10% of the deceased were to be found in this form, as calculated for Schipluiden, some remains should have been found at Wateringen. A possible explanation for this is that the deceased were buried, or subjected to some other treatment, at a different site nearby.

In some respects the treatment of the dead represents a continuation of Mesolithic traditions. Human remains in a refuse zone next to the settlement are a conspicuous characteristic of phase 1 of Hardinxveld-Polderweg. At both Hardinxveld sites and in the several small cemeteries of Swifterbant bodies were buried in a prostrate position on their backs, without grave goods other than a few (clothing) ornaments. On the other hand, however, the dominant tightly flexed, crouched burial position at both Ypenburg and Schipluiden can be seen as typically Neolithic, as are the incidental 'functional' grave goods (Louwe Kooijmans in press b). If we take these burial customs to reflect the occupants' spiritual world, then we may assume that that world also underwent a 'substitution phase', to use the terminology of Zvelebil and Rowley-Conwy (1984).

8 Deposition

Three of the excavated sites (Schipluiden, Ypenburg and Rijswijk) yielded unmistakable evidence of different forms of deliberate deposition. The deposits are predominantly remains of animals, in particular dogs. Like the absence of human skeletal elements, the absence of deposits at Wateringen 4 cannot be attributed to the more limited size of this site. The differences between the other sites do not seem to be fundamental, and can be adequately explained by differences in preservation.

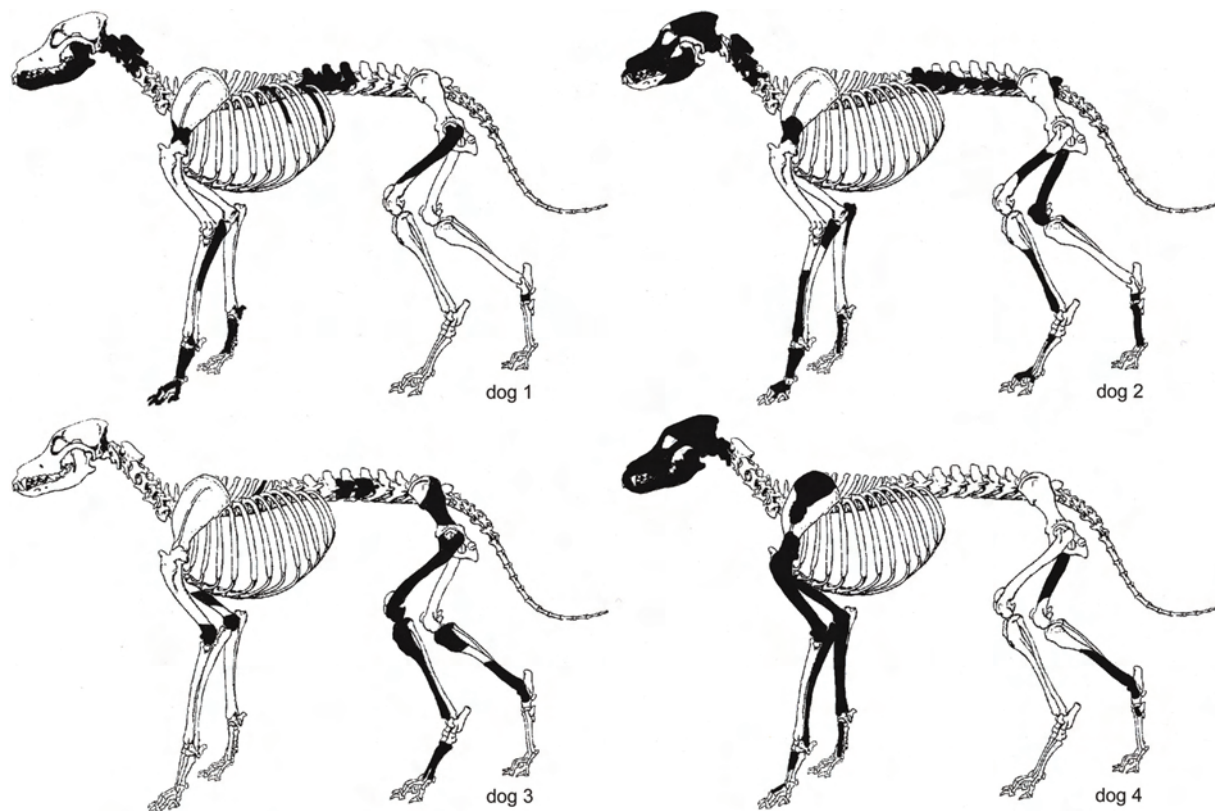


Fig. 16 Schipluiden, partial depositions of four dogs. The recovered remains are indicated in black.

At Schipluiden four incomplete skeletons and seven complete heads – that is, skulls with the lower jaw and in some cases an atlas, axis and/or a few cervical vertebrae – were found in the deposition zones next to the dune (fig. 16; Zeiler 2006a, 392 f, and Appendix 22.3). Comparable observations had previously been made at Rijswijk: at site 4 were the remains of an entire dog in anatomical position in the fill of a well, along with the incomplete remains of a second individual, at site 1 was an incomplete skeleton and at site 2, entirely isolated, a skull with a fitting atlas and axis (Laarman 2004, 54). At Ypenburg, finally, two incomplete skeletons of an adult and a young dog were found together (De Vries 2004, 22). So in a few cases the remains were buried, but more often the dogs were killed in the context of a remarkable ritual, according to which the remains were collected and dumped only after some time, the heads often separately.

Occasionally other animals were deliberately buried. Site 4 of Rijswijk-A4 yielded the remains of two small pigs, one of which was 8 months old and complete except for the lower legs, the other was an incomplete piglet.

In addition, 'deposition pits' were found at both Schipluiden and Ypenburg. They are small pits with remarkable contents, which we assume were intentionally deposited in the pit. At Schipluiden one such a pit was found, at the northern periphery of the dune. It contained many bones of three bovine animals and the smashed skull of a dog. A fairly small pit at the periphery of the dune at Ypenburg was found to contain a complete earthenware pot and a granite quern. At this same site was another small pit, with a diameter of only 10 cm, containing nine pieces of flint, among which were six axe flakes (Houkes & Bruning in Koot *et al.* 2008).

These depositions belong to a tradition that was widespread throughout the Lower Rhine area from the beginning of the Swifterbant culture. Noteworthy are burials of a young wild boar and a group of deposition pits at Hardinxveld-De Bruin whose contents included a large pot (Louwe Kooijmans 2001b), pots found at Bronneger, Urk and Ede-Rietveld, and flint deposits in the peripheral zone of the Hoge Vaart site, all of which date from the first half of the 5th millennium (Peeters 2007, 201). The oldest deposits of antler and cattle horn sheaths found in

the province of Drenthe date from the same time (Prummel & Van der Sanden 1994; Ufkes 1997). A major difference, however, is that these objects were deposited in the 'wilderness', in 'waterlogged depressions' and in stream valleys and bogs, and not in or at the periphery of a settlement's domestic space. Of slightly younger date is a series of stray, complete pots of the Michelsberg culture found in the north of Belgium and in the Dutch province of Limburg (Louwe Kooijmans & Jongste 2006, 495-496).

In the Lower Rhine area a varied tradition evolved from the beginning of the Swifterbant culture onwards – a tradition of on- and off-site deposition practices that gradually acquired a new meaning in the course of the Neolithic through the use of new objects, in particular axes. These depositions reflect a new or more intensive form of communication with the spirits of nature that was unknown in the preceding Mesolithic (*cf.* Ebbesen 1993). The Swifterbant communities may have taken over the farmers' views on the surrounding wild nature (what Hodder (1990) termed the *agrios*) and have made efforts to pacify the forces in that nature – a nature into which, with their livestock and fields, they were now penetrating in a different way than in the past. In that sense this deposition custom is an essential aspect of the Neolithisation process. The prominent role played by dogs in this custom goes back to the special status of dogs in the Late Mesolithic, as expressed by deliberate burials, a good example of which in the Netherlands was found at the Late Mesolithic site of Hardinxveld-Polderweg (Louwe Kooijmans 2001a).

9 Material culture

As only Schipluiden yielded a certain quantity of artefacts made of organic material, a comparative assessment of the material culture will necessarily be limited to pottery and stone artefacts.

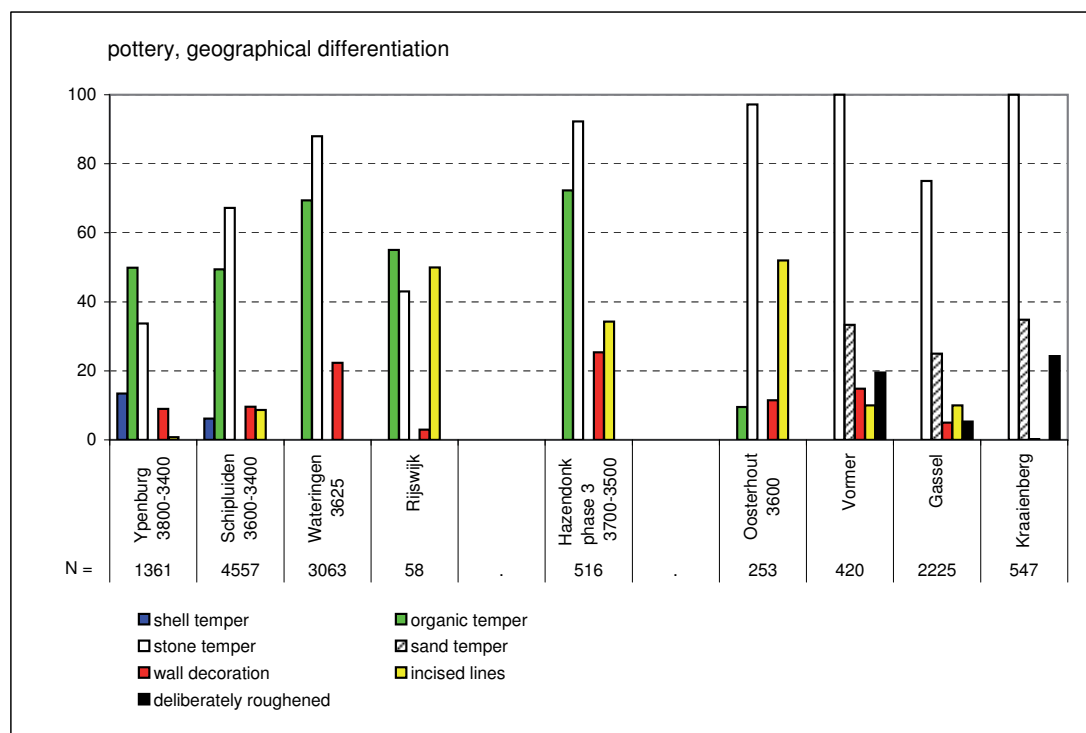


Fig. 17 Geographical differentiation of the pottery at sites of the Hazendonk group along a transect from the coast to the surroundings of Nijmegen. Note that the high line decoration score of Rijswijk is insignificant in view of the low overall decoration %. Data from Raemaekers 1999, 2008; *idem et al.* 1997; *idem in* Ball & Van den Broeke 2007; *idem & Rooke* 2006; various papers by the author.

All the sites produced the same simple type of pottery that is characteristic of the Hazendonk group. The simple pots have straight walls, with or without a low inverted rim, made of coils connected via H joints, tempered mainly with crushed quartz and decorated with fields of spatula, fingertip and fingernail impressions or with vertical lines, without motifs. The pottery assemblages of the Delfland sites show few differences, which are moreover much less pronounced than the differences with respect to pottery produced at sites further east, in the river area (fig. 17; see also Raemaekers 1999 and *id.* in Ball & Van den Broeke 2007). The use of shell as temper is – not surprisingly – a distinct characteristic of the coastal area, as is the use of vegetable matter. Crushed stone, in particular quartz, was on the contrary used mainly in the river area. At the coast, this form of tempering became dominant only in the course of the occupation period. In the east, sand was also used to temper the clay. Wall decoration in the form of vertical lines was common at all the sites in the river area, but rare at the coast. A third distinguishing feature in the east is a rough outer wall created by smearing lumps of clay over it (*Schlickrauhung*). Such pots, with a turned-down rim (a *Tupfenleist*), are related to the *Vorratsgefässe* of the Michelsberg culture. In addition, Hazendonk assemblages in the river area comprise thin-walled, smooth or polished bowls and dishes whose source of inspiration is still unclear. The carinated profiles resemble those of the Grimston bowls in England. So the typological relations are more complex than a simple Hazendonk-Michelsberg gradient (Louwe Kooijmans 2005, 2006b).

The interregional differences show that the Delfland potters had a certain independent status that allowed them to make their own technical and stylistic choices within a general earthenware concept. The pots produced at the individual Delfland sites however differ only little from one another. The Rijswijk assemblage has a conspicuously low percentage of decoration whereas Schipluiden stands out for the use of line decoration (only one sherd with line decoration was found at Rijswijk!). Such differences may reflect limited contacts with the east, differentiated according to site.

This pottery style is combined with a bipartite flint tradition: in addition to a simple flake industry based on relatively small river pebbles, the sites' occupants used a toolkit made of flint imported from a distant source that bears a close resemblance to the toolkit of the Michelsberg culture, comprising triangular points, *Spitzklinge*, sturdy scrapers and borers. These tools were used for specific tasks, in particular harvesting cereal, making fire and manufacturing beads. They had a special meaning for the people (Van Gijn 2008). We also see the production of the first flint axes. There do not seem to be any fundamental differences between the sites, implying that the occupants all had access to the flint sources in the chalk zone in the south of the province of Limburg, Hainault and Pas de Calais. This 'imported flint' amounted to between 7.5 % (Schipluiden) and 10.6 % (Wateringen) of the total amount of flint used. The scores for the different sources vary quite a bit from one site to another, which could mean that each local group had its own contact area, though it should be added that it is difficult to distinguish between the different types of flint.

At all the sites, and also at Hazendonk, the main types of stone used were sandstone, quartz and quartzites, whose sources are hard to identify. The percentages of igneous and metamorphic rocks (other than quartzite) were remarkably high at Schipluiden and Ypenburg, and differ very little from one another in the worked stone finds (21 and 23%). Noteworthy finds are small nodules of pyrite, which – like one of the flint types – may have been collected along the coastal cliffs of Boulogne-sur-Mer, where they are still to be found today (pers. comm. K. van Oorde). An alternative is a source in the Ardennes.

Jet and amber beads were made in Delfland. Jet bead blanks found at Schipluiden and Wateringen show that the beads were produced at the sites themselves, implying an innovation. No such beads are known from the Late Mesolithic anywhere in the Netherlands – including Hardinxveld – but they are known from the Swifterbant culture. Jet was relatively prominently represented at Schipluiden, amber at Ypenburg, in particular in the burials, and this is

an important difference between these two sites. Like the pyrite and one of the flint types, the jet probably came from the coast near Boulogne-sur-Mer, or it may have been washed up on beaches further north. Small pieces of amber could probably be picked up along the North Sea beach to the north of Delfland.

It would seem that the occupants of the Delfland sites maintained contacts in several directions to obtain materials that were not to be found in their own region: with the east specifically for stone, with the chalk areas in the south of Belgium for high-quality flint, and with the coast of Pas-de-Calais also for pyrite and jet. On the one hand this indicates continuation of the lines of contact that had existed for more than two thousand years, ever since the Late Mesolithic; on the other the individual local Hazendonk communities of Delfland seem to have had contacts with different areas.

10 Retrospective

The above was an exercise to break the common archaeological custom of defining monolithic cultures bottom up, with the sites being taken as the constituent elements, by instead approaching things from the opposite direction and searching for differences between sites that resemble one another in many other respects – in age and culture, in landscape setting and function – in order to obtain an understanding of the degree of freedom of action of the local communities. This we have been able to do thanks to the high quality of the evidence obtained in Delfland. The aspects that the individual sites have in common reflect the structure of the regional society, while the differences between the sites show the local communities' practices, the choices they made to suit their needs.

In structural terms the community coincided with the transition from the Mesolithic to the Neolithic, what is known as the 'substitution phase', a period of change that covered a long time – many centuries – in the Low Countries. Those changes are clearly observable in many aspects of the society. The individual contemporary sites – which had all reached the same stage in the Neolithisation process – however differ from one another in important social aspects, the differences being quite substantial in some cases. To a point, the people followed their own course in the Neolithisation process. The settlements vary from compact, collective and site-bound to mobile and open. As far as subsistence is concerned, one group (Rijswijk) had by this stage abandoned hunting and fishing, and in the other we observe site-bound preferences – not so much in the basic subsistence system as in the hunting of furbearing animals and birds and in fishing. Widely differing choices were made in the treatment of the dead, too. Other social aspects (deposition, material culture) show more subtle differences, in particular concerning the sources of uncommon mineral raw materials.

An approach as adopted above may prove fruitful in other regions with a rich archaeological record. The past few years, for example, the former 'uniform interpretation' of the LBK has given way to a new approach in which the emphasis is on the diversity observable at all levels, from Europe as a whole to within the southern part of the Dutch province of Limburg (Modderman 1988; Amkreutz 2006; Van Wijk & Van de Velde 2007). Now that the cultural construction work has been more or less completed, it is interesting to shift our focus to the pluriformity of the communities behind the 'cultures' we have defined in order to obtain a better understanding of the people who formed part of them. This study of Delfland around 3500 BC is a finger exercise in this respect.

Acknowledgements

The author owes a special word of thanks to Hans Koot for making available the data and draft chapters of the large-scale Ypenburg excavation. Okke Dorenbos, Hester van den Ende and Tom Hazenberg were also most helpful. For information, comments and useful discussions I would moreover like to thank Luc Amkreutz, Corinne Bakker, Peter van den Broeke, Joanne Mol, Bert van der Valk and Jørn Zeiler. Illustration 1 is by Walter Laan, the histograms are by the author and Medy Oberendorff made the other illustrations. The English translation is by Susan Mellor.

Leendert P. Louwe Kooijmans
l.p.louwe.kooijmans@arch.leidenuniv.nl

Notes

1. This article is a revised version of Louwe Kooijmans in press b. All dates are in calibrated years BC.
2. All dates quoted in this article are in years cal BC.
3. From the basic documents it is evident that 21 red deer scores concern antler.

References

- Amkreutz, L. 2006, Bandkeramiek op de Maasoevers: feit of foutje?, *Westerheem* 55, 130-140.
- Amkreutz, L. & L. Verhart 2006, De Hazendonkgroep en het midden-neolithicum van Limburg, *Archeologie in Limburg* 104, 10-17.
- Bakker, C.B., & C.Y. Burnier 1997, 's-Gravenhage: Wateringse Veld 1. In: R.M. van Heeringen & M. Meffert (eds), *Archeologische Kroniek van Zuid-Holland over 1996, Holland* 29, 389.
- Ball, E.A.G. & P.W. van den Broeke in prep., *Oosterhout-'t Klumke. Opgravingen op 't Klumke te Nijmegen-Oosterhout. Boeren uit het Midden-Neolithicum, de IJzertijd en de Merovingische periode op een zandrug in de oostelijke Betuwe*, Nijmegen (Archeologische Berichten Nijmegen 6).
- Beets, D.J. & A.J.F. Spek 2000, The Holocene evolution of the barrier and back-barrier basins of Belgium and the Netherlands as a function of late Weichselian morphology, relative sea-level rise and sediment supply, *Geologie en Mijnbouw* 79, 3-16.
- Bourdieu, P. 1977, *Outline of a theory of practice*, Cambridge (Cambridge University Press).
- Brinkhuizen, D.C. 2006, Fish. In: L.P. Louwe Kooijmans & P.F.B. Jongste (eds), *Schipluiden, a Neolithic settlement on the Dutch North Sea coast c. 3500 cal BC*, Leiden (Analecta Praehistorica Leidensia 37/38), 449-470.
- Cleveringa, J. 2000, *Reconstruction and modelling of Holocene coastal evolution of the western Netherlands*, PhD thesis Utrecht.
- Darvill, T. & J. Thomas (eds) 1996, *Neolithic houses in Northwest Europe and beyond*, Oxford (Oxbow).
- De Vries, L.S. 2004, *Luilekkerland aan de kust. De faunaresten van de neolithische nederzetting bij Rijswijk-Ypenburg*, Amersfoort (Rapportage Archeologische Monumentenzorg 106).
- Ebbesen, K. 1993, Sacrifices to the powers of nature. In: S. Hvass & B. Storgaard (eds), *Digging into the past, 25 years of archaeology in Denmark*, Aarhus, 122-125.
- Groenman-van Waateringe, W., A. Voorrips & L.H. van Wijngaarden-Bakker 1968, Settlements of the Vlaardingse Culture at Voorschoten and Leidschendam (ecology), *Helinium* 8, 105-30.
- Grogan, E. 2004, The implications of Early Neolithic houses. In: I. Shepard & G. Barclay (eds), *Scotland in Ancient Europe*, Edinburgh, 1-14.
- Hodder, I. 1990, *The domestication of Europe*, Oxford (Blackwell).
- Koot, J.M. 1994, *In kannen en kruiken. Veertig jaar archeologisch onderzoek in Rijswijk*, Rijswijk (Rijswijkse Historische Reeks 11).
- Koot, H., L. Bruning & R.A. Houkes (eds), 2008, *Ypenburg-locatie 4. Een nederzetting met grafoeld uit het midden-neolithicum in het West-Nederlandse kustgebied*, Den Haag.

- Laarman, F.J. 2004, Rijswijk Rijksweg A4. In: L.S. de Vries, *Luilekkerland aan de kust. De faunaresten van de neolithische nederzetting bij Rijswijk-Ypenburg*, Amersfoort (Rapportage Archeologische Monumentenzorg 106), 53-56.
- Louwe Kooijmans, L.P. 1993, Wetland exploitation and upland relations of prehistoric communities in the Netherlands. In: J. Gardiner (ed.), *Flatlands and wetlands: current themes in East Anglian archaeology*, Norwich (East Anglian Archaeology Report 50), 71-116.
- Louwe Kooijmans, L.P. (ed.) 2001a, *Hardinxveld-Giessendam, Polderweg. Een jachtkamp uit het Laat-Mesolithicum, 5500-5000 v. Chr.*, Amersfoort (Rapportage Archeologische Monumentenzorg 83).
- Louwe Kooijmans, L.P. (ed.) 2001b, *Hardinxveld-Giessendam, De Bruin. Een jachtkamp uit het Laat-Mesolithicum en het begin van de Swifterbant-cultuur, 5500-4450 v. Chr.*, Amersfoort (Rapportage Archeologische Monumentenzorg 85).
- Louwe Kooijmans, L.P. 2006, Nogmaals Hazendonk. In: J.H.F. Bloemers (ed.), *Tussen D26 en P14: Jan Albert Bakker 65 jaar*, Amsterdam (Amsterdams Archeologisch Centrum), 147-180.
- Louwe Kooijmans, L.P. 2007, The gradual transition to farming in the Lower Rhine Basin. In: A. Whittle & V. Cummings (eds), *Going over: the Mesolithic-Neolithic transition in north-west Europe*, London (Proceedings British Academy 144), 287-309.
- Louwe Kooijmans, L.P. in press a, Het Neolithicum van Delfland, structuur en praktijk. In: J. Flamman & E.A. Besselen (eds), *Het verleden boven water. Archeologische monumentenzorg in het AHR-project*, Amersfoort-Delft (Rapportage Archeologische Monumentenzorg 148).
- Louwe Kooijmans, L.P. in press b, Multiple choices, mortuary practices in the Low Countries during the Mesolithic and Neolithic, 9000-3000 cal BC. In: F. Lüth & Th. Terberger (eds), *Berichte der Römisch-Germanischen Kommission*.
- Louwe Kooijmans, L.P. & P.F.B. Jongste (eds) 2006, *Schipluiden, a Neolithic settlement on the Dutch North Sea coast c. 3500 cal BC*, Leiden (Analecta Praehistorica Leidensia, 37/38).
- Modderman, P.J.R. 1988, The Linear Pottery Culture: diversity in uniformity, *Berichten van de Rijksdienst voor het Oudheidkundig Bodemonderzoek* 38, 63-140.
- Mol, J. 2006, Coastal evolution of Delfland and the Schipluiden microregion in relation to Neolithic settlement. In: L.P. Louwe Kooijmans & P.F.B. Jongste (eds), *Schipluiden, a Neolithic settlement on the Dutch North Sea coast c. 3500 cal BC*, Leiden (Analecta Praehistorica Leidensia 37/38), 268-283.
- Oude Rengerink, J.A.M. 1996, *Wateringse Veld Deelgebied 1. Verslag van een karterend booronderzoek*, Amsterdam (RAAP-rapport 138).
- Paalman, D. 1996, *Neolithisch Wateringen, ecologie en seizoenbepaling*, MA thesis, Faculty of Archaeology, Leiden.
- Peeters, J.H.M. 2007, *Hoge Vaart-A27 in context: towards a model of Mesolithic-Neolithic land use dynamics as a framework for archaeological heritage management*, PhD thesis Amsterdam.
- Prummel, W. & W.A.B. van der Sanden 1995, Runderhoorns uit de Drentse venen, *Nieuwe Drentse Volksalmanak* 111, 84-131.
- Raemaekers, D.C.M. 1999, *The articulation of a 'New Neolithic'. The meaning of the Swifterbant culture for the process of neolithisation in the western part of the North European Plain*, Leiden (Archaeological Studies Leiden University 3).
- Raemaekers, D. 2008, Het aardewerk. In: H. Koot, L. Bruning & R.A. Houkes (eds), *Ypenburg-locatie 4. Een nederzetting met grafveld uit het midden-neolithicum in het West-Nederlandse kustgebied*, Den Haag, 189-202.
- Raemaekers, D.C.M., C.C. Bakels, B. Beerenhout, A.L. van Gijn, K. Hänninen, S. Molenaar, D. Paalman, M. Verbruggen & C. Vermeeren 1997, Wateringen 4, a coastal settlement of the Middle Neolithic Hazendonk 3 group, *Analecta Praehistorica Leidensia* 29, 143-91.
- Raemaekers, D. & M. Rooke 2006, The Schipluiden pottery. In: L.P. Louwe Kooijmans & P.F.B. Jongste (eds), *Schipluiden, a Neolithic settlement on the Dutch North Sea coast c. 3500 cal BC*, Leiden (Analecta Praehistorica Leidensia, 37/38), 113-128.
- Ufkes, A. 1997, Edelhartgeweien uit natte context in Drenthe, *Nieuwe Drentse Volksalmanak* 114, 142-170.
- Van der Valk, A. 1992, *Mid- and Late-Holocene coastal evolution in the beach-barrier area of the Western Netherlands*, PhD thesis Amsterdam (VU).
- Van der Valk, A. 1996, Geology and sedimentology of late Atlantic sandy, wave-dominated deposits near The Hague (South-Holland), The Netherlands. The reconstruction of an early prograding coastal sequence, *Mededelingen van de Rijks Geologische Dienst* 57, 201-28.
- Van Gijn, A.L. 2008, Exotic flint and the negotiation of a new identity in the 'margins' of the agricultural world: the case of the Rhine-Meuse delta. In: H. Fokkens, B. Coles, A.L. van Gijn, J.P. Kleijne, H.H. Ponjee & G. Slappendel (eds), *Between Foraging and Farming*, Leiden (Analecta Praehistorica Leidensia 40), 193-202.

- Van Wijk, I. & P. van de Velde 2007, Terug naar de bandkeramiek. In: R. Jansen & L.P. Louwe Kooijmans (eds), *Van contract tot wetenschap, tien jaar archeologisch onderzoek door Archol BV, 1997-2007*, Leiden, 131-149.
- Zeiler, J.T. 1997, *Hunting, fowling and stock-breeding at Neolithic sites in the western and central Netherlands*, PhD thesis Groningen.
- Zeiler, J.T. 2006a, Mammals, birds. In: L.P. Louwe Kooijmans & P.F.B. Jongste (eds), *Schipluiden, a Neolithic settlement on the Dutch North Sea coast c. 3500 cal BC*, Leiden (Analecta Praehistorica Leidensia 37/38), 375-442.
- Zeiler, J.T. 2006b, Wild of tam? Varkens langs de meetlat, neolithische varkensbotten uit Wateringen en Rijswijk Rijksweg A4 nader bekeken, Leeuwarden (ArcheoBone Rapport 52).
- Zvelebil, M. & P. Rowley-Conwy 1984, Transition to farming in northern Europe: a hunter-gatherer perspective, *Norwegian Archaeological Review* 17, 104-28.