The domestic sphere of the Corded Ware Culture: a functional analysis of the domestic implements of three Dutch settlements

García Diaz, V.

Chapter 8. The domestic implements during the fourth and third millennia BC

8.1. Introduction

The transition between the fourth and third millennia BC in the north of the Netherlands is characterized by the exploitation of diverse ecological areas by two cultural groups: the TRB and the Vlaardingen group, the later of which is partially contemporaneous with the CWC. The production system included diverse economic activities: fishing, hunting, gathering, fowling, farming and food production. This model was valid until, probably, the beginning of the Early Bronze Age, when farming became the principal subsistence activity (Fokkens 2005). The emergence of the CWC can be better understood by studying the groups present in the Netherlands before and during the period when the CWC was active. The working hypothesis of this work is that the '*mutual knowledge*' of both the TRB and the Vlaardingen group was, at least partially, transmitted and shared by the Corded Ware communities. The selection of raw materials, the technological processes involved in the production and maintenance of the implements and the way tools were used and discarded by the CWC were probably influenced by knowledge shared with the TRB and Vlaardingen groups. In this chapter, an overview of the implements found in domestic TRB and Vlaardingen contexts is presented. The objective is to analyse possible connections between these two groups and the Corded Ware communities through the tools used for daily activities, understood both as sources of the social identity of the groups, and as a reflection of change and social interaction (Dobres 1995, 2009; Dobres and Hofman 1994; Miller 2009).

8.2 TRB group

The TRB in the Netherlands formed part of the Western TRB group, composed of TRB groups from the Netherlands and Northern Germany Several attempts have been made to provide a typo-chronology of the Western TRB group based on pottery (Bakker 1979; Brindley 1986b; Knöll 1959; Van Giffen 1925-1927), Brindley's typology (1986b) is the most widely accepted. The TRB was divided into seven chronological horizons based on pottery shape, decoration techniques and decoration motifs. According to Brindley (1986b), Horizon 1 started around 3400 cal BC, with the late phase of the TRB culture placed around 2850 cal BC. Consequently, the TRB period would have lasted for about 550 years (Brindley 1986b). However, developments in ^{14}C dating and newly obtained samples have provided a different chronology for the group. Lanting and Van der Plicht (1990/2000) proposed that the Western TRB group would have started and finished later than Brindley (1986b) proposed, between 3350 cal BC and 2750 cal BC (Lanting and Van der Plicht 1990/2000). However, a precise dating of the group is still

lacking and the origin of the Western TRB group is still under discussion, although a combination of local traditions (flint and stone technology) and external developments (pottery technology) has been proposed (Lanting and Van der Plicht 1990/2000)(Table 8.1).

	Horizon	Brindley 1986b	Van Giffen 1927	Van den Broeke et al. 2005	Midgley 1992	Lanting and Van der Plicht 1999/2000
Starting date	1	3400	Drouwen	3400	3700	3350
	2	-	Drouwen	-	-	-
	3	3300	Drouwen	-	-	-
	4	3200	Drouwen	-	-	-
	5	3050	Early Havelte	-	-	-
	6	2950	Middle Havelte	-	-	-
Ending date	7	2850	Late Havelte	2900	2850	2750

Table 8.1. Dating of the Dutch TRB (years in cal. BC) (after Verschoof 2011).

Most of the data concerning the western TRB group originates from burials. Dutch TRB settlements are mainly located on the Pleistocene soils of the Netherlands, and due to the acidic properties of these soils the preservation of organic remains is generally poor. Animal and human bones are not well represented, limiting the amount of information available about the economic and social life of the inhabitants. It is generally assumed that the economy of the TRB group was based on crop cultivation and farming, while hunting and fishing were also practised (Van Gijn and Bakker 2005). In addition, neither house structures nor objects made from organic materials such as wood are usually preserved. However, there are some exceptions: two house plans were attributed to the TRB group in Hattemerbroek-Bedrijventerrein Zuid (Hamburg *et al*. 2011) and a plan of a long house was documented at Bouwlust–Slootdorp (Van Heeringen and Theunissen 2001). In addition, faunal remains were recovered at both sites (Hamburg *et al.* 2011; Van Heeringen and Theunissen 2001) and at Wetsingermaar (Raemaekers *et al*. 2011/2012).

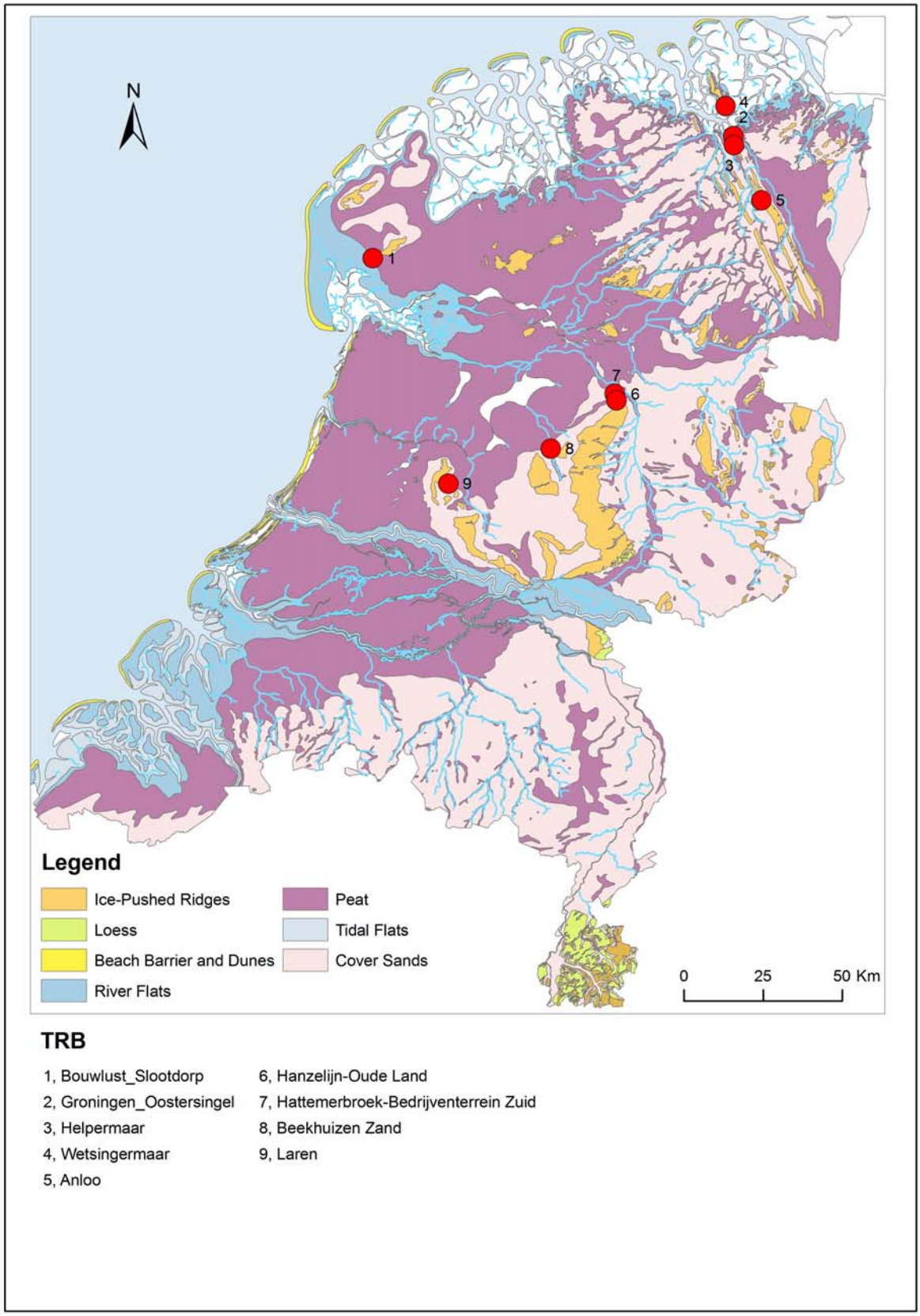

Figure 8.1. Overview of the TRB settlements cited on the text (after Vos and de Vries 2011).

8.2.1 Flint, stone and amber procurement network

In 2005 Raemaekers suggested that the study of TRB flint implements had been '*ignored*' (Raemaekers 2005: 276) and unfortunately, although new analysis of grave goods has been conducted and published since then, a systematic study of flint assemblages from TRB settlements is still lacking. Despite this, the diverse publications of settlement assemblages show the predominant use of local stones and a small percentage of southern and imported materials. The TRB settlements were mostly located to the north of the main rivers and as such locally available flint and stone were limited to the moraine outcrops. Flint and stone were collected from the Meuse and Rhine areas at Hanzelijn-Oude Land (Verbaas *et al.* 2011a; Verbaas *et al.* 2011b) and Hattemerbroek-Bedrijventerrein Zuid (Knippenberg *et al.* 2011a; Knippenberg *et al.* 2011b). At the former site, the boulder clay deposits of the Drenthe Plateau were also used as a source area. Although a provenience analysis was not conducted, it can be assumed that the boulder clay deposits of the Drenthe Plateau were also used as a source area for Anloo (Jager 1985; Waateringe 1960), Beekhuizen Zand (Modderman *et al*. 1977) and Laren (Bakker 1961).

Fragments of amber, ochre and fossils were used at Hanzelijn-Oude Land. While fossils could have easily been collected at the boulder clay deposits or in the river areas, ochre probably derived from the Ardennes, or areas of Germany. On a smaller scale, Veluwe flint and water-rolled northern material were also used at Hattemerbroek-Bedrijventerrein Zuid (Knippenberg *et al*. 2011a).

The use of local flint was also the norm in both the Noord-Holland and Groningen provinces. At Bouwlust–Slootdorp, although a small number of southern implements were encountered, the majority (76.6%) of flint and stone materials were collected from moraine outcrops, probably from the nearby deposits of Wieringen (Peeters 2001a). Flint and stone were mainly obtained from the nearby boulder clay deposits at the settlements of Wetsingermaar (Niekus *et al*. in (Raemaekers *et al.* 2011/2012: 12-13), Groningen-Oostersingel (Boersma *et al.* 1990; Kortekaas 1990) and Helpermaar (Fens and Mendelts 2013a, 2013b). In the later site, exotic flint and stone were also used to produce axes. Stone-axe fragments suggested that the material had a Scandinavian provenance (Fens and Mendelts 2013a, 2013b). Finally, amber could have been collected from the North Sea coastline (Waterbolk 1991).

The predisposition to use local materials is similar to the tendency observed for the *hunebedden* grave goods, where imported implements were deposited along with a high percentage of artefacts produced from local flint (Van Woerdekom 2011), but it

contrasts significantly with the TRB axe hoards and depositions; the sources of materials in the latter are located at a great distance from TRB settlements. Some hoards also included imported flint nodules that, similar to the axes, were imported in an unmodified state from Germany and Denmark (Beuker 2010; Van Gijn and Bakker 2005; Wentink 2006; Wentink and Van Gijn 2008). These axes have been interpreted as special objects, produced for the specific purpose of their deposition (Wentink 2006). The axes were deposited in peat bogs, water streams and other waterlogged places, suggesting the importance of water for TRB communities.

8.2.2 Techno-typological analysis of the flint, stone and amber implements

The character of the domestic TRB flint technology was influenced by the low quality and the small size of the local raw material. The technology applied to the cores to obtain flakes was not standardized, and variation in the size and shape of the cores resulted in products with variable metrical attributes. Core preparation was minimal at most of the sites, or even absent, as in the case of Bouwlust–Slootdorp (Peeters 2001b). Flint nodules and pebbles were exploited mainly using direct hard percussion and the hammer and anvil technique (Fens and Mendelts 2013a).

Flint assemblages were mainly made up of flakes, and blades were present only in low numbers. Unmodified flakes dominated the sample in every flint assemblage, with low percentages of retouched tools that ranged from 1.9% at Bouwlust–Slootdorp (Peeters 2001b) to 6.5% at Location 2 of Hattemerbroek-Bedrijventerrein Zuid (Knippenberg *et al*. 2011a) and 9% at Hanzelijn-Oude Land (Verbaas *et al*. 2011a). One exception is Location 3 of Hattemerbroek-Bedrijventerrein Zuid, where 16% of tools were retouched (Knippenberg *et al*. 2011a). Retouched tools were dominated by scrapers, as exemplified by Location 1 of Hattemerbroek-Bedrijventerrein Zuid, where scrapers comprised more than 25% of the retouched assemblage. A predominance of scrapers was also documented at Laren (Bakker 1961), Anloo (Jager 1985; Waateringe 1960;), Hanzelijn-Oude Land (Verbaas *et al*. 2011) and Helpermaar (Fens and Mendelts 2013a). Other tools, such as drills, transversal arrowheads, retouched flakes, retouched blades, axes and TRB picks were also documented, albeit in lower numbers, in TRB assemblages (Bakker 1961; Fens and Mendelts 2013a; Jager 1985; Knippenberg *et al*. 2011; Peeters 2001b; Verbaas *et al.* 2011a; Waateringe 1960).

	Laren	Anloo	Bouwlust–Slootdorp	Hanzelijn-Oude Land	Hattemerbroek-Bedrijventerrein Zuid (Location 1)	Hattemerbroek-Bedrijventerrein Zuid (Location 2)	Hattemerbroek-Bedrijventerrein Zuid (Location 12)	Harderwijk-Beekhuizerzand	Groningen-Oostersingel	Groningen-Helpermaar	Total
Unmodified Flakes		-	-	-	2565	245	42	119	16	-	2987
Unmodified Blades	*	-	-	-	89	11	2	9	12	33	156
Retouched Flake		-	-	27	266	27	3	-	17	-	340
Retouched Blades		-	-	7	21	2	-	-	1	-	31
Retouched general		-	27	14	-	6	1	-	-	257	305
Core and core fragments		-	163	220	1081	68	15	18	1	487	2053
Scrapers	*	*	18	41	234	16	7	75	14	505	910
Borers		*	13	-	1	2	1	-	3	55	75
Wedges		-	-	-	-	-	-	-	-	-	
Hammerstone		-	-	1	1	-	1	-	-	-	3
Arrowheads	*	*	7	2	10	3	-	2	4	95	123
Sickle		*	-	-	-	-	-	-	-	4	4
Strike-a-lights		-	2	2	1	-	-	-	-	-	5
Burins		-	1	-	-	-	-	-	-	-	1
Pics		-	21	-	1	-	-	-	-	59	81
Axe		-	2	1	1	-	-	-	-	1	5
Block		-	-	39	421	10	-	-	-	32	502
Waste	*	*	3846	94	1252	73	10	-	-	9438	14713
Flint general	50	-	10.137	945	6925	517	98	600	-	33195	52.467

Table 8.2. Flint tool types and number of implements found at the TRB settlements cited on the text. When the tool types or the material are mentioned but the number is not specified, an asterisk is used.

Technological approaches to stone tools have only recently been applied to the assemblages from the sites of Hanzelijn-Oude Land (Verbaas *et al*. 2011b), Hattemerbroek-Bedrijventerrein Zuid (Knippenberg *et al*. 2011b) and Helpermaar (Fens *et al*. 2010; Fens and Mendelts 2013b). As a whole, stone implements were used without any modification prior to their use. However, querns and grinding tools often display flake negatives suggesting that the tools were fabricated so as to obtain a specific shape, and/or were rejuvenated after use. The main types documented at the TRB settlements were querns, grinding stones, whetstones, anvils and hammer stones. In addition, one schist axe was documented at Laren (Bakker 1961), and polished axes were collected at Hattemerbroek-Bedrijventerrein Zuid (Knippenberg *et al*. 2011b), Hanzelijn-Oude Land

(Verbaas *et al*. 2011b) and Helpermaar (Fens *et al*. 2010; Fens and Mendelts 2013b). However, the chronology of the axes from the two former settlements is not accurate, and a Corded Ware chronology cannot be disregarded.

	Laren	Anloo	Bouwlust–Slootdorp	Hanzelijn-Oude Land	Hattemerbroek-Bedrijventerrein Zuid (Location 1)	Hattemerbroek-Bedrijventerrein Zuid (Location 2)	Hattemerbroek-Bedrijventerrein Zuid`(Location 12)	Harderwijk-Beekhuizerzand	Groningen-Oostersingel	Groningen-Helpermaar	Total
Flake	-	-	-	2	74	10	-	-	-	13	99
Core	-	-	-	-	4	-	-	-	-	-	4
Quern	-	*	-	-	8	-	2	-	-	-	10
Flaked stones	-	-	-	-	17	2	-	-	-	-	19
Grinding tools	*	*	-	-	2	-	-	-	-	13	15
Anvil	*	-	-	-	-	-	-	-	-	-	-
Hammerstones	*	*	-	1	108	15	1	5	-	6	136
Rubbing topol	-	-	-	-	8	-	-	-	-	-	8
Polishing stones	1	-	-	-	-	-	-	-	-	1	2
Pounder	-	-	-	-	-	-	-	-	-	6	6
Axe	1	-	-	-	1	-	-	1	-	1	4
Weight	-	-	-	-	-	-	-	-	-	-	-
Cubic stones	-	-	-	-	-	-	-	-	-	-	-
Broken stones	-	*	-	21	534	-	-	-	-	4	559
Stones general	-	-	-	24	806	91	21	6	-	58	1006

Table 8.3. Stone tool types and number of implements found at the TRB settlements cited on the text. When the tool types or the material are mentioned but the number is not specified, an asterisk is used.

8.2.3 The use of the tools during the TRB period

Use-wear analysis on domestic sites of the TRB culture is unequally represented. Flint from settlements located in the central parts of the Netherlands, such as Laren (Bakker 1966) and Harderwijk-Beekhuizerzand (Modderman *et al.* 1976), was too abraded for microscopic analysis, while implements from more recently excavated settlements located '*on the fringes of the plateaus proved to be more suitable for microscopic analysis*' (Van Gijn 2013: 26). Use-wear analysis has been performed on flint implements from four TRB settlements: Bouwlust–Slootdorp (Van Gijn 2010a, unpublished material), Groningen-Oostersingel (Van Gijn 2010a, unpublished work), Hattemerbroek-Bedrijventerrein Zuid (Knippenberg *et al.* 2011b) and Hanzelijn-Oude Land (Verbaas *et al.* 2011a). In addition, a small sample of stone tools from

Hattemerbroek-Bedrijventerrein Zuid (Knippenberg *et al.* 2011b) and Hanzelijn-Oude Land (Verbaas *et al.* 2011b) was analysed.

Vegetal resources

Although the results of the use-wear analysis of TRB domestic contexts are limited, some conclusions can be drawn. First, use-wear traces related to plant working and processing are highly represented. At Bouwlust–Slootdorp, traces of several plant materials were documented on five of the analysed edges (26.3%) (Van Gijn 2010a, unpublished material), while at Location 1 of Hattemerbroek-Bedrijventerrein Zuid the results of the use-wear analysis indicated the importance of basketry and the production of bone and wooden objects (Knippenberg *et al*. 2011b). Most of the traces could be related to the on-site manufacture of tools. Organic remains played an important role in TRB communities, not only as building material but also as raw material for the production of tools, as suggested by the findings from wetland settlements with similar chronologies (Menotti and O'Sullivan 2013; Müller 2012).

TRB communities are understood to have practised an extensive method of cultivation known as *'slash-and-burn'* cultivation, which involved the creation and maintenance of open areas in the forest (Bakels and Zeiler 2005; Van Gijn and Bakker 2005). If this hypothesis is correct, a number of tools meant for forest clearance, the preparation of the soil, and the harvesting and processing of cereals should be documented. Cereal impressions on pottery and cereal grains have been found at several sites (Bakels and Zeiler 2005), but tools suggestive of such activities are hardly ever found at TRB settlements (Van Gijn 2013). Complete axes, adzes, and sickles are rarely documented at TRB settlements, and only one sickle-blade from a domestic context is known for the TRB period (Van Gijn 2010a, unpublished work). As already stated, the absence of sickles is a common phenomenon in the Dutch Neolithic that could be explained in several ways (Bakels and Van Gijn 2014): the use of bone and wooden sickles for cereal harvesting have been documented ethnographically and archaeologically (Anderson and Peña-Chacorro 2014; Anderson and Rodet-Belarbi 2014), as have agricultural practices not involving tools at all (Ibáñez Estévez *et al.* 2000). Most of the stone tools with traces related to cereal processing were documented in the province of Overijssel. At Hanzelijn-Oude Land, most of the 24 stones analysed display use-wear traces related to cereal processing (Verbaas *et al.* 2011b) and at Location 1 of Hattemerbroek-Bedrijventerrein Zuid subsistence activities were mainly represented by cereal processing. In addition, use-wear analysis was carried out on two granite querns found at Location 2, which displayed use-wear related to cereal processing. The function

of the tools was supported by the phytolith analysis, which revealed the presence of siliceous plant on the surface of the querns (Knippenberg *et al.* 2011b).

Although some implements related to plant working are missing from the settlements, studies of the flint assemblages from several megaliths show that sickles and axes were intentionally removed from domestic contexts and deposited at funerary structures instead (Van Gijn 2010a, 2013; Van Woerdekom 2011). The axes from the tombs were heavily used, but they were re-sharpened before their final deposition. However, use-wear polish and other use-wear traces were partially preserved on the surface of the tools, indicating that the axes were used for chopping wood (Van Gijn 2010a, 2013). Similar to the axes, sickles with heavily developed wear traces were documented in burial contexts (Van Gijn 2010a, 2013).

Animal resources

Although TRB groups are considered to have been farmers, the importance of fowling and hunting was revealed by the excavation of the archaeological site of Bouwlust–Slootdorp. This settlement, located in the wetland area of the Noord-Holland province, displayed similar characteristics to the Corded Ware settlements presented in this volume (see Chapters 4, 5 and 6). The analysis of the wild animal remains indicated that ducks were regularly fowled and consumed within the site, as, occasionally, were red deer (Lauwerier 2001 in Van Heeringen and Theunissen 2001; Schnitger 1991b; Woltering and Jager 1991). Finally, shellfish gathering and fishing were also common activities, as the remains of mussels and several fish species, especially sturgeon, indicate. Moreover, use-wear traces related to fish processing were documented at Location 1 of Hattemerbroek-Bedrijventerrein Zuid, reinforcing the great importance of this resource for the diet of the TRB groups on the Pleistocene sands (Knippenberg *et al.* 2011b). Hunting and fishing were probably performed with the transversal arrowheads found in TRB domestic contexts and at TRB megaliths (Van Gijn 2010a; Van Woerdekom 2011), but the importance of other tools produced with bone, wood and other perishable materials should not be disregarded.

Hide scraping traces are frequently documented at the TRB flint assemblages. Craft activities were dominated by hide scraping at Hattemerbroek-Bedrijventerrein Zuid and Groningen-Oostersingel (Knippenberg *et al.* 2011b; Van Gijn 2010a, *unpublished work*) and one retouched blade and several scrapers were used to scrape skin at Hanzelijn-Oude (Verbaas *et al.* 2011a). Although other implements were used for hide scraping, this task is generally related to a specific tool type: flint scrapers. The special

meaning of the flint scrapers is inferred from scrapers with hide processing use traces that were placed on the *hunebedden* (Van Gijn 2010a; Van Woerdekom 2011).

Fire

Strike-a-lights are commonly documented at TRB settlements. At Bouwlust–Slootdorp use-wear traces were documented on two implements, one core and one unmodified flake, suggesting their use as strike-a-lights (Van Gijn 2010a, unpublished material). The use of several tool types as strike-a-lights is a documented phenomenon in prehistory. In the Bronze-Age Netherlands, both long blades and blade-like flakes were used, and no uniform typology of the tools occurred (Van Gijn 2010a). Strike-a-lights are considered to be personal items. Traditionally, it has been assumed that the TRB '*pics*' were used as strike-a-lights (Van Gijn 2010a). Although a systematic study of this tool type has not been performed, TRB '*pics*' from several *hunebedden* display traces of wear that have been interpreted as strike-a-lights (Van Gijn 2010a; Van Woerdekom 2011). In contrast to the traces displayed by the implements from domestic contexts, the traces of use displayed by the tools were not heavily developed, indicating a short duration of use. It has even been argued that '*pics*' were exclusively produced for funerary rituals (Van Gijn 2010a).

8.2.4 Settlement tools as identity markers: The TRB flint

The use of domestic implements as grave goods is a recurrent practice during the TRB period. Flint axes, sickles, arrowheads, scrapers and strike-a-lights were placed, after their use, in megalithic graves. The importance of these implements within the daily practices of the TRB community may have been the reason for their secondary role as grave goods (Wentink *et al.* 2011: 403).

Axes, strike-a-lights and sickles played an important role in the agricultural cycle of the TRB communities, which was characterized by '*slash-and-burn*' cultivation (Bakels and Zeiler 2005). The ritualization of agricultural tools was a common practice during the Dutch Neolithic, as exemplified by the intentional fragmentation of querns and sickles during the LBK period and at the Hazendonk sites respectively, and the deposition of sickles in hoards during the Late Bronze Age (Van Gijn 2014b). This practice was also documented outside Dutch territory, and parallels have been documented in several contexts (Hamon 2005, 2008; Hamon *et al.* 2011; Jadin 2003; Knutsson 2014; Van Gijn 2014b), indicating the great significance that agricultural practices held for the TRB groups (Van Gijn 2014b). Agricultural practices were an important element of the '*mutual knowledge*' of the TRB groups. Agriculture implied the transformation of the landscape by destroying and growing, which symbolically linked this activity to the cycles of life and

death and the cosmologies of prehistoric populations (Bradley 2005; Knutsson 2001, 2014; Van Gijn 2014b). It also implied the investment of knowledge and skills in the different steps related to the cultivation of cereals, from clearing the space to the selection of different harvesting techniques and tools (Anderson and Peña-Chacorro 2014; Anderson and Rodet-Belarbi 2014; Smerdel 2014).

Arrowheads and scrapers, on the other hand, reflected the importance of hunting, fowling and fishing for the TRB society. Hunting, fowling and fishing were, as in the case of agricultural practices, activities which implied a high level of knowledge of the landscape and the rhythms of nature (Ingold 2000a). In addition, the technological implications probably included a large range of equipment, of which the transversal arrowheads found in the various TRB contexts were only a small part. The use of hooks, fishing nets, traps, fences and pitfalls for fishing and hunting were common in the TRB period, as suggested by several remains found in other European settlements with better preservation of organic remains (Hallgren 2012; Marciniak 2005; Menotti and O'Sullivan 2013; Müller 2012). Animals were not only a fundamental part of the subsistence practices of the TRB communities; animal materials were also used for several crafts such as hide working. Hide could be used to produce clothes, rope and containers, but also as a building material employed to prepare roofs or the inner spaces of dwellings (Beyries 2002; Beyries and Joulian 1990; Rahme and Hartman 1995).

The reutilization of domestic implements during the TRB in burials could be understood as a reflection of the intrinsic '*mutal knowledge*' embedded in the use of tools from domestic contexts. Graves were '*places deeply embedded in the history and genealogy of the local group*' (Wentink *et al.* 2011: 404). The settlement tools worked as a link between the ancestors and the groups, forming part of the narratives of a community. The activities performed with these tools implied a high level of social interaction between the landscape and the society, but also an investment of knowledge and skills learnt through the community. In this sense, the deposition of domestic implements in funerary contexts '*symbolized activities relevant to the community at large*' (Van Gijn 2010a: 175).

8.3 Vlaardingen

The Vlaardingen culture dates to between 3400 and 2500 cal BC, coexisting with the first Corded Ware communities. Although cremated human bones were found at Vlaardingen and Hekelingen III, the main information about the group originates from the settlements, which are distributed in various ecological environments. Although the first excavated Vlaardingen site, Zandwerven, was documented on top of a dune in the

salt marshes of Westfrisia, most of the other documented Vlaardingen settlements – more than 30 – are located further south on coastal barriers in the Older Dune area, on stream ridges in the freshwater-intertidal areas, and on river dunes and levees of the peat and the river clay areas (Raemaekers 2003; Van Gijn and Bakker 2005: 293). Palynological and botanical studies showed that the Vlaardingen sites were located in wet environments, in a landscape dominated by alder carr and fresh-water marshes (Brinkkemper *et al.* 2011). The best-supported theory is that Vlaardingen groups combined different economies, adapting their subsistence choices to the exploited environment. The groups which settled in the interior of the Netherlands focused on farming and cropping, while the subsistence strategies of the coastal settlements mainly involved gathering, fishing and hunting. Remains of naked barley and emmer wheat were present at most of the excavated sites, and ard marks were documented at Hellevoetsluis-Ossenhoek (Gosens 2009). Hazelnuts, wild apples and berries were collected and used as a food source. In addition, hunting, predominantly of red deer and wild boar, and fishing, principally for sturgeon, were an important subsistence source in the fresh-water marshes. Finally, cattle and pigs and less frequently sheep and goats were bred and stocked (Brinkkemper *et al.* 2011; Zeiler 1997).

Although structures and house plans are not commonly encountered during the excavations, at Vlaardingen several concentrations of postholes, flint, pottery and bone remains were documented. Two of these concentrations, one on the eastern levee and another on the western levee, were interpreted as possible house structures dated between roughly 2500 and 2300 BC (Glasbergen *et al*. 1961; Van Regteren Altena *et al*. 1962). At Hellevoetsluis-Ossenhoek, one fence, one structure and several plough marks were documented during the excavation (Van Hoof 2009a). Recently, however, the most striking find came to light during the excavation of Habraken te Veldhoven: several structures, such as water and fire pits, five houses and one building were identified among more than 200 postholes registered at the site (Van Kampen 2013). The houses had a long, trapezoidal plan, measuring six metres in width and between 25 and 40m in length. In addition, one more building was also documented. Although some comparisons were made with the house found at Zeewijk, which was interpreted as a ritual structure (Drenth *et al*. 2008; see Chapters 6 and 7), the building at Habraken te Veldhoven was interpreted as a grain storage facility (Van Kampen 2013). Habraken te Veldhoven was inhabited by an egalitarian society with a farming-based economy, and the grain storage would have had communal purposes (Kubiak-Martens *et al*. 2013; Van Kampen 2013). The six structures were dated between 2900 and 2500 BC (Van den Brink and Van Kampen 2013), confirming an occupation during the first half of the third millennium BC, but a precise association with a specific group could not be determined, and the typology

of the material culture did not help. The pottery showed some specific traits of the Stein group, but several recurrent forms and features were considered typically Vlaardingen, so it was suggested that the pottery belonged to the pottery group defined by Beckerman and Raemaekers (2008) as '*Vlaardingen and Stein*' pottery (Beckerman and Raemaekers 2008; Van Kampen and Van den Brink 2013: 94-98).

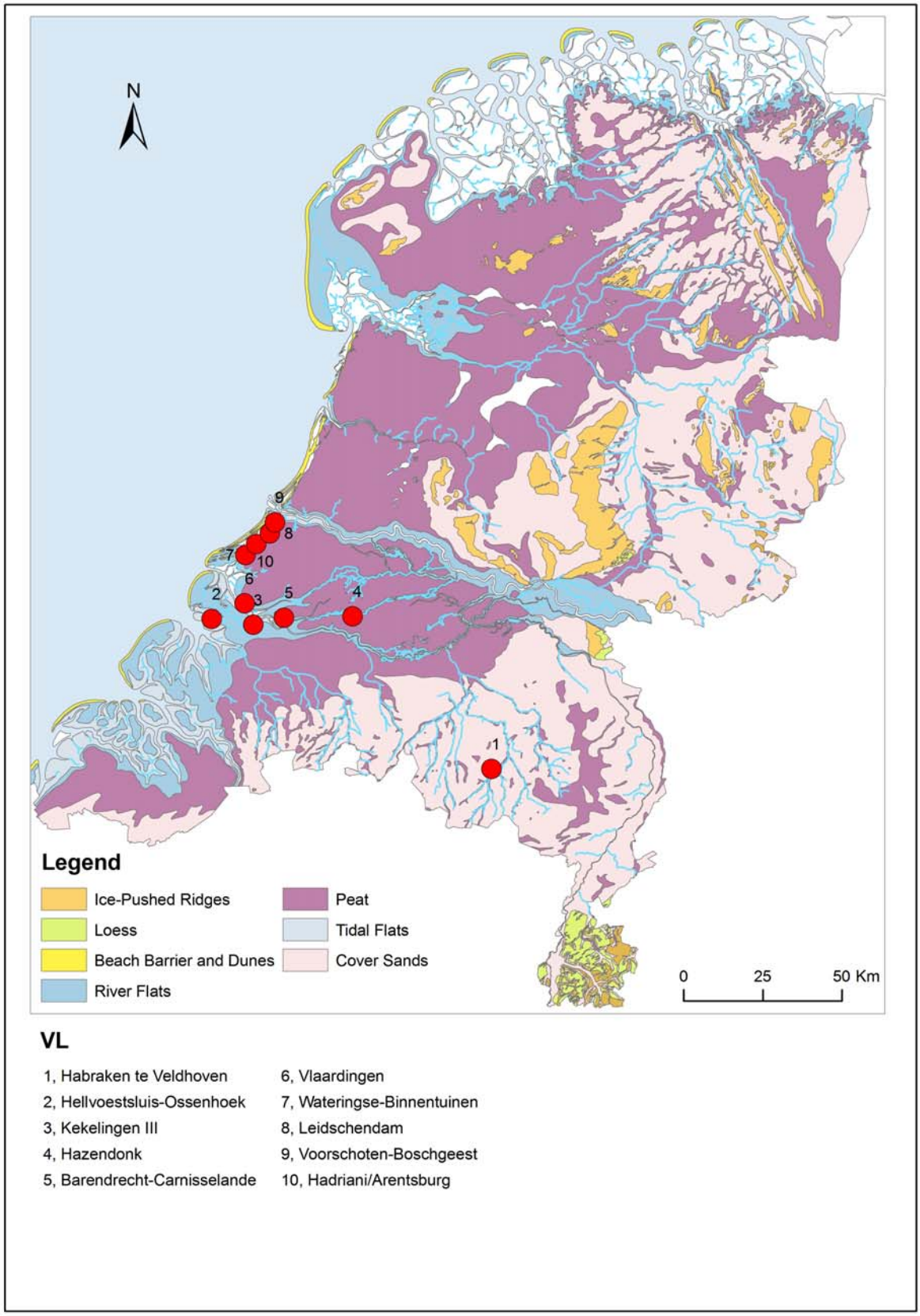

Figure 8.2. Overview of the Vlaardingen settlements cited on the text (after Vos and de Vries 2011).

8.3.1 Flint, stone, amber, jet and bone procurement networks

Raw material acquisition differed from one settlement to another. In some settlements, the local exploitation of mineral resources predominated. Flint and stone were collected from the fluvial deposits of the Meuse and the Rhine rivers at Leidschendam (Van Beek 1990), Voorschoten-Boschgeest (Glasbergen *et al*. 1967), Vlaardingen (Van Regteren Altena *et al*. 1962; Van Gijn in Van Beek 1990), Barendrecht-Carnisselande (Moree *et al*. 2011) and Wateringe-Binnentuinen (Mullaart 2012: 26; Houkes and Verbaas *in press;* Houkes and Verbaas *in press*). In addition, small nodules of amber were probably collected from the nearby coastlines and beaches (Waterbolk 1991). The procurement and use of local materials is a reflection of the landscape perception of the Vlaardingen groups, who used different environments, adapting their economic choices and exploiting the raw material available in each zone. The collection of stones, flint and amber was, as in the case of the CWC (see Chapter 7), probably embedded in other economic activities, for example animal herding or fishing.

However, southern and imported mineral resources were present in high percentages at several sites. At Vlaardingen some authors (Van Regteren Altena *et al.* 1962; Van Gijn in Van Beek 1990) suggest a southern origin for part of the flint and for some types of quartzite, which were probably collected in France and Ardennes in Belgium (Van der Lijn in Van Beek 1990). At Hekelingen III, most of the flint used was imported. Two possible areas for the flint acquisition have been suggested (Verhart 1983): the region of Boulogne-Sur-Mer (France) and the Belgian Lanaye deposits, where Hainault Spiennes flint was acquired (Van Gijn 1989; Verhart 1983). The former region was also used for the inhabitants of Wateringe-Binnentuinen (Mullaart 2012: 26; Houkes and Verbaas *in press;* Houkes and Verbaas *in press*) and Hellevoetsluis-Ossenhoek, along with flint from western Belgium and Limburg (Van Hoof and Metaxas 2009: 83-84). Hellevoetsluis-Ossenhoek is located in an area where stones are not present, so all raw materials were brought to the site from elsewhere. Granite was probably collected in the form of erratic blocks from the basin of the old Meuse River, the moraines near Amersfoort or South Limburg (Van Hoof and Metaxas 2009: 83-84). The origin of four fragments of pyrite found at the site could be traced to the Ardennes, Achterhoek or the Calais region, and the main source for a jet bead was located in the area of Calais (Van Hoof and Metaxas 2009: 83-84). Jet was probably washed away and carried to the southern coast by the sea (Van Gijn and Verbaas 2009).

Although it has been argued that Vlaardingen people did not consider flint important in the expression of their own identity (Van Gijn 2010a: 139), the use of exotic raw materials seems to have been significant. Raw material selection is not systematic

and it does not seem to be related to specific tool types (Van Gijn 2010a). However, although it is not clear why this raw material was selected, the use of imported raw material has been considered an important activity intended to maintain social relationships between different groups (Van Gijn 2010a: 22).

8.3.2 Techno-typological analysis of the flint, stone and bone implements and jet and amber ornaments

Flint

In 2005, the study of the Vlaardingen flint assemblage was considered too '*new and recent*' to allow for an accurate interpretation of the results of the few available technological analyses (Raemaekers 2005: 274). Essentially, a systematic technological and typological analysis of the Vlaardingen flint assemblage is still lacking, although some conclusions can be drawn from the published settlement reports. Broken flint axes, flint nodules and pebbles were used as cores and the flint assemblage is characterized by its small size. Generally, the size of the axes was bigger, so flint tools obtained from axes also had larger metrical dimensions, as in the case of the Hellevoetsluis-Ossenhoek assemblage (Metaxas 2010; Van Hoof and Metaxas 2009). Although it is still unknown whether axes were brought to the site complete or broken, what seems clear is that the axes were imported and not produced *in situ*. No *debitage* or production waste was found during the excavations, suggesting that axes were transported as finished products to the settlement (Houkes and Verbaas 2014b).

Vlaardingen flint technology has been classified as '*ad hoc*' (Moree *et al.* 2011). It was oriented towards the production of flakes, while blades were scarce (Van Beek 1990), as at Hekelingen III (Van Gijn 1990; Verhart 1982) and Wateringe-Binnentuinen (Mullaart 2012, *in prep;* Houkes and Verbaas *in press*); it is even possible that blades were completely absent (Moree *et al*. 2011; Van Gijn 1990; Verhart 1983). Flint technology was characterized by the use of hard, direct percussion, without proper preparation of the core platforms, and was occasionally combined with the use of bipolar techniques. The assemblage is characterized by low variability in terms of tool types; unmodified flakes, splinters and waste by-products dominate most assemblages (Table 8.4), although other tool types such as retouched flakes and blades, scrapers, strike-a-lights, axes, borers and arrowheads were also documented. In most cases, flint production took place on-site and a high number of splinters and cortical pieces were recovered at several sites (Houkes and Verbaas 2014a; Metaxas 2010; Van Hoof and Metaxas 2009). However, at other sites, such as Barendrecht-Carnisselande, although cortex was present on some of the implements, the percentage of flakes exhibiting more

than 50% of cortical surfaces was low. Consequently, the authors suggested that it is likely that some of the tools were knapped off-site (Moree 2011).

	Voorschoten-Boschgest	Voorschoten-De Donk	Leideschendam	Vlaardingen	Hekelingen III	Hellevoetsluis-Ossenhoek	Wateringe-**Binnentuinen**	Barendrecht-Carnisselande	Habraken te Veldhoven	Hadriani / Arentsburg	Hazendonk	Total
Unmodified Flakes	134	1520	-	4809	-	206	1125	3	310	219	2	8328
Unmodified Blades	-	62	4	104	-	7	41	-	23	6	-	247
Retouched Flake	-	-	-	-	-	49	-	-	12	29	31	121
Retouched Blades	-	-	-	-	-	3	-	-	3	-	6	12
Retouched general	2	-	-	-	64*	-	307	4	-	5		380
Core and core fragments	38	121	131	80	49	6	52	-	-	15	1	493
Scrapers	-	-	116	628	119	91	619	-	8	50	5	1636
Borers	-	-	6	89	23	5	7	-	-	-	-	130
Hammerstone	-	-	-	-	-	-	4	-	5	-	-	9
Arrowheads	-	-	7	44	11	4	8	-	3	6	1	84
Sickle	-	-	-	-	-	-	4	-	-	-	-	4
Strike-a-lights	-	-	-	-	1	1	-	-	-	4	-	6
Burins	-	-	-	-	-	-	-	-	-	2	-	2
Chisel	-	-	-	-	-	-	-	-	3	-	-	3
Axe	-	-	-	341	3	14	-	-	-	-	-	358
Axe flakes and fragments	24	24	51	-	-	23	-	-	31	22	13	188
Block	-	-	-	-	-	-	23	1	-	-	1	25
Waste	-	152	-	-	-	167	346	-	-	110	-	775
Others	-	-	-	619	-	-	848	6	296	1001	-	2770
Flint general	258	2022	1773	6.714	1.011	847	3384	14	694	1469	196	1.485.913

Table 8.4. Flint tool types and number of implements found at the Vlaardingen settlements cited on the text. When the tool types or the material are mentioned but the number is not specified, an asterisk is used.

Stones

The stone tool assemblage was dominated by querns, grinding stones and hammer stones. Other tool types, such as polishing stones, polished axes, and anvils, were present but in smaller numbers (Table 8.5). Generally speaking, stones were brought to the site and used without any modification. However, some tools showed traces of intentional modification prior to use. At Hadriani/Arentsburg, one fragment of a handstone showed traces of pecking, while several fragments of querns were flaked to obtain the desired shape and to rejuvenate their use surface. In addition, at least one rejuvenation flake from a quern was documented at the site (Houkes and Verbaas 2014b). At Habraken te Veldhoven several production fragments collected at the site suggest that the unworked nodules were brought to the site and modified when needed. Traces of flaking and pecking, as well as 13 flakes related to stone tool production, were

documented at the settlement (Devriendt 2013). At Barendrecht-Carnisselande 1, stones were selected and modified on several occasions. An axe and a grinding stone showed evidence of pecking, after which the axe and the axe fragment were polished (Moree *et al*. 2011).

	Voorschoten-Boschgest	Voorschoten-De Donk	Leideschendam	Vlaardingen	Hekelingen III	Hellevoetsluis-Ossenhoek	Wateringe-Binnentuinen	Barendrecht-Carnisselande	Habraken te Veldhoven	Hadriani / Arentsburg	Hazendonk	Total
Flake	-	-	-	-	-	3	19	-	13	4	-	39
Core	-	-	-	-	-	-	-	-	-	-	-	-
Quern	-	-	*	26	-	17	15	1	-	2	-	61
Flaked stones	-	-	-	1	-	-	-	-	9	1	-	11
Grinding tools	-	-	-	23	-	18	3	-	27	-	-	71
Anvil	-	-	-	-	-	-	-	1	2	-	-	3
Hammer stones	-	-	*	10	-	6	10	1	-	-	-	27
Rubbing topol	-	-	-	-	-	-	3	-	4	-	-	7
Polishing stones	-	-	-	4	-	-	-	-	1	-	-	5
Pounder	-	-	-	-	-	-	-	-	-	-	-	-
Axe/Axe fragment	-	-	*	3	-	1	27	2	1	-	-	34
Weight	-	-	-	-	-	-	-	-	-	-	-	-
Cubic stones	-	-	-	-	-	-	-	-	-	-	-	-
Broken stones	-	-	-	-	-	111	-	-	-	-	-	111
Others	-	-	-	4277	-	10	804	2	1001	3922	-	10016
Stones general	-	-	680	4344	-	166	881	7	1058	3929	-	11065

Table 8.5. Stone tool types and number of implements found at the Vlaardingen settlements cited on the text. When the tool types or the material are mentioned but the number is not specified, an asterisk is used.

Antler, bone and wooden tools

Due to the good preservation of organic materials, a significant number of bone, antler and wood/plant implements were recovered at several Vlaardingen settlements. Waste by-products and splinters of bone were also recovered, along with several finished and half-finished tools, pointing to local production of bone tools (Van Gijn and Bakker 2005). Bone implements were produced using the '*metapodium technique*', also documented at contemporaneous sites such as Hekelingen III (Maarleveld in Van Gijn 1990). As already discussed in Chapter 7, the '*metapodium technique*' is known to have been employed from the Mesolithic, linking the '*mutual knowledge*' of the Mesolithic and the Neolithic population, and suggesting a continuity in the practices of both groups (Van Gijn 1990). At Vlaardingen, bones were mainly used to produce chisels or awls, while antler was used to produce hammers, handles or points. In addition, at Barendrecht-Carnisselande 1, one antler point and one unknown object made from a pig bone were documented (Moree *et al.* 2011).

Wooden tools and objects reflect the importance of the sea during the Vlaardingen period. Fishing was one of the main activities documented at the Vlaardingen settlements, as inferred from the high number of fish bones recovered (Brinkkemper *et al*. 2011; Zeiler 1997). An oak-dug canoe and a paddle made of ash wood were recovered at Hazendonk (Van Iterson Scholten 1977); a paddle was found at Hekelingen III (Van Gijn and Bakker 2005: 295-296); and the remains of a fishing net, fragments of a string and a net sinker were documented at Vlaardingen (Van Iterson Scholten 1977). Water was not only important for fishing; it was also a means of transportation and communication for prehistoric communities. The importance of water for prehistoric communities increased from the Mesolithic (Cummings 2003; Warren 2000) until the Bronze Age, when the existence of *mariorities*, understood as *'institutions that served specifically for the conduct of certain kinds of interaction across the water'*, is proposed (Needham 2009: 20). The formation of the supposed *'mariorities'* during the Bronze Age could be related to the emergent importance of the sea during the Middle and the Late Neolithic, which manifested itself in the gradual rise and increased sophistication of maritime technologies and the ritualization of the sea by prehistoric communities (Cummings 2003; Needham 2009; Warren 2000).

	Voorschoten-Boschgest	Voorschoten-De Donk	Leideschendam	Vlaardingen	Hekelingen III	Hellevoetsluis-Ossenhoek	Wateringe-Binnentuinen	Barendrecht-Carnisselande	Habraken te Veldhoven	Hadriani / Arentsburg	Hazendonk	Total
Chisel	-	-	-	*	*	5	-	-	-	-	8	13
Awl	-	-	-	-	*	2	-	-	-	-	-	2
Knife	-	-	-	-	-	-	-	-	-	-	1	1
Point	-	-	-	*	-	-	-	1	-	-	12	13
Tubes	-	-	-	-	-	2	-	-	-	-	-	2
Hammer	-	-	-	*	-	-	-	-	-	-	-	-
Handle	-	-	-	*	-	-	-	-	-	-	1	1
Undetermined	-	-	-	-	-	-	-	-	-	-	17	17
Total	-	-	-	*	-	9	-	-	-	-	39	48

Table 8.6. Bone tool types and number of implements found at the Vlaardingen settlements cited on the text. When the tool types or the material are mentioned but the number is not specified, an asterisk is used.

Ornaments

Ornaments are rarely found at Vlaardingen settlements and always in low numbers. When they are excavated, the finds are mainly made of jet and amber. Bead fragments were documented at Hellevoetsluis-Ossenhoek (Goossens 2009) and Leideschendam (Glasbergen *et al*. 1967). At Vlaardingen the ornament assemblage

mainly comprised long polished amber beads and one pierced canine tooth (Van Regteren Altena *et al*. 1962). At Voorschoten-Boschgeest three jet beads displayed an hourglass/biconical perforation and several scratches in the surface (Glasbergen *et al*. 1967). At Hellevoetsluis-Ossenhoek, one fragment of an amber bead and one fragment of a jet bead were documented during the excavation. Both bead fragments were produced by cutting the material. The amber bead was polished, and an hourglass type of perforation was performed. The jet bead displayed flake negatives, suggesting that the final shape of the bead was produced by knapping (Van Gijn and Verbaas 2009).

8.3.3 The use of tools in the Vlaardingen Culture

Vlaardingen settlements are among the best-studied sites in the Netherlands from a use-wear perspective. The absence of burials for this group focused the interest of the researchers on the settlements from the very beginning. Therefore, flint was extensively studied and Vlaardingen implements were among the first on which use-wear analysis was carried out (Bienefeld 1986, 1988; Van Gijn 1984, 1989). In addition, the good preservation of the materials, including organic implements, provided abundant information about the economic and social practices of the Vlaardingen communities. Functional information about Vlaardingen assemblages is available for nine settlements. Although flint is the most frequently analysed material, stone, bone and amber have also been studied. Through the analysis of the Vlaardingen implements, some conclusions about the role of the settlements and the composition of the groups can be drawn.

Vegetal resources

Vegetal resources played an important role in the Vlaardingen group. Use-wear traces related to soft plant processing were documented on a large number of tool edges at Leidschendam (Van Gijn 1990), Vlaardingen (Van Gijn 1984; Van Gijn in Van Beek 1990) and Hekelingen III (Van Gijn 1990) and were proportionally more important at other studied assemblages such as Hellevoetsluis-Ossenhoek (Metaxas 2010; Van Hoof and Metaxas 2009) and Hadriani/Arentsburg (Houkes and Verbaas 2014a). These traces demonstrate the importance of textiles for these communities, not only for the production of clothes, but also for the production of other objects such as bags and baskets, or the manufacture of nets and ropes used for fishing, similar to the ones found at Vlaardingen and Hekelingen III (Van Iterson Scholten 1977; Van Regteren Altena 1962; Van Regteren Altena *et al.* 1963). As has also been observed at Corded Ware settlements, traces of woodworking seem to be underrepresented, although use-wear traces suggesting debarking and woodworking activities are present at the sites of Habraken te Veldhoven (Van Gijn and Siebelink 2013), Hazendonk and Hekelingen III

(Van Gijn 1984, 2012; Van Gijn in Van Beek 1990; Van Gijn and Bakker 2005), hinting at the local production of wooden tools. Although infrequent, more than one excavation yielded several wooden objects, as well as evidence for the use of wooden posts employed for house construction. While traces related to the production of small tools or the repair of implements are present, tools such as axes or adzes are missing. It is possible that other materials such as bone were used for axe production, although the absence of complete flint and stone axes for the Vlaardingen period could also be explained by their reuse as cores to obtain other types of tools.

Implements with traces related to cereal harvesting were documented at several sites (Metaxas 2010; Van Gijn 1990; Van Hoof and Metaxas 2009). It has been assumed that the economic practices represented in the Vlaardingen settlements were linked to an economic model characterized by the exploitation of diverse geographical areas and their natural resources. Cereals were probably consumed at several settlements, as inferred from the archaeobotanical analysis (Brinkkemper *et al.* 2010; Brinkkemper *et al.* 2011). However, local production of crops was probably not performed at every settlement. The absence of cereal-harvesting traces led to the suggestion that agricultural products such as linseed, naked barley or emmer wheat were imported to Hekelingen III (Louwe Kooijmans 1980; Out 2009). However, sickles were documented at Leidschendam (Van Gijn 1990) and Hellevoetsluis-Ossenhoek (Metaxas 2010; Van Hoof and Metaxas 2009), supporting the hypothesis that cereals were cultivated locally on the dune ridge. Querns were documented and studied at Wateringe-Binnentuinen (Houkes and Verbaas *in press*), Hellevoetsluis-Ossenhoek (Van Gijn and verbaas *in press*), Hadriani/Arentsburg (Houkes and Verbaas 2014b), Habraken te Veldhoven (Van Gijn and Siebelink 2013) and Barendrecht-Carnisselande (Moree *et al.* 2011). At Wateringe-Binnentuinen traces of nut cracking were also present, confirming the archaeobotanical studies that suggested a large contribution of hazelnuts to the Vlaardingen diet (Bakels and Zeiler 2005; Brinkkemper *et al.* 2010; Brinkkemper *et al.* 2011; Out 2009).

Animal resources

Vlaardingen communities consumed animal resources very frequently. Fishing, fowling and hunting were mainly practised at coastal settlements, while cereal cultivation and cattle livestock were predominant at inland settlements. The archaeozoological analysis shows that animals were exploited for diverse purposes: domestic and hunted animals were exploited to obtain several raw materials with which the Vlaardingen groups produced daily implements; cattle were probably used for animal traction, breeding and meat production; and cut marks indicate that beavers, otters and wildcats were hunted not only for furs, but also for their meat (Brinkkemper *et al.* 2011: 213).

In this context, it is not strange that bone and hide working were two of the most frequently inferred activities at Leidschendam (Van Gijn 1984, 1989), Vlaardingen (Van Gijn 1984; Van Gijn in Van Beek 1990), Hekelingen III (Van Gijn 1989), Hellevoetsluis-Ossenhoek (Metaxas 2010; Van Hoof and Metaxas 2009), Hadriani/Arentsburg (Houkes and Verbaas 2014a) and Habraken te Veldhoven (van Gijn and Siebelink 2013). As in the case of the TRB group, hide processing was mainly performed with flint scrapers, although traces of cutting and piercing of hides were also documented at several sites (Metaxas 2010; Van Gijn 1989; Van Hoof and Metaxas 2009). Use-wear analysis shows that implements were used to work both fresh and dry hide, suggesting that the entire process of animal skin processing was carried out at the settlements.

The local production of bone tools was also corroborated through the use-wear traces. Use-wear related to cutting, engraving and sawing bone could indicate butchering activities, but it could also suggest the production and manufacturing of tools and other implements. Despite the importance of hunting and fishing, use-wear traces of neither activity is well represented. Besides fur animals, red deer and wild boar were frequently found at several settlements, such as Vlaardingen and Hekelingen III (Brinkkemper *et al.* 2010; Brinkkemper *et al.* 2011; Zeiler 1997). However, only four arrowheads displaying impact traces were documented at Hadriani/Arentsburg (Houkes and Verbaas, *in prep*) and Hellevoetsluis-Ossenhoek (Metaxas 2010; Van Hoof and Metaxas 2009). At the former site, the arrowheads also preserved residues of tar, showing how projectiles were hafted. The great importance of fishing is inferred from the high number of fish remains collected at the settlements. Although sturgeon is the most commonly represented species at most sites, the Vlaardingen communities also consumed other fresh- and saltwater species such as herring, eels, catfish and pike (Brinkkemper *et al.* 2010; Brinkkemper *et al.* 2011). Unexpectedly, despite this widespread use of fish as a food source, use-wear traces of fish processing were only encountered at Wateringe-Binnentuinen (Houkes and Verbaas *in press*). As already explained in Chapter 6, the absence of use-wear traces related to fish processing could be due to several factors, such as tool preservation and working techniques (Anderson 1981; Briels 2004; Clemente Conte 1997; Clemente Conte and García-Díaz 2008; García-Díaz 2009; García-Díaz and Clemente Conte 2008; Gutiérrez Sáez 1990; Iovino 2002; Moss 1983; Plisson 1985; Semenov 1981[1957]; Van Gijn 1986, 1990).

Fire making

Traces of fire making were documented at several settlements (Houkes and Verbaas 2014a*;* Metaxas 2010; Van Hoof and Metaxas 2009). The strike-a-lights excavated were heavily worn, suggesting repeated use over time. As already suggested,

these tools have been interpreted as personal items (Van Gijn 2010a, 2010b; Van Gijn *et al.* 2006). Besides the symbolic use of strike-a-lights within the TRB communities, fire control was an important skill for prehistoric communities. Fire was used in a wide range of activities, and hearths could be understood as a socializing space around which daily tasks were performed and social norms were shared and established. Hearths became focal points in the daily life of the inhabitants of these settlements (see Chapter 7).

8.3.4 The role of flint, stone and bone implements in the Vlaardingen Culture

The numerous analyses of the settlement implements of the Vlaardingen Culture provide a great body of data to study the social implications of the organization of settlement technology. Although the use of flint implements has been understood to have been '*ad hoc*' (Van Gijn 2010a, 2010b), use-wear analysis of other tools showed that the domestic technology was more complex and was important in the expression of the Vlaardingen identity. In the first place, bone implements played a major role in the transmission of the cultural traditions and '*mutal knowledge*' of the Dutch Neolithic groups. The good preservation of the organic materials at Vlaardingen revealed the importance of bone tools for the economic practices of the Vlaardingen groups (Maarleveld in Van Gijn 1990; Moree et al. 2011; Van Gijn and Bakker 2005). The analysis of the *chaîne opératoire* of the implements established that they were produced using the '*metapodium technique*', which linked the technological traditions of the Vlaardingen culture with Mesolithic groups (Van Gijn 2005). Mesolithic traditions were probably maintained and transmitted by earlier Neolithic groups, as suggested by the use of this technique at other Neolithic settlements such as Schipluiden (Van Gijn 2006). The use-wear analysis of the Vlaardingen assemblages revealed the importance of flint tools in the local production of bone tools (Houkes and Verbaas 2014a; Metaxas 2010; Van Gijn 1984, 1989, 1990, 2010a, 2010b; Van Hoof and Metaxas 2009). Although the functional studies of bone tools are limited, the main tool types documented at the archaeological settlements suggest their use in craft activities. (Moree *et al.* 2011; Van Iterson Scholten 1977; Van Regteren Altena 1962; Van Regteren Altena *et al.* 1963). Flint implements were extensively used for craft activities; whereas scrapers and retouched tools were principally used for hide scraping and woodworking, flint tools were also used for the production of amber and jet ornaments, pottery and fire-making (Van Gijn 2010b).

Use-wear analyses of Vlaardingen stone implements confirmed their importance in subsistence activities. Cereal processing was mainly performed with both stone and flint implements. Stone tools were primarily used to grind cereals (Houkes and Verbaas *in press*; Houkes and Verbaas 2014b; Van Gijn and Verbaas 2009; Van Gijn and Siebelink

2013) and, despite the low number of flint sickles, they were also used in at least part of the process of harvesting crops (Van Gijn 2010a, 2010b). In addition, and despite the problems with the development of traces from soft materials (see Chapters 3 and 7), flint implements seem to have had an important role as part of the communities' fishing gear. In the first place, traces observed on pointed flakes used to split willow have been interpreted as evidence that the tools were used to manufacture fish traps (Van Gijn 2010a: 90). The rest of the fishing toolkit was mainly comprised of wooden tools, as suggested by the wooden implements recovered at several excavations (Van Gijn and Bakker 2005: 295-296; Van Iterson Scholten 1977). Finally, flint also played a role in the final processing of fish, as inferred by the traces of use at several sites (Van Gijn 201a, 2010b).

8.4 The Corded Ware Culture as a local development: the role of Vlaardingen and TRB groups as generators of knowledge

The Corded Ware community emerged in a context in which strong changes were appearing. Farming and crop cultivation became the main activity of the TRB groups, who began to modify their surrounding landscape intensively (Bakels 2005). The TRB communities witnessed the arrival of the plough and wheeled vehicles (Fokkens 1986, 2005, 2012; Van Gijn and Bakker 2005), innovations which, generated as they were by the emergence of a new economic system, would strongly impact the development of the Beaker groups. In addition, a strong dependence on fishing, gathering and hunting was also present, as inferred from the archaeological remains at Bouwlust–Slootdorp and most of the Vlaardingen settlements studied. Although the origins of the CWC in the Netherlands are still under study, a local component in the formation process of the group is widely accepted (Fokkens 1986; Van der Waals 1964, 1984; Van Gijn and Bakker 2005; see Chapter 2). The economy of the Corded Ware communities was based on a combination of several activities (see Chapter 7). Crop cultivation and farming were combined with hunting, gathering and fowling. In this sense, it could be suggested that Corded Ware groups continued the economic practices developed by the Vlaardingen and TRB communities, developing some innovations and generating and assimilating others. As a reflection of this continuity, the analysis of the flint and stone implements from settlement contexts proposed a connection between and the continued evolution of the material cultures of the three groups. The rate of change probably depended on the assemblage type and the internal characteristics of the group. The merging of cultural traits could have been easier in places where social and cultural cohesion was stronger. With a more uniform group composition and similar economic practices, the spread of the new developments could be easily absorbed, as shown by the pottery analysis. While the

pace of transition between TRB and Corded Ware pottery types was fast, Vlaardingen pottery types coexisted with CWC pottery types for some time, and evolved until the beaker-shaped type began to dominate during the Vlaardingen 2b phase (Beckerman 2012a). Recent pottery analysis suggest a close connection between Vlaardingen and CWC groups. The technological and morphological characteristics of the pottery remains found at Zandwerven and other Corder Ware settlements have been considered as *`similar ceramic developments between 3090 BC and 2200 BC in both parts of the coastal area'* (Noord-Holland and Zuid-Holland province) (Beckerman 2016: 187), and interpreted as a technological continuity between the groups.

The study of the flint and stone assemblage of the three groups leads to some conclusions. In the first place, it seems that there is clear continuity in the use and exploitation of the space. This persistent use of the space had already been inferred from the fact that groups settled repeatedly in similar locations. In this sense, the most striking case was Zandwerven, where a Corded Ware settlement was placed on top of a Vlaardingen site (Van Regteren Altena and Bakker 1961). The occupation of Zandwerven and Bouwlust–Slootdorp could be understood as a precedent for the extensive use of the Noord-Holland province by the Corded Ware community. One explanation for this is the importance of water resources, along with the strategic position of this region, which provided easy access to other resources extensively exploited by the CWC. The water marshes of the Noord-Holland province were the natural habitat of various birds which, along with several fish species, completed the diet of the groups (Bakels 2005; Zeiler 1997; Zeiler and Brinkhuizen 2012, 2013, 2014; see Chapter 7). Despite the importance of water sources, the vicinity of the Pleistocene deposits of Wieringen as an explanation for settlement in Noord-Holland could not be disregarded. The use of flint and stone from this area was already documented at settlements located in similar areas during the TRB (Bouwlust–Slootdorp) and the Vlaardingen period. The quality of the raw materials used by both groups in different areas was similar, and in this sense, the use of this location by the Corded Ware community could be seen as a link between the three groups. If the landscape is understood as a generator of knowledge (Bourdieu 1973; see Chapter 3), then the stone and flint implements collected from this area represent the material reflection of this knowledge (Scarre 2004). The presence of local materials in the TRB *hunebedden* shows the symbolic importance of the domestic implements produced using local material, which was used alongside imported material. The use of local material would influence the flint and stone assemblage produced by the Corded Ware communities (see Chapter 7).

Technological traditions continued in the production of flint and stone implements. Bipolar technology was used more intensively by the Corded Ware groups and dominated the Bell Beaker technology (Croese 2010; Louwe Kooijmans 1974). The simplicity of bipolar technology implied that the entire group could produce flint implements and no specialists were needed (see Chapter 7). Both TRB and Vlaardingen settlements are considered to have been non stratified societies, with no clear distinctions made inside the settlements and, in the case of the TRB group, in burial rituals. In fact, a communal effort was probably required to build the *hunebedden* (Bakker 1992, 2005). The use of a technology where no specialist would be needed could imply that the egalitarian character of the Vlaardingen and TRB societies was incorporated into the Corded Ware communities. Following the analysis of the Corded Ware settlements, as observed in Chapters 4, 5 and 6, it can be assumed that these communities were also egalitarian.

The technology conditioned the tool types produced. Flint technology was oriented to produce small implements, mainly unmodified flakes, and blade technology remained scarce. Other types of tools such as scrapers and retouched flakes, already well represented in the TRB and the Vlaardingen assemblage, were produced and used at the Corded Ware settlements. It seems clear that the functionality of the implements depended on the characteristics of each individual settlement, but two main activities were predominant: plant working and hide processing. For the former activity, during the TRB and the Vlaardingen period scrapers and retouched tools were selected. This tool type was also predominantly preferred at the Corded Ware settlements, as suggested by the use-wear analysis of Mienakker (García-Díaz 2013; see Chapter 5) and Zeewijk (García-Díaz 2014a; see Chapter 6).

Although the analysis of settlement implements suggests that technological continuity was the norm during the fourth and third millennia, changes can be observed when implements from settlement contexts are compared to the funerary assemblages. As already stated, the assemblage in the communal burials of the TRB culture, the *hunnebedden*, was characterized by a high percentage of local flint. It was common to find domestic tool types characteristic of settlement contexts, such as scrapers, flakes and sickles, the latter showing traces of extensive use (Van Gijn 2010a; Wentink 2006). In the Corded Ware burials, a change in the selection and use of the grave goods is observed. Arrowheads and unmodified flakes made of local flint were still documented in the graves (Van Gijn 2010a: 145; Chapter 2), but it is clear that imported flint was beginning to play an important role in funerary practices. This is suggested by the imported axes, the Scandinavian blades and the Grand-Pressigny and Romigny-Léhry daggers imported from France during the AOO period. As already stated in Chapter 7, the

skills reflected in the imported material contrast sharply with the simplicity of the settlement assemblages. In addition, use-wear traces show a distinction between the grave goods of the TRB and the CWC. Some implements documented at the Corded Ware burials suggest a connection with the daily activities of the TRB communities. Analysed arrowheads with impact traces (Van Gijn 2010a) and battle-axes that were probably used to clear the landscape (Wentink *in preparation*) reflect the economy of the Corded Ware groups. However, some of the imported material, for instance the French daggers, had a different symbolic meaning. Use-wear traces suggest that the implements were hafted and placed on a bast sheath, and the daggers were probably taken in and out of the sheaths in several occasions, as a symbolic display (Van Gijn 2010a). This suggests that the importance of these implements was no longer connected to their previous use, but to their origin and the technology employed to produce them. Daggers and blades were imported to the Netherlands as finished products, implying that, by the Late Neolithic, neither the technology and nor the acquisition of the raw material were performed by Dutch communities.

From the TRB to the Late Neolithic B, a deep transformation took place in society. While TRB, Vlaardingen and Corded Ware were organized as egalitarian communities, the first manifestations of the changes in the social structure of the groups began to emerge in the graves. The change in the rituals observed to bury members of the community, from communal to singular, was probably a consequence of a gradual change in the identity and the social structure of the group. The adoption of farming and agriculture by the TRB groups was one of the first steps in social change (Fokkens 1986), and technology played an important role, in the first place because technological innovations, exemplified by the plough and wheeled vehicles, facilitated the adoption of the new economic system. The way these technological innovations were incorporated within society probably also generated changes. Through learning processes and social rules, implements were produced and incorporated into the communal practices of the groups. However, the importation of technologically complex finished objects such as French daggers redefined the conception of '*mutual knowledge*'. The technological referents were no longer inside the community, but outside, and the use and benefit of these items ceased to be communal.