The articulation of a "New neolithic"

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4 The cultural context

4.1 The Late Mesolithic of the western part of the North European Plain

4.1.1 INTRODUCTION

In order to study the process of neolithisation in the western part of the North European Plain, it is necessary to place the Swifterbant Culture in a wider perspective. These data are presented in this chapter, while the interpretation of the Swifterbant Culture in relation to the subjects presented here is found in chapter 5. The starting point in a discussion of the process of neolithisation in the western part of the North European Plain is the archaeological record of the Late Mesolithic in this area. In order to assess the role of the Late Mesolithic population in this process, the material culture, subsistence base and mobility strategies of the Late Mesolithic are presented, after which the transition from Late Mesolithic to early Swifterbant Culture is discussed.

4.1.2 FLINT TECHNOLOGY AND TYPOLOGY

Stylistic developments in flint tools are the basis of various seriations which have resulted in the subdivision of the Mesolithic into a number of stages. According to Verhart and Groenendijk (in press), the repeated (and not stratigraphically separated) use of site locations (illustrated by the wide range of ^{14}C-dates pertaining to individual sites) prohibits a detailed division as proposed by Newell (1970b; 1973) and Arts (1990). On the basis of Verhart and Groendijk's critical evaluation of these typologies, their tripartition of the Mesolithic period is followed here. Newell subdivided the Late Mesolithic period a Late Mesolithic and Late Mesolithic Survival phase, the latter characterised by the introduction of Svaerdborg and Maglemose points and core and flake axes derived from the western Oldesloe Culture (De Leien Wartena Complex) (Newell 1973, 408). As the specific point types appear in Denmark some 1500 years before the start of the proposed 'Survival' phase, and core and flake axes are no longer seen as markers for the Late Mesolithic, the existence of the De Leien Wartena Complex is seriously disputed; for this reason, it is left out of consideration here (Verhart/Groenendijk in press).

The Late Mesolithic of the southern part of the Netherlands and western and central Belgium is named the Rhine Basin Group (Newell 1973, 407) or Rhine-Meuse-Scheldt Culture (Gob 1985, 23-24). As such, it encompasses the southern part of the study area. The ^{14}C dates pertaining to the Late Mesolithic phase range between 7700 and 6250 BP (Gendel 1984, 27; Gob 1985, table 1; Newell 1973, graph 4). The final part of the Late Mesolithic is contemporary with the first phase of the Neolithic in this area, the *Linearbandkeramik*, to be discussed in the next section. Rhine Basin Group artefacts are not only produced on flint, but also on Wommersom quartzite, both predominantly worked in blade technology. Tools include regular, parallel-sided blades ('Montbani blades'), retouched bladelets, flake scrapers and numerous point types. These points encompass trapezes (symmetrical, asymmetrical, right-angled or rhombic) and points with surface retouch, such as mistletoe points (*feuilles de gui*), scalene or leaf-shaped points and points with oblique bases (Gendel 1984, 111, 118- 123; Gob 1985, 25, 28, 29; Huyge/Vermeersch 1982, 159-185, table 7; Newell 1973, 406).

The Northwest Group constitutes the Late Mesolithic of the northern part of the Netherlands and Lower Saxony, the northern part of the study area (Newell 1973, 406). The ^{14}C dates of the Late Mesolithic range between 7700 and 6800 BP (Newell 1973, graph 4). The flint industry of the Late Mesolithic phase of the Northwest Group is set apart from the preceding industry by its wider blades and broad trapezes. The new elements include more numerous and a wide variety of (broad) trapezes, long, narrow scalene triangles, small or micro-triangles, needle-shaped points, thin small crescents and small round thumbnail scrapers. These are accompanied by tool types which were already current: B and C points, backed blades and lanceolates, end and side scrapers, knives, retouched blades and flakes, borers, burins and denticulated blades. The absence of mistletoe points, leaf-shaped points and Wommersom quartzite is also considered as characteristic (Newell 1970b, 47, 48; 1973, graphs 2, 3).

4.1.3 SUBSISTENCE BASE

Because of the inaccessibility of remains in the Holocene areas of the western part of the North European Plain, the Late Mesolithic evidence is almost virtually restricted to surface scatters of flint found on the Pleistocene sands. Reconstructions of the Late Mesolithic subsistence base in

the study area are therefore based on data from a wide area around it (especially Denmark, but also northern Germany, Belgium and Great Britain). Certain similarities in food remains and environment across northern Europe are often brought forward to suggest that the subsistence base of the Late Mesolithic in the study area was based on the same resources (Verhart/Groenendijk in press). Overviews by Jarman (1972) and Andersen *et al*. (1990) combine data on a European scale. On the basis of these data, it might appear that elk, aurochs, roe deer, red deer, horse, wild boar, bear, beaver and otter were hunted frequently in the study area. Whether the natural environment in the study area indeed supported these animals remains uncertain and is seriously doubted here: the use of Mesolithic zoological data from other regions suggests that there was a standard Mesolithic subsistence base, an assumption which is quite unfounded. Charred food remains from the study area include hazelnuts, cherries, acorns and water chestnuts (Verhart/Groenendijk *in press*).

4.1.4 SITE TYPOLOGY AND MOBILITY STRATEGIES

Lacking sites with preserved bone material or sites with a well-defined, short occupation period, interpretation of Mesolithic sites in the study area has to be based on flint scatters. Functional interpretations of Mesolithic flint scatters are first of all based on various site characteristics, such as the size of the scatter, the shape of the scatter and its content (total number of tools and proportions of tool categories). Two models based on these site characteristics in the study area present important insights into the intersite variability. The first explicit use of site characteristics is presented by Newell (1973). In his set of Mesolithic sites, he distinguishes type A sites with a trapezoidal shape, measuring between 13×20.5 and 26×40m, with 153-400 tools; type B sites with an oval shape, measuring between 4×7 and 5×9 m with 34-40 tools; and type C sites with a round shape, measuring between 1.5×2 and 3.5x4.3 m, with 6-37 tools. A specific site type for the 'Survival' phase is type D, an oval scatter with a size between 27.2×66 and 40×92 m, with 5,000-5,500 tools (Newell 1973, 402, graph 1). Newell interprets the type B and C sites as extraction camps and the type A and D sites as base camps or maintenance camps (Newell 1973, 404-407). In other words, Newell proposes a logistic mobility system in which long-term occupied base camps are kept supplied by means of extraction camps and special-activity sites (section 3.8.4.2). A similar model is proposed by Price (1978), who distinguishes five site types. Type 1 is a circular or oval scatter, 2-5 m in diameter with less than 1000 artefacts, less than 25 retouched tools and with a predominance of a particular tool category; this type is interpreted as an extraction camp. The second type is similar to type 1 but lacks the predominance of a specific tool category; it is interpreted as a base camp. The medium-sized sites of types 3 and 4 have an elongated, oval shape, are 5-10m in length and 4-8 m wide and cover an area of 30-100 m^2. The short-term base camp, type 3, has between 1,500 and 2,500 artefacts, while long-term base camp type 4 has 2,500-10,000 artefacts. Type 5 is considered an aggregation camp with a surface area of some 300 m^2 (Price 1978, 89-91).

Given the limitations of the data set, the studies by Newell and Price seem to reach the highest possible level of interpretation. Certainly, the use of their models is problematical because of the possibility of re-use of site locations. While in both classifications the specific site types are distinct, one may wonder whether the larger sites are not palimpsests of indistinguishable phases of occupation, as reflected in the smaller site types, instead of truly different types of settlement, as suggested by both Newell and Price. Price mentions that "the majority of the values [used in the analysis] are remarkably similar" (1978, 97). It appears that the number of artefacts and the size of the scatters are the principal variables in the distinction between his types 2, 3, 4 and 5 (Price 1978, table 1). Verhart and Groenendijk (in press) point out that "an increase in the size of a site may indeed be the result of an increase in the size of the group camping there but it may also reflect a longer period of use by one and the same group", a problem which cannot be easily dismissed. Nevertheless, the distinction between the specialised tool spectra of Price type 1 sites and the generalised tool spectra of his other site types may indeed reflect a difference in site function.

It is the uncertain interpretation of flint scatters in terms of settlement systems that leads many archaeologists to explicitly incorporate ethnographic data into their analyses. For the Mesolithic of the Atlantic period in northwestern Europe, especially the American Northwest Coast and Californian Indians, the Bering Strait and north Alaskan Inuit and the Japanese Ainu are frequently presented as sources for analogies (Odell 1980, 54; Rowley-Conwy 1983, 112). According to Rowley-Conwy, these societies occupy environments where "several species of migratory mammals, birds and fish appear in places closely adjacent to one another-but at different times of the year" (1983, 112), as did the people of the Ertebølle Culture. The serial exploitation of seasonal resources allows a sedentary lifestyle (and the emergence of social complexity; section 5.2.3) (Rowley-Conwy 1983). It appears that this analogy is persuasive. The interpretation of the larger and denser flint scatters of especially the Late Mesolithic in the western part of the North European Plain as the reflection of a more sedentary lifestyle (Newell 1973, 409; Price 1981b, 222) may spring from presummed similarities to the subsistence base of the Danish Late Mesolithic (Newell 1973, 409, 410; Price 1981b). In other words, one might be inclined to interpret the large flint scatters of the Late Mesolithic of the

western part of the North European Plain in similar terms as the Danish evidence, in which the keywords are sedentism and complexity.
I would suggest that this picture is somewhat premature. As stated above, there are no data on the subsistence base of the Late Mesolithic in the western part of the North European Plain. It therefore remains difficult to determine the degree of sedentism or seasonality. My first argument against the archaeological analogy with the Danish situation in particular is that the subsequent Swifterbant Culture probably was fairly mobile in character (section 3.8.4.3). Since the introduction of crop cultivation may have operated as a factor promoting sedentarity, the Late Mesolithic population of this area probably is likely to have been at least equally mobile. Secondly, the higher density of flint tools and the larger size of the Late Mesolithic sites is certainly not only explicable by increasing sedentarity; the effect of re-use of a site location has to be taken into account as well. In other words, the Late Mesolithic occupation of the western part of the North European Plain may well have been of a more mobile character than that of Denmark (Verhart in prep.) (see section 5.2.3). Thirdly, the Late Mesolithic sites in the study area may be typified as inland sites, in contrast to the Danish sites which are oriented on the coast. The lower density of biomass in the inland environment may have prevented the sedentarity marking the Danish coastal sites (pers. comm. A. van Gijn 1998).

4.1.5 FROM THE LATE MESOLITHIC TO THE EARLY SWIFTERBANT CULTURE

That the roots of the Swifterbant Culture lie in the Late Mesolithic of the study area is beyond dispute (Deckers 1982, 35-38; Louwe Kooijmans 1993a, 128-129). This continuity is most apparent at Swifterbant. The river-dune sites S11-13, S21-24 and S61 were occupied both during one or more stages of the Mesolithic and during the subsequent period of the Swifterbant Culture (section 3.2).
A continuity in flint technology and typology is easiest to attest. According to Deckers, there are "few noticeable differences in the basic material" (1982, 37). The use of both blade and flake technology seems characteristic for both the Mesolithic and Neolithic assemblages at Swifterbant (Deckers 1982, table 1), while the same sources of raw material were used. Nevertheless, some changes are found as well: blade cores become less frequent, while *pièces esquillées* appear in larger numbers. The tool spectra also reveal continuity, including the major point type, the trapeze. Differences between the Late Mesolithic and Neolithic assemblages are the absence of Mesolithic point types and the appearance of blades with gloss in the Neolithic assemblages (Deckers 1982, 37-38).
On a general level, site locations seem to differ dramatically: the sites of the Swifterbant Culture are as a rule located in wetland areas, while the Mesolithic flint scatters are found in the uplands. In section 3.7.3, it was argued that the absence of sites of the Swifterbant Culture in the uplands may be the result of taphonomic processes, while the typical Swifterbant point type, the trapeze, is indistinguishable from Late Mesolithic ones. At the same time, the absence of Mesolithic sites in the wetlands may be explained by the fact that since Mesolithic times, thick deposits were formed effectively obscuring all traces, excluding specific circumstances such as at Swifterbant. In other words: although Late Mesolithic and Swifterbant sites are generally found in different parts of the study area, it may well be that no shift in site location occurred and that the differences are entirely the result of taphonomic processes. The sites of the Swifterbant cluster may indicate that comparable natural environments were exploited both in Late Mesolithic times and during the period of the Swifterbant Culture.
The continuity in flint technology and typology, and site location is straightforward in comparison to the development in subsistence strategies. Owing to the lack of information on the Late Mesolithic subsistence base in the study area (see above), one can only surmise that the extended broad spectrum economy typical of the Swifterbant Culture (section 3.8.3) is an extension of a broad spectrum economy in the Late Mesolithic. In a similar perspective, the proposed mobility strategies of the Middle Phase of the Swifterbant Culture may operate as a model for the mobility system of the Late Mesolithic. On the basis of the proposed residential mobility of the Swifterbant Culture, a similar high mobility may be presumed for the Late Mesolithic. The drawback of such a teleological perspective is that a Late Mesolithic subsistence base and mobility strategy inferred from the Middle Phase of the Swifterbant Culture allows no discontinuities other than the introduction of domesticates. Therefore a critical view leads to the conclusion that only the flint technology and typology (and in some instances also the location of sites), provide evidence of continuity from the Late Mesolithic to the Swifterbant Culture.

4.2 5300-4900 BC: The *Linearbandkeramik* Culture

4.2.1 INTRODUCTION

From around 5300 BC onwards, the Mesolithic population of northwestern Europe was confronted with the *Bandkeramik* Culture (LBK). After an initial phase restricted to western Hungary, northern and eastern Austria, Slovakia, the Czech Republic and southern and central Germany (Lüning *et al*. 1989, fig. 1) (*älteste Bandkeramik*, Modderman phase Ia), the LBK expanded into northwestern Europe (phase Ib) and further west into Hainault (phase IIa; Constantin 1985, 54) and the Paris Basin. Traditionally, this expansion is interpreted as a process of colonisation (for example: Alexander 1978, 19; Ammerman/Cavalli-Sforza 1973; Gronenborn 1994, 145;

Lüning *et al*. 1989). Arguments in favour of colonisation are found in the near-absence of Late Mesolithic sites on the loess, the homogeneity of LBK material culture and the differences in material culture and subsistence base between the indigenous Mesolithic communities and the LBK newcomers.
In a contrasting view, this colonisation model is challenged, while at the same time the role of the Mesolithic population is emphasised. In this view, colonisation is rejected on the basis of 1) the low population density in the Hungarian Plain which does not allow enough population pressure for the swift and large-scale expansion of the LBK, 2) the diverse locations of newly founded settlements, of which some are not suited for the agricultural practice of the supposed colonists and 3) the diversity in subsistence strategies as reflected in the mammal bone spectra: the high proportions of wild mammals at some sites again seem inappropriate for agriculturalists. These arguments are placed beside two arguments which support the Mesolithic basis underlying the LBK. First, analysis of human remains reveals strong differences among LBK populations, unaccounted for if the LBK population derived from one common source. If Mesolithic stock contributed to the LBK populations, the observed variability may reflect differences already present in the pre-LBK populations of the areas involved (Dennel 1985, 127; Modderman 1988, 128-129; Whittle 1996, 150-152). A second reason to assume a Mesolithic contribution in the creation of the LBK is found in the flint technology and typology (Gronenborn 1994, 146 and Tillmann 1993, 176 for *älteste Bandkeramik*; Newell 1970a; 1973 for Dutch LBK (phase 1b)), an interpretation often dismissed (Louwe Kooijmans 1976a, 236; Whittle 1996, 152 note 25). A third argument is Whittle's proposal of a mobile LBK society in which the settlements are the foci of mobility strategies rather than permanent habitations (1996, 160-162). While archaeological data certainly allow such a conclusion, Whittle's construction of a mobile LBK society is certainly based on his assumption of Mesolithic roots of the LBK, rather than vice versa. As such, this argument is of a rhetorical nature.
On the basis of archaeological data alone, it remains difficult to choose between stressing the contribution of Late Mesolithic populations to the constitution of the LBK and the arguments in favour of colonisation. It is for this reason that I think that both archaeological observations should be taken into account in explanating the origins of the LBK: the cultural roots of the LBK are found in the southeast, while at the same time the Mesolithic populations of central Europe did not vanish into thin air. This suggests that the swift and large-scale expansion of the LBK was made possible by both population expansion and Mesolithic influx (cf. Dennel 1985, 127). Whatever the scenario, from around 5300 BC onwards a stable 'frontier' situation evolved in which LBK and Mesolithic groups lived side-by-side.

4.2.2 THE *LINEARBANDKERAMIK* CULTURE

In northwestern Europe, the LBK period is dated between around 5300 and 4900 BC (Breunig 1987, 133; Lanting/Mook 1977, 42). While the Hinkelstein Group is a late LBK stylistic development in the German Upper Rhine area and as such generally seen as a part of the LBK, the subsequent Grossgartach Group, which is found in the same area, is often presented as a separate entity (e.g., Dohrn-Ihmig 1983, 6). Both the clear stylistic similarities between the LBK and Grossgartach material culture and the occurrence of Grossgartach and LBK material together in late LBK features (Stehli 1974) suggest that the Grossgartach Group may be regarded as a stylistic derivative of the primary LBK tradition. Both the Hinkelstein and Grossgartach Groups are here included in the discussion of the LBK. The primary Neolithic of the LBK was eventually replaced over a large area by the second stage of the Central European Neolithic, the Rössen Culture (section 4.3).
LBK house plans are known in large numbers from many sites. Modderman's 1970 classification of the Dutch plans may be termed classic. He distinguishes three parts: a northwestern part bordered by a foundation trench that held a plank wall, a middle part and a southeastern part typified by the paired postholes within the plan. The rectangular house plans are further subdivided lengthwise by rows of three posts. On the basis of these elements, three types of plan are distinguished: small houses with only a middle part (*Kleinbauten*; type 3), houses with a middle and a northwestern part (*Bauten*; type 2) and longhouses which also include a southeastern part (*Grossbauten*; type 1). While only the northwestern part of a type 1b plan is bordered by a ditch, a type 1a plan is a longhouse entirely surrounded by a trench. The length of the houses depended upon the number of constituent elements and ranged between 10 and 36 m. Of course, the identification of northwestern and southeastern parts indicates that LBK houses had similar orientations.
LBK settlement sites are composed of a varying, small number of contemporary houses (Modderman 1970, 100-120). In some cases, the occupation history seems to start with the construction of a single longhouse in a 'pioneer phase', followed by three or four longhouses. In the subsequent phases, shorter houses appear to become increasingly common (Modderman 1988, 98-99). Apart from these settlement sites, enclosures in the form of causewayed ditches and palisades are known from various sites. In most cases, the enclosures did not surround a settlement but were located near the settled area. In those few instances where a settlement was located within the enclosure, a defensive interpretation may be proposed (Keeley/Cahen 1989; Modderman 1988, 103; Price *et al*. 1995, 100). Other interpretations suggest their use as corrals (Modderman 1988, 102) or foci of communal activities (Whittle 1996, 176). In any case, the LBK

enclosures started a tradition of enclosed areas which lasted for centuries (sections 4.3.2 and 4.4.2). The general image of LBK settlement systems is one of settlement clusters in which a series of settlements consisting of a small number of houses, are located on the loess plateaus bordering the river valleys (*cf*. Bogucki 1988, 72).

The *Linearbandkeramik* is named after its pottery, which is often decorated with linear designs on the body surface. The decorated ware is thin-walled and as a rule not tempered. By contrast, the undecorated pottery is often tempered with sand, grit or grog. Pottery forms include round-bellied flasks and pots with short necks, but mostly comprise a variety of bowls. Besides these general forms, there are flat-based beakers and bowls with a foot. Lugs (horizontally and vertically perforated) and knobs are found at the point of maximum circumference. The wide variety in decorative motifs allows a detailed typochronological analysis. This is based on rim decoration consisting of horizontal groove-lines and/or rows of impressions and body decoration in the form of bands incised with denticulated or simple spatulas. The area outside these bands is sometimes filled in with secondary motifs (Modderman 1988, 111-113; Stehli in Farrugia *et al*. 1973).

The flint material from the Graetheide and neighbouring Aldenhoven settlement clusters is based on a variety of raw-material sources, of which Rijckholt-Rullen is the most common category. Other flint types include terrace flint, Light-grey Belgian and Vetschauer flint (De Grooth 1994, 32, 34; Newell 1970a, 145; Löhr/Zimmermann/Hahn in Kuper *et al*. 1977, 154-160, table 51). The raw material is worked in both blade and flake technology, of which blade technology is the more common. The tool list includes blade and flake scrapers, side scrapers, borers, burins, *pièces esquillées,* macrolithic tools (Farrugia in Farrugia *et al*. 1973; Löhr/Zimmermann/Hahn in Kuper *et al*. 1977, 216-250; Newell 1970a, 148-159) and various point types: triangular points with a straight or concave base and scalene points (LBK points) (Newell 1970, 148-151; Zimmermann 1977, tables 73-86). These are accompanied by high, middle-high and low adzes, while perforated wedges appear during the Hinkelstein phase. Middle-high adzes are no longer in use during the Grossgartach phase (Modderman 1970, 184-191; section 3.7 and table 3.45).

The LBK practice of cultivation is relatively well-known. The staple crops are emmer wheat and einkorn. In some cases, naked barley is found as well. Another characteristic crop of the western LBK is poppyseed (Bakels 1991a, 280; Bakels/Zeiler in press). The location of the arable fields may be studied on the basis of the weeds that appear among the cereals and in the pollen diagrams. This reveals that the LBK fields were probably isolated and small, located on the loess plateaus, and surrounded by forest (Bakels 1988; Bakels/Zeiler in press). The richness of the loess soils probably allowed long-term cultivation of the same plots (Modderman 1970, 210-211). Given these characteristics, LBK crop cultivation may be typified as intensive horticulture. The Neolithic character of the LBK subsistence is not only reflected in the faunal remains, it is also supremely manifest in various mammal-bone spectra from settlement sites in which bones of domestic animals often constitute more than 90% of the total (Clason 1967, table 49). As a rule, bones of cattle are the most numerous, followed by sheep/goat and pig. This general picture is qualified by a number of sites which yielded considerably more bones of wild mammals: 22% of the bones from Müddersheim are of wild mammals (Stampfli 1965, fig. 26), 36% at Straubing (Ziegler 1989, table 1a) and up to 62% at Hienheim (Clason in Modderman 1977, table 28). Calculations of the required acreage for both crop cultivation and animal husbandry reveal that in some regions herding may have prompted the use of areas beyond the settled loess zone (Bakels 1982; Modderman 1988, 116-117). At the same time, this may explain (some of) the rare finds of LBK material outside the farmed area proper (see below).

4.2.3 CONTACT SITUATIONS

Introductory remarks

The advent of the *Linearbandkeramik* resulted in the co-existence of hunter-gatherers and farmers across large parts of Europe: the farmers in the loess zones and the hunter-gatherers beyond. Anthropological studies of such contact situations may provide an interpretative framework for archaeological data pertaining to this period; this will be presented in section 4.2.4.

The contacts between hunter-gatherers and farmers may have resulted in three different contact situations, all based on the static frontier concept (Alexander 1978; Dennel 1985, fig. 6.4). The first scenario is a closed frontier, in which there is no interaction between hunter-gatherers and farmers. This option may be dismissed on the basis of the various LBK tools found outside the loess area. A second possibility is that a parasitic open frontier existed in which theft of agricultural goods and farmers' possesions explains the LBK finds beyond the loess. In this perspective, the LBK settlements surrounded by palisades and deep ditches may reflect defensive structures against hostile actions by hunter-gatherers. The third scenario is that of a symbiotic open frontier. It may well be that both symbiotic and parasitic relations characterised the frontier situations: in some instances, hunter-gatherers may have acted hostilely against the LBK farmers, while at other moments they played various parts in the LBK social world. This last aspect is pursued here.

When it was realised in cultural anthropology that most (if not all) present day hunter-gatherers have neighboured and

interacted with farming communities for hundreds of years, they could no longer be seen as 'pristine' societies. This reinterpretation of hunter-gatherer communities is best-known as the 'revisionist debate'. This debate focuses on the impact of these contacts on the original character of the hunter-gatherer communities (a.o. Lee 1992; Stiles 1992). As a result of this attention for contact situations, a cascade of articles during the 1980s and 1990s has demonstrated the existence of long-term relations between hunter-gatherers and farmers in many parts of the world (see various articles in Leacock/Lee 1982, Schrire 1984 and others cited in this section). These studies not only focus on case studies, but also analyse these contact situations on a cross-cultural level. As a direct result of these new contact studies, the relevance of studying contemporary hunter-gatherer communities for understanding Pleistocene hunter-gatherers has been questioned. If the influence of farming neighbours on the present-day hunter-gatherers is strong and has a long time-depth, how can these hunter-gatherers be seen as analogous to Pleistocene hunter-gatherers who lived in a world without farmers? The provocative thought was ventilated that in some regions hunter-gatherer communities could only exist in relation to farming neighbours, and therefore did not exist prior to the establishment of farming in the area. This idea was developed for Borneo, were the lives of the Punan *secondary hunter-gatherers* were intimately interwoven with those of their farming neighbours and — through the coastal villages — even with the Chinese empires (Hoffman 1984). His conclusions are questioned by other researchers who stress the authentic character of the Punan hunter-gatherers (Spielman/Eder 1994, 319). A similar notion was developed by Headland, who claims that tropical rain forests were unsuited for habitation without access to farming produce: "while faunal resources are usually sufficient there, these may not provide sufficient lipids to supply the nutritional needs of humans in the absence of wild plant starches" (Headland/Reid 1989, 47). It is for this reason that Headland describes the tropical rain forest as a *green desert* (Headland 1987). *Secondary hunter-gatherers* and *green desert* are important notions in the study of present-day hunter-gatherer communities, inhibiting the use of these communities as examples of pristine societies in models for Pleistocene hunter-gatherers, but the concepts remain intriguing and of potential use for studies of later prehistory on relations between hunter-gatherers and farmers.

An important aspect of the use of anthropology-based parallels for the understanding of long-term relations between hunter-gatherers and farmers in the (archaeological) past is the time-depth involved. The large time-depths which are proposed for the contact situations between hunter-gatherers and farmers in the ethnographic present suggest that this is a rare occasion where the focus of anthropological research has a similar time-depth as archaeology in general. The long-term continuity in relations between hunter-gatherers and farmers which is attested in both anthropology and archaeology suggests that comparable relations between hunter-gatherers and farmers occurred in both the ethnographic and the archaeological past.

Contacts between hunter-gatherers and farmers

Knowledge about farming may have predated the actual intrusion of farming communities into the territories occupied by the hunter-gatherer communities. The long-distance contacts of the hunter-gatherer communiuies may have brought exciting news of strange people who built big houses, burned the forest, cultivated plants and kept animals. At a certain moment, during their seasonal round, the hunter-gatherers may have stumbled upon a village of these strange people who up till then were only known from the tales of far away. The contact situation starts here, outside the scope of both anthropology and archaeology. One may assume that in the oral history of the hunter-gatherer communities, the first contact and perhaps the idealised Eden-like situation preceding it featured prominently for a very long time. Although the first establishment of the contacts between the hunter-gatherers and farmers eludes anthropological and archaeological studies, the outcome of this development is available for research.

In the section above, it was mentioned that many articles have recently been published on this issue. At the same time, the number of documented contact situations between hunter-gatherers and small-scale farmers is limited. These include the San of the Kalahari Desert, the Efe of Zaire, the Okiek of Kenya, the Agta of the Phillipines and the Hill Pandaram of South Asia. The following account of contact situations is based on a similarly small number of ethnographic situations (Spielman/Eder 1994, 304). Although it is realised that the contacts between hunter-gatherers and farmers in emic perspective may not be dividable into subsistence and social aspects, a piecemeal etic presentation of distinct aspects is preferred here, following Spielman/Eder 1994. The subdivision is of course by no means a natural one but based on western notions in which the economic and social realms of everyday life have increasingly become separated. By contrast, this subdivision may be of little importance in the studied societies.

The contacts between hunter-gatherers and farmers may be of a diverse nature. They may encompass exchange of food, commodities and the use of labour for tasks in the farming cycle. The exchange of food items is centred on the exchange of game hunted by the hunter-gatherers for the farmers' garden produce (Spielman/Eder 1994, 304-305). In the more ecological-deterministic literature, this exchange is seen as a fulfilment of the biological needs of the humans

involved. These needs are met by "the exchange of non-domestic proteins produced by hunters for domestic carbohydrates produced by farmers" (Peterson 1978, 335). Of course, the *green desert* notion reasons along the same lines: without specific food categories available in large quantities, a human population does not survive. One could argue that in this perspective the other aspects of the exchange and the contacts in general, to be described below, are merely the cloak under which this biology-based mechanism is hidden. When it is realised that human societies are no mere biological organisms, one may question whether the nutritional aspect is the only or major reason for long-term exchange relations between hunter-gatherers and farming communities. It seems safe to assume that both nutritional and social aspects are important in such exchange relations.

Secondly, the other commodities that are exchanged are diverse. The forest produce collected by the hunter-gatherers may include honey, beeswax, resin, rattan, medicinal herbs, hides and ornaments made from ivory or bone. The items exchanged by the farming communities include metal or metal items, traps, cloth and clothing and cooking pots. The exchange of tobacco and dogs is also documented (Fewster 1994, 87-89; Gordon 1984, 207- 208; Headland/Reid 1989, 45; Knuttson 1969, 91; Spielman/Eder 1994, 305).

A third category of exchange is the incorporation of the labour of hunter-gatherers into the subsistence base of the farming community. These tasks are mostly of an auxiliary nature, performed by guides, porters, agricultural labourers or the herders of domestic stock, though in some instances the hunter-gatherers act as ritual specialists for farming populations (Peterson 1978, 342; Headland/Reid 1989, 48; Spielman/Eder 1994, 305-306). Not only will the hunter-gatherers have access to the farmers produce through these jobs, but they also gain an intimate knowledge of agricultural practice and the keeping of domestic animals. It is no wonder that some hunter-gatherers start cultivating crops for themselves and thus become small-scale farmers as well (Gordon 1984, 210; Headland/Reid 1989, 47; Peterson 1978, 339; section 3.8.4.2).

Long-term relations between hunter-gatherers and farmers are not limited to the exchange of goods, commodities and labour, but also include an exchange of knowledge and information. Interwoven with this exchange is a complex of social relations which lubricate the exchange, thus creating predictable behaviour and stability in this exchange. These social relations may be manifold, but all relate to rendering the behaviour of the other group's members predictable by incorporating their existence into one's own social structure. This incorporation may operate by means of fictive kinship systems, hereditary trade partnerships, or participation in ritual events (Peterson 1978, 342; Fewster 1994, 89). While these forms of incorporation are based on equality between the two communities, other forms of interaction suggest a more imbalanced relation: it is common that neighbouring hunter-gatherer and farmer groups speak the same language, but if this is not the case, it is the language of the farmers that is adopted by the hunter-gatherers and not *vice versa*. In intermarriage, a similar imbalance is observed when the farmer men do marry women from the hunter-gatherers, but the opposite seems rare (Spielman/Eder 1994, 306-311, but see Gordon 1984, 214). When all the aspects of social relations are taken together one could say that the "hunter-gatherers conform to the organisation and behavioral expectations of the villagers, rather than the reverse" (Spielman/Eder 1994, 307). This makes it clear that these imbalanced relations may be interpreted in terms of class relations, in which the hunter-gatherers are seen as slaves, serfs or clientage of the farmer population (Spielman/Eder 1994, 309).

The success of this incorporation of hunter-gatherers as a labour force into farmers' subsistence strategies is limited: if deemed necessary, the freedom of the forest is nearby. Moreover, the incorporation is only active for the length of the hunter-gatherers' stay in the farmers' villages (Quensel-von Kalben 1994, 345-346). For the rest of the time, the influence of the farmers over the hunter-gatherers is absent. The fact that the relations between these communities have large time-depths points to the failure of the farming communities to truly incorporate the hunter-gatherers: if these attempts at incorporation had been successful at any time in the past, the hunter-gatherers would have become an indistinguishable part of the farming communities and the hunter-gatherer-farmer relations observed today would not have existed (pers. comm. A.L. van Gijn 1996). To take this argument one step further, the proposed a-symmetric relations could be seen in an opposite manner, with the hunter-gatherers as the dominant party: whenever they deem it necessary, they can walk out and decamp to the forest.

Archaeological correlates

After this sketch of present-day contact situations, it is time to turn to archaeology: how may these observations be incorporated into the archaeological discourse? First, this excursion into anthropology allows an interpretation of stray finds of items of material culture (adzes, pottery) from the farming communities outside the territories occupied by them. On the basis of the ethnographic situations presented above, we may interpret these finds as the result of exchange relations between hunter-gatherer and farming communities. At the same time, the absence of finds attributable to hunter-gatherers in the farming settlements may be the result of the nature of the exchanged goods: the forest products are as a rule of perishable materials, while labour is of course invisible in the archaeological record.

Secondly, this survey of present-day contact situations informs us of the labour relations which may come about

when farming and foraging communities live side-by-side for many years. As a result of the incorporation of the hunter-gatherers' labour in the agricultural tasks and herding, they gain intimate knowledge of these new activities. Of course, this knowledge is an important step on the road to crop cultivation and herding by these hunter-gatherers; in other words: the incorporation of these new elements into their pre-existing mode of subsistence.
A more conceptual level on which this survey leaves important clues is one of attitudes. While the hunter-gatherers and farming communities may have fundamentally different origins and world views (see Louwe Kooijmans 1998) leading to exotic behaviour from the others' point of view, these long-term and intensive relations create a compatible social structure which effectively bridges this gap in attitudes. This enables long-term and stable relations between communities that originally were completely alien from each other.

4.2.4 ARCHAEOLOGICAL IMPLICATIONS

Introduction

While contact situations between hunter-gatherers and farmers are documented in the ethnographic present, one may wonder whether this insight into contact situations may be applied to the archaeological data on the period of the LBK. What archaeological evidence is there of contacts between people of the LBK and the hunter-gatherer communities of northwestern Europe? In general, this discussion focuses on two specific categories of pottery frequently found in LBK contexts (La Hoguette and Limburg ware) and on the interpretation of LBK material on Mesolithic sites, or, more generally, outside the loess zone occupied by LBK people.

La Hoguette pottery

While the type-site is located in Normandy, the finds largely stem from eastern France, Dutch and Belgian Limburg and western Germany (Lüning *et al*. 1989, fig. 1-2; Roussot-Larroque/Burnez 1992, map 1; Van Berg 1990, map 3). In the western part of the *älteste* LBK distribution, this ware is dated to Modderman's phases Ia and Ib, while in the Lower Rhine Basin (where LBK occupation began in phase Ib), it is absent in LBK assemblages. The La Hoguette pottery in this area is not found in association with LBK or other well-dated material (Gassel: Brounen/De Jong 1988; Sweikhuizen: Modderman 1987). This suggests that in these parts, La Hoguette predates the LBK. Hoguette pottery is absent in the LBK settlements of the Paris Basin (Constantin 1985, table 31; Lüning in Lüning *et al*. 1989, 382- 385; Van Berg 1990, 163).
Our knowledge of La Hoguette is restricted: house plans and subsistence are unknown, while flint tools are only known from Bavans (eastern France) and only in association with both Late Mesolithic and LBK artefacts (Aimé/Jeunesse 1986). This prohibits a definitive identification of these flint tools as part of the La Hoguette material expression. In other words, the La Hoguette phenomenon constitutes a specific class of pottery. This pottery is mainly tempered with shell and bone, but sand, grit and grog were also used as tempering agents. It is coil-built with N-joins. The pottery morphology is restricted to oviforms and bowls, with an interior thickening of the rim, knobs or horizontally perforated lugs and horizontal wavy ribs on the body as further morphological characteristics. Typical decoration of La Hoguette pottery consists of a series of horizontal allignements of small impressions on the ribs, bordered with lines of larger impressions. The ends of these motifs are accentuated by a lug, vertical groove or impression. Rim decoration consists of a small number of horizontal series of small spatula impressions. All impressions were made with spatulas with one or more points (Jeunesse 1986, 43; Kloos in Lüning *et al*. 1989, 371- 382; Roussot-Larroque/Burnez 1992, 131-133; Van Berg 1990, 163). A comparison with LBK pottery as described above reveals significant differences in technological, morphological and decorative characteristics, which has prompted the common opinion that the LBK people did not produce La Hoguette pottery (Lüning in Lüning *et al*. 1989, 360; Modderman 1987, 91-92; Van Berg 1987, 267-268).

La Hoguette and Swifterbant

Hogestijn and Peeters (1996, 112) suggest that La Hoguette pottery could be the source of the Swifterbant pottery style. Their arguments include the widespread occurrence of La Hoguette pottery beyond the loess zone and the similarities to Swifterbant pottery in point bases and bowls. To them, these arguments outweigh the morphological differences (the interior thickening of La Hoguette rims) and dissimilar decoration techniques and motifes. In my opinion, the observed similarities are of too general a nature, while the differences in tempering agents, decorative schemes and morphology seem too great to make La Hoguette pottery the stylistic ancestor of the Swifterbant pottery style. Moreover, the La Hoguette finds of Ede-Frankeneng (Schut 1988) and Gassel (Brounen/De Jong 1988)[1] are geographical outliers of a tradition which is concentrated in a region well south of the study area.

Limburg pottery

Like La Hoguette pottery, Limburg pottery is found both in LBK contexts and in scattered sites from the Paris Basin in the west, across Belgian and Dutch Limburg, into western Germany. Contrary to La Hoguette pottery, its geographical distribution does not include the area where *älteste* LBK is found (Lüning *et al*. 1989, fig. 1-2; Roussot-Larroque/Burnez 1992, map 1; Van Berg 1990, map 3). On the basis of its association with LBK finds, Limburg pottery is dated to the

entire LBK occupation span from Modderman phase Ib to IId (Lüning in Lüning *et al*. 1989, 382-385; Van Berg 1990, 163). Of course, the few isolated finds of Limburg pottery might predate the LBK occupation.
Limburg finds are restricted to pottery. It is tempered with bone, sand, grit or grog and coil-built with N-joins. Bowls are the dominant pottery form, and are accompanied by flasks and pots with short necks. Other morphological characteristics include interior thickening of rims, lugs (horizontally or vertically perforated) and knobs. Body decoration schemes seem to radiate from the base and subdivide the body into vertical zones filled in with various patterns. Rim decoration is carried out in a herring-bone design. Similarities to La Hoguette pottery are found in tempering agents, building technique and the presence of bowls and lugs, while the other, more specific characteristics of Limburg pottery are not reflected in La Hoguette pottery. Similar remarks can be made in relation to LBK pottery: tempering agents, pottery morphology (bowls, flasks and pots with short necks) and lugs are found in both Limburg and LBK pottery, while the differences in decoration schemes are especially striking. The differences between Limburg and LBK pottery in terms of technology, morphology and decoration schemes indicate that Limburg pottery was not produced by the LBK people (Constantin 1985, 139; Modderman 1970, 118; 1974; 1988, 125-127; Van Berg 1990, 175).

Discussion
Essentially, there are three possible explanations for La Hoguette and Limburg pottery. The first possibility is that it is special-purpose pottery produced by LBK people (Constantin 1985, 144). The stylistic links with Cardial pottery (Van Berg 1990, 167; Jeunesse 1987), the long distance between the type-site and the LBK settlement area and the absence of La Hoguette pottery in the eastern LBK suggest that this option may be discarded. A second scenario is that it was produced by other people influenced by (contacts with) the LBK (Modderman 1970, 118; 1988, 125-127). In this case, the contacts with the LBK are interpreted as crucial and the association of LBK with Limburg/La Hoguette pottery as typical. A third explanation is that it was produced quite independently from the LBK; the association appears significant only because site formation processes have restricted the preservation of Limburg/La Hoguette pottery outside LBK contexts (Constantin 1985, 185; Van Berg 1990, 148). While the first option is generally refuted, the choice between the two remaining alternatives depends on the value attached to both the differences and the similarities between Limburg/La Hoguette and LBK pottery (see below) and the importance attributed to the predominance of LBK associations over other La Hoguette/Limburg assemblages. In other words, what is the significance of the sites in which La Hoguette or Limburg pottery are found without LBK admixture?
The discussion starts with the differences and similarities between La Hoguette pottery and LBK pottery. One might suggest that La Hoguette pottery was produced by people who came into contact with LBK people. This style of pottery production spread further west into Normandy, leaving no traces. If pottery was an unknown phenomenon for the La Hoguette people prior to their contacts with LBK people, one might expect that in the adoption of the idea of pottery production, certain characteristics of LBK pottery might have been adopted as well. More specifically, the success of the transformation of soft clay into pottery is dependent upon technology: which components are needed for the fabric, how is a form built and how is the pottery fired? If La Hoguette pottery production was inspired by LBK potters, one would expect that many technological characteristics of LBK pottery to have been adopted. This is not the case. In my opinion, the differences between La Hoguette and LBK pottery technology indicate that an independent production of La Hoguette pottery is more likely. Moreover, the stylistic similarities to Cardial pottery suggest a western source of inspiration instead (Van Berg 1990, 167; Jeunesse 1987). If the differences between La Hoguette and LBK pottery are emphasised, a pre-LBK start of La Hoguette pottery could be possible.
To assess the possibility of a pre-LBK start of La Hoguette/Limburg, a small series of sites are presented over and over again Keeley 1992, 87-90; Price *et al*. 1995, 102; Van Berg 1990, 175). In the case of Bavans, the association of Late Mesolithic flint artefacts with La Hoguette and LBK pottery precludes an identification of pre-LBK pottery (Aimé/Jeunesse 1986). The Late Mesolithic flint artefacts found in a pit in the LBK settlement of Oleye are accompanied by bone-tempered sherds, which together with the lack of LBK finds in this pit is seen as an indication of a pre-LBK date for these finds (Keeley/Cahen 1989, 165). In my opinion, the featurelessness of these bone-tempered sherds is a warning that an interpretation with a far-reaching conclusion, such as the presence of pre-LBK pottery in northwestern Europe, should not be based on this assemblage. Weelde-Paardsdrank 4 (Huyge/Vermeersch 1982) presents a problematic association like that found in Melsele (see below). The association of Late Mesolithic flint artefacts, sherds tempered with grit, organic material and grog, and bones of domestic animals (cattle and pig) in a bioturbated layer of Weelde requires caution. Such problematic associations are best illustrated by Melsele (Van Berg *et al*. 1991; 1992; Van Roeyen/Van Berg 1989). The flint artefacts, bones of domestic cattle and pig (only burnt fragments) and sherds were — again — collected from a bioturbated layer. The Melsele pottery is tempered with grog, bone, haematite, grit, flint and organic material

and is coil-built with N-joins. Morphological characteristics include vertical rims, *Tupfenleist*-like rims, round and flat bases and knobs. Decoration is carried out with a two-pointed spatula. The authors suggest that this pottery is similar to Limburg, La Hoguette, Blicquy – Villeneuve-Saint-Germain and Swifterbant pottery (Van Berg *et al*. 1992, 97). In my opinion, these finds should be divided into a set of Late Mesolithic flint artefacts and sets of considerably younger sherds dating from the period of the Blicquy Group and the Michelsberg Culture. Elements which might point to Blicquy pottery are the bone, grog and organic temper, the coil-building with N-joins, the round bases and the two-pointed spatula (section 4.3.4). Grog, grit, flint and organic material are all known as tempering agents from sites of the Michelsberg Culture in Belgium, while the *Tupfenleist* rims, horizontally perforated lugs and round and flat bases may also date to this period. The vertical rim is reminiscent of Hazendonk 3 pottery (sections 4.4.2 and 4.4.4). In other words, all pottery characteristics may be found in the period of the Blicquy Group and the Michelsberg Culture. In this interpretation, the domestic mammals are no longer problematic, while the ^{14}C date of 3780 BC (Price *et al*. 1995, 102) supports the idea that occupation did take place around the time suggested.

While the above sites present no definitive evidence of a pre-LBK start of either La Hoguette or Limburg, the absence of LBK-La Hoguette associations in the Lower Rhine Basin in combination with the presence of La Hoguette sites in this same area suggests that here La Hoguette may predate LBK (see above). On the basis of differences between La Hoguette and LBK pottery and the absence of associations in the Lower Rhine Basin LBK sites, a development of La Hoguette pottery production independently from LBK influences is probable. The position of Limburg pottery is less clear-cut (see below).

A model

In order to present a possible explanation for Limburg pottery, it is important to start from the specific geographical and chronological contexts in which La Hoguette and Limburg pottery occur. In the area of the *älteste* LBK, La Hoguette sherds are found in the first part of the LBK settlement history (phases Ia and Ib in Modderman's terminology), while Limburg pottery is absent. In the Lower Rhine Basin, La Hoguette is unknown from LBK associations, while Limburg and LBK pottery co-occur during the entire LBK period (phases Ib-IId). In Hainault and the Paris Basin, no La Hoguette pottery has been found, while Limburg pottery is present throughout the LBK period.

In the western part of the *älteste Bandkeramik*, La Hoguette pottery is sometimes found in LBK contexts as a result of contacts between LBK people and La Hoguette neighbours. Outside the LBK sites, La Hoguette finds are scarce as a result of site formation processes: La Hoguette pottery discarded on the surface would have weathered and disappeared long ago. At the time of the subsequent expansion of the LBK into the Lower Rhine Basin (phase Ib), a second pottery style was created, similar to La Hoguette in technology but with a distinctly different style: Limburg pottery. The technological similarities suggest that the La Hoguette and Limburg pottery styles may have been produced by a single group or by related groups. Apparently, pottery in La Hoguette style no longer fulfilled the (social) purposes that were required in this contact situation. This change in pottery style might suggest that the contacts between LBK people and the makers of La Hoguette/Limburg pottery changed as well. Because most of the La Hoguette and Limburg pottery is known from LBK discard contexts, it remains difficult to specify these relations. One might suggest that since the pots were discarded in LBK settlements, at least the final stage in the life of these artefacts took place there. If it was not the pot in itself that was important, but its content, one might suggest that forest products like those mentioned in section 4.2.3 were exchanged. Another possible commodity exchanged in the pottery is poppyseed, a species which is restricted to the western part of the LBK distribution, like La Hoguette and Limburg pottery. Later, the LBK extended into Hainault and the Paris Basin. The absence of La Hoguette and presence of Limburg pottery in the LBK sites of this area may be explained by the fact that LBK occupation started there after the replacement of the La Hoguette style by the Limburg style. In other words, while La Hoguette pottery probably had an origin independent from the LBK, the effect of contacts with LBK people in the creation of the Limburg pottery style cannot be ruled out. To complicate matters, it may be that Mesolithic populations participated in the LBK, so it may be that (segments of) different Mesolithic groups acted in different ways: some may have contributed in the creation of the LBK, while others held out against this creation, as is reflected in the continued production of a distinct pottery style, La Hoguette. The Limburg pottery style was possibly created in as a result of the interplay of LBK and La Hoguette people.

Contacts

Above, it was proposed that Limburg pottery may be seen as resultant of the contacts between LBK and other people in northwestern Europe. These contacts are also reflected in the frequent finds of LBK material in Late Mesolithic sites. Van der Graaf's research yielded a substantial number of such associations in her study area of the eastern part of North-Brabant and the north of Dutch Limburg (1987), but it remains problematic to determine the significance of these associations. As a rule, these associations are surface scatters which combine Late Mesolithic and LBK material culture

characteristics. Nevertheless, these sparse and inconclusive reflections of contacts between LBK and the other inhabitants of northwestern Europe may be seen as indicative of a broad spectrum of contact situations, as suggested above. The lack of organic remains from these sites prevents an identification of the subsistence base for these groups. One might argue that the adoption of domesticates started in this period, as reflected in the finds of domestic mammal bones from Weelde-Paardsdrank and Melsele. In my opinion, the problematic association of these bones with the Late Mesolithic flint artefacts prohibits such an interpretation. Moreover, the wetland data from the early phase of the Swifterbant Culture (4900-4600 BC) suggest that crop cultivation and animal husbandry had were not yet adopted before 4600 BC, which makes it doubtful that the Neolithic subsistence base was already acquired during LBK times. On the other hand, widespread knowledge of such subsistence activities may be assumed on the basis of the above-mentioned ethnographic analysis. The effects of the long-term contact situation on the subsistence strategies of the people of the western part of the North European Plain remain invisible until the period of the Rössen Culture, as will be discussed in the next section.

4.3 4900-4400 BC: The Rössen Culture and the Bischheim and Blicquy Groups

4.3.1 INTRODUCTION

The second phase of the Central European Neolithic starts with the Rössen Culture. Although the people of the Rössen Culture did not expand significantly beyond the loess soils already occupied by their LBK ancestors, their influence on their Mesolithic neighbours living in northwestern Europe appears to have been larger. It is this influence which is the topic of this section.
The Rössen Culture is chronologically restricted to the period between 4900 and 4350 BC (Breunig 1987, 39), while its manifestations are concentrated in a core area encompassing the loess areas of southern and western Germany (Eckert 1986, fig. 17; Stroh 1938, maps 1-2). The Bischheim Group constitutes the final phase of the Rössen Culture in its northwestern distribution (Eckert 1986, fig. 17; Lüning 1969, map 2) and spreads onto the border of the Pleistocene sands beyond (Ven-Zelderheide, Verscharen/Mooren 1993). The first phase of the subsequent Michelsberg Culture is dated between 4460 and 4350 BC (Breunig 1987, fig. 41) and therefore overlaps with the final part of the Rössen Culture. The intermediate position of Bischheim material-culture characteristics between Rössen and Michelsberg suggests that that the Bischheim phase is to be dated in the century between 4450 and 4350 BC.
The dating of the Blicquy Group is even less certain. The finds are almost entirely restricted to a small area in Hainault where the remains are found in a LBK settlement cluster. This spatial correlation might be interpreted as showing that Blicquy material culture was contemporary with LBK in a role similar to that of La Hoguette and Limburg pottery (Cahen/Docquier 1985, 113; Modderman 1988, 125; Roussot-Larroque/Burnez 1992, 133; Van Berg 1990, 167; Van Berg *et al*. 1982, 7, 31). This interpretation is supported by various ^{14}C dates (Constantin 1985, 316). An alternative interpretation is presented by Constantin and followed here. He states that the co-occurrence of Blicquy and LBK finds on these sites but not in closed association suggests that the Blicquy and LBK occupations were not contemporaneous. Moreover, Blicquy pottery reveals stylistic similarities with especially of the youngest LBK pottery, suggesting that the Blicquy occupation should be dated after the LBK habitation. A number of ^{14}C dates may be brought forth to underpin this interpretation (Constantin 1985, 199; Farrugia *et al*. 1982, 132).

4.3.2 THE RÖSSEN CULTURE

The vast excavations in the German Rhineland revealed that the house plans of the Rössen Culture are a continuation of the LBK tradition combined with distinct Rössen traits. The longhouse tradition with a northwest-southeast orientation and subdivision by transverse rows of three posts is combined with a trapezoid ground plan with convex sides. During the Rössen period, the southeastern end gradually widens, while the northwestern end becomes progressively narrower, resulting in a more clearly trapezoid ground plan. While most settlement sites are enclosed by a palisade, others are not. In the case of the two palisaded settlements in the German Lower Rhine area (Langweiler 12 and Hambach 260), both sites were replaced by enclosures without houses. The settlements of the Rössen Culture comprised both single farms and small hamlets (Dohrn-Ihmig 1983, 18-44).
The pottery of the Rössen Culture is often richly decorated and morphologically diverse, which certainly has stimulated the research interest. While research into its technological characteristics has been limited, our knowledge of pottery forms, decoration patterns and techniques is considerably more detailed. Grote's article on the settlement site of Exberg is rare in its discussion of tempering agents. The Exberg pottery may be divided into a group of thin-walled ware which is decorated and in which temper is absent or consists of some sand. Lugs are absent. Besides this small group (15%) of fine ware, the bulk is thick-walled, undecorated and tempered with sand and grit. In this group, lugs and knobs are found (Grote 1989, 57-63). On the basis of pottery morphology and decoration, the Rössen Culture may be divided into an early phase (Rössen I) and a late phase (Rössen II). The stylistic link with the subsequent Bischheim Group has resulted in the correlation of Bischheim with

Rössen III (see discussion in Zeeb 1994). The Rössen I pottery is characterised by a wide spectrum of pottery forms: round-based carinated beakers, round-based beakers and large pots with knobs, beakers with a foot, rectangular dishes, flat-based and round-based conical pots and wide-mouthed pots with lugs. Other pottery forms are shared with Rössen II: flasks, dishes and dishes with a foot. New pottery forms of the Rössen II phase are round-based beakers and large pots, and sieves. The Rössen I pottery is decorated in a dense (*Teppichmuster*), horizontally arranged pattern of paired impressions (*Doppelstich*) or grooves. Rössen II pottery is decorated with series of paired impressions around the maximum belly diameter or neck, with sometimes triangular, zig-zag or horizontal (*Metopen*) fields or vertical lines of stab-drag impressions (*Furchenstichlinien*) added. Rim decoration on both Rössen I and II pottery is restricted to a series of spatula impressions on the top (*Randkerbung*), while knobs and horizontally perforated lugs may be decorated with a series of impressions (Dohrn-Ihmig 1983, 7-17; Stroh 1938).

The Rössen flint technology is based on various types of raw material. In the Rhineland, Rijckholt-like flint (*Maas-Feuerstein*) predominates and is accompanied by Rullen and Obourg (Zevenwegen?) flint types (Dohrn-Ihmig 1983, 46), while Exberg, which is located some 50 km from the nearest moraines, exclusively yielded erratic flint (Grote 1989). The flint is worked in both blade and flake technology, of which, judging from the depicted tools, blade technology seems to have been preferred for the production of modified artefacts. Tools comprise various scrapers on both blades and flakes, burins, blade borers and pointed blades, triangular points, trapezes and transverse arrowheads (Dohrn-Ihmig 1983, 46-48, fig. 25; Grote 1989, 52-55, figs 7-9; Lichardus 1976, 31-36, figs 7; Stroh 1938, 73-78, figs 16-20). These are accompanied by high and low adzes, perforated wedges, and high perforated adzes and stone axes with oval or round cross-sections (table 3.45).

The few mammal bone spectra from settlement sites of the Rössen Culture and Bischheim Group indicate that wild and domestic animals were consumed in varying proportions. While the mammal bone spectrum from Schernau (Bischheim Group) is dominated by wild mammals (78%), the wild/domestic ratio at Hienheim (Rössen) is 48:52. The Flemsdorf (Rössen) spectrum features 99% domestic animals. The principal domestic species are also different: Hienheim is dominated by pig and Flemsdorf by cattle, while at Schernau cattle and pig are equally common. Bones of sheep/goat are also found, but in smaller numbers (Clason in Modderman 1977; Gehasse 1995, table 9.1; Nobis 1983, 160-162, table 38; Teichert 1974). While the practice of working small and permanent fields, typical for the LBK, continued, the spectrum of cultivated cereals expanded: besides emmer wheat and einkorn, naked wheat and naked barley frequently appear (Bakels 1990; 1991a; 1991b; Bakels/Zeiler in press).

4.3.3 THE BISCHHEIM GROUP

The two house plans from Schernau (Lüning 1981) are a first indication of the intermediary position of the Bischheim Group in relation to the Rössen and Michelsberg Cultures. This is evident from the ground plans: the first (Stelle 21) is trapezoid, while the second (Stelle 77) is rectangular and the first indication of a new building tradition (see section 4.4.2). The clear differences in the layout of the ground plans is combined with strong similarities, as both house plans are constructed on levelled ground in a similar orientation (northwest-southeast) and are similar in size (13.2m × 4.4/5.5m and 14.9m × 6.8m respectively). As both house plans date to the Bischheim period, it is impossible to determine whether they were occupied consecutively or simultaneously.

Bischheim pottery is often tempered with grit and is coil-built. N-joins seem to predominate. The pottery morphology encompasses round-based and flat-based beakers, biconical beakers, flasks and dishes. It is less often decorated than Rössen pottery (around 7%). The decoration repertoire comprises a series of paired impressions on the shoulder, sometimes extended with 'hanging' vertical, zig-zag or wavy lines, or triangular fields of stab-drag impressions. Other pottery is decorated with a series of fingertip impressions on the shoulder. *Randkerbung* is the only form of rim decoration. Knobs and horizontally perforated lugs complete the list of decorative elements (Lüning 1969, 14-19; 1969/1970, table 3; 1981, 125-131; Lüning *et al*. 1971, 70-75, table 9). The sparse information about the flint industry of the Bischheim Group suggests that the above description of the flint artefacts of the Rössen Culture still seems to apply. New elements are flint axes and nosed blade scrapers (Dohrn-Ihmig 1983, 48; Lüning 1969/1970, 43; Lüning *et al*. 1971, 75, fig. 13).

The Bischheim Group appears to be a crucial link in the chain of the Neolithic tradition in western Europe. While in many repects it may be seen as a continuation of the *Bandkeramik*-Rössen tradition, some of the crucial differences between the Rössen and Michelsberg Cultures seem to have taken shape in the Bischheim Group. The continuity of the Rössen tradition is clear in the trapezoid house plan of Schernau, the pottery technology, morphology and decoration (both techniques and designs), and flint artefacts. At the same time, the rectangular house plan from Schernau and polished flint axes are indicative of the new traditions. In this light, the intermediate position of Bischheim pottery between Rössen II and early Michelsberg pottery may be interpreted as a line of continuity across a divide in other aspects of society.

4.3.4 THE BLICQUY GROUP

The few excavated Blicquy house plans reveal their position in the LBK building tradition. The house plans are rectangular or somewhat trapezoid with a maximum length of some 30 m. Owing to the limited scale of the excavations, the lay-out of the settlement is unknown (Constantin 1985, 148-149).
The pottery is mainly tempered with bone, but also with grog and organic material. The quartz which is found in a minority of the sherds probably was naturally present in the clay. In a small number of the sherds (8%), coil-building with N-joins was observed. Pottery morphology is varied but consistently displays round bases. It may be typified as (small and large) bowls, pots with short necks and flasks (Constantin 1985, tables 49-56). Rim decoration consists of one or two series of (vertical or oblique) spatula impressions on the outside or a series of impressions on the top (*Randkerbung*) or a series of dot-like appliques. Body decoration is more varied and may consist of allover fingertip impressions, series of spatula impressions which cover the surface in a free-flowing manner or are 'hanging' from a horizontal series of similar impressions, a herringbone motif restricted to a horizontal zone or covering the entire surface or, lastly, carelessly incised 'standing' triangles (Cahen/Docquier 1985, 100-102; Constantin 1985, 152-182; Farrugia *et al*. 1982, 109-121; Hazeur/Constantin 1993; Van Berg *et al*. 1982, 8-14).
Flint technology was based on both blade and flake technology, of which flake technology may have been the more frequently employed, judging by the recovered cores. The tool list comprises blade and flake scrapers, side scrapers, denticulated flakes, retouched blades, truncated blades, flake and blade borers, burins, macrolithic tools, flake axes and various point types. Scalene LBK-points predominate and are accompanied by a few irregular triangular points and transverse arrowheads (Cahen/Docquier 1985, 103-108; Caspar/Burnez-Lamotte 1994; Constantin 1985, 182-189; Farrugia *et al*. 1982, 121-128; Van Berg *et al*. 1982, 25-31).
The subsistence data are limited. The presence of einkorn is ascertained, while cattle and sheep/goat are also attested. Game includes aurochs, red deer and wild pig (Constantin 1985, 193).

4.3.5 A COMPARISON TO THE SWIFTERBANT CULTURE

Traditionally, the Swifterbant Culture has been interpreted as an extension of the north European Ertebølle Culture (see section 5.2.3). When this interpretation is abandoned (Ten Anscher *in prep*.; Raemaekers 1997), the logical source of inspiration for the newly evolving Swifterbant Culture is the Rössen Culture (*cf*. Ten Anscher *in prep*.) as it is during the period of the Rössen Culture that the incorporation of various new elements separated the Early Phase of the Swifterbant Culture from the preceding Late Mesolithic. To what extent are these new elements traceable to the Rössen Culture?
It is important to start with the realisation that the inhabitants of northwestern Europe maintained exchange relations which also incorporated people of the Rössen Culture. This is exemplified by the scatter of perforated wedges across the study area (fig. 3.35), the presence of long-distance raw materials at Hoge Vaart (section 3.6.3) and Brandwijk L30 (section 3.3.3), the occurrence of trapezes in both Swifterbant and Rössen contexts and several pots in Rössen style found in Swifterbant contexts. In our study area, such pottery finds include those from Hüde (section 3.5.5), Aalten (Schut 1981), Graethem (Bloemers 1972), Neer (Bloemers 1972), St. Odiliënberg (Bloemers 1972) and Groesbeek (Borst-Pauwels 1984).
Predictably, the social relations embodied by these documented contact situations enabled not only the transfer of goods (pottery) but also of ideas (and people?). First of all, the idea of pottery production probably derived from the people of the Rössen Culture, judging by the similarities between Swifterbant and Rössen pottery: grit temper, *Randkerbung*, the shoulder as a zone for decoration and round-bellied beakers are found in both contexts. Swifterbant pottery does not encompass the morphological diversity typical of Rössen pottery, which suggests that rather than a wholesale adoption of available templates, a selection was made (Ten Anscher in prep.). It is striking that this selection includes the more general characteristics of Rössen pottery, while the 'typical' Rössen decorative elaborateness was not adopted. This selective behaviour constitutes a purposeful re-constructing of the meaning of pottery: the Rössen connotation is avoided (no adoption of decorative schemes), while at the same time, the as yet limited knowledge of pottery production ensured a technological and morphological conservatism in which the Rössen derivation remains observable to archaeologists (etic; emblemic) but was probably not experienced as such by the people of the Swifterbant Culture (emic; isochrestic) (section 2.2).
A second aspect of these contacts between the people of the Swifterbant and Rössen Cultures might be the adoption of crop cultivation and animal husbandry, although this is difficult to attest. First of all, Bronneger (section 3.6.9) and Polderweg (section 3.6.2) did not yield any remains of domestic plants or animals. Secondly, the long occupation history of Hüde I (section 3.5), Hoge Vaart (section 3.6.3) and P14 (section 3.6.10) prevents the certain identification of pre-4400 BC cereal remains or bones from domestic animals. As a result, Brandwijk L30 constitutes the *terminus ante quem* for the introduction of domestic mammals (4610-4550 BC), while the earliest dates for crop cultivation are found in a later part of the middle phase of the Swifterbant Culture (4600-3900/3800 BC) (tables 3.48, 3.49 and fig. 5.1).

4.4 4400-3500 BC: The Michelsberg Culture and Hazendonk 3 Group

4.4.1 INTRODUCTION

The Michelsberg Culture constitutes a major part of the European Neolithic, first and foremost because its remains are found in large parts of Western Europe, from northern France, Belgium and the southernmost part of the Netherlands, through western, central and eastern Germany into Poland and the Czech Republic (Lüning 1967, appendix 6). Moreover, the Michelsberg Culture spans some 1000 years from around 4400 BC till 3500 BC (Lanting/Mook 1977, 60-64; Breunig 1987, 179-182). Not surprisingly, there are both chronological and geographical subdivisions of this immense space-time unit. While I. Scollar (1959) presented a geographical subdivision of the Michelsberg Culture, J. Lüning proposed a phasing of the Michelsberg culture into five phases (1967), which will be discussed below. The spatial subdivision yielded a large number of groups, of which the Rhenish *Hauptgruppe* is central in Lüning's chronological subdivision and constitutes the core of the Michelsberg Culture. Apart from the Rhineland Group, the Belgian Group is presented as well to serve as a point of reference for the Hazendonk 3 Group, to be defined below.

4.4.2 THE MICHELSBERG CULTURE

In comparison to the previous period, settlements of the Michelsberg Culture are less well known. The scant information suggests that the large house plans of the LBK and Rössen Cultures were replaced with small, rectangular plans with axial posts as documented in Koslar 10 (Boelicke *et al.*, 1981, 256) and St. Odiliënberg (Wansleeben/Verhart in Stoepker 1993) or small, irregular, aisled plans which are known from Thieussies (Vermeersch/Walter 1980). Wansleeben and Verhart suggest that this new building tradition is correlated with single house sites occupied for the duration of the building's life span and/or a number of soil-exhausting agricultural cycles (1990, 398-399). These settlements sites functioned alongside causewayed enclosures (e.g., Eckert 1986).

The pottery of the Michelsberg Culture encompasses a variety of morphological categories and numerous sub-types, extensively discussed by Lüning (1967). On the basis of this variety, he proposed a fivefold phasing of the Michelsberg Culture. On a more general level, Lüning's phases I and II constitute an early period (4460-3990 BC) of which phase I is not only contemporary with the Bischheim Group (section 4.3.3), but seems similar also in material culture. Lüning's phase III forms the middle period (4220-3780 BC), while phases IV and V make up the late period, of which phase-V sites are restricted to the Neckar area (3980-3360 BC; Lanting/Mook 1977, 82; Willms 1982, 51; Breunig 1987, fig. 41). The overlap in the dating of these periods suggests that there was a gradual development in pottery morphology rather than clear-cut breaks in the expressions of material culture. The pottery from the early period of the Michelsberg Culture is typified by the presence of articulated tulip beakers, wide beakers with short necks, articulated storage vessels and flasks with a high-positioned series of lugs. In the middle period, carinated and conical broad beakers were introduced, along with flasks with a low-positioned series of lugs and shoulderless beakers. The late period is characterised by the presence of narrow beakers without shoulders and flasks with a low-positioned, perforated ring (Willms 1982, 51). Other pottery elements occur throughout the Michelsberg Culture: these include clay discs and *Tupfenleist* rims (Lüning 1969, fig. 2). The pottery is tempered with grit (Lüning 1967, 13). Decoration is rare and consists of rows of impressions on shoulders or the outside of rims. The impressions are of nails or spatulas. Another type of rim decoration is called *Lochbuckel*: a series of impressions below the rim resulting in a corresponding series of small bulges on the inner side of the rim. A characteristic finishing technique is *Besenstrich* (Lüning 1967, 17). A comparison of the pottery of the Michelsberg Culture in Belgium with this general picture highlights the former's preference for flint as a tempering agent (organic, grit, grog and shell temper are also found). Typical early elements here are articulated tulip beakers; elements of the middle period include carinated and conical beakers, while no typical late pottery forms have been identified (Louwe Kooijmans 1980b, 183-184; Vermeersch 1987/1988, 3-4 and figs 4-5). Clay discs (Scollar 1959, fig. 1.3) and *Tupfenleist* rims (Scollar 1959, fig. 1.8c) are also present. The flint tool kit of the Michelsberg Culture comprises pointed blades, blade and flake scrapers, retouched blades and various projectile types (Lüning 1967, 70-73); triangular points (with concave or straight bases: Lüning 1967, table 14, 40-43), leaf-shaped points (Lüning 1967, table 15, 50) and drop-shaped points (Willms 1982, table 11, F145). Apart from these tools, various types of axe are found, of which stone axes with oval cross-sections are the most numerous. Other types include flint axes with oval cross-sections, stone axes with rectangular cross-sections and perforated wedges (table 3.45). The flint tools from the Michelsberg Culture in Belgium reveal a co-occurrence of blade and flake technology: there are blade and flake cores, borers and scrapers. These are complemented with flake burins, macrolithic tools, retouched blades and various projectile types (leaf-shaped and triangular points and transverse arrowheads). While both polished flint and stone axes with oval cross-sections are common, the typical axe type in Belgian Michelsberg is the flake axe (Vermeersch 1987/1988, 4-7).

The material expression of the Michelsberg Culture was not restricted to Michelsberg contexts, but apparently was also attractive to other communities, judging by the numerous

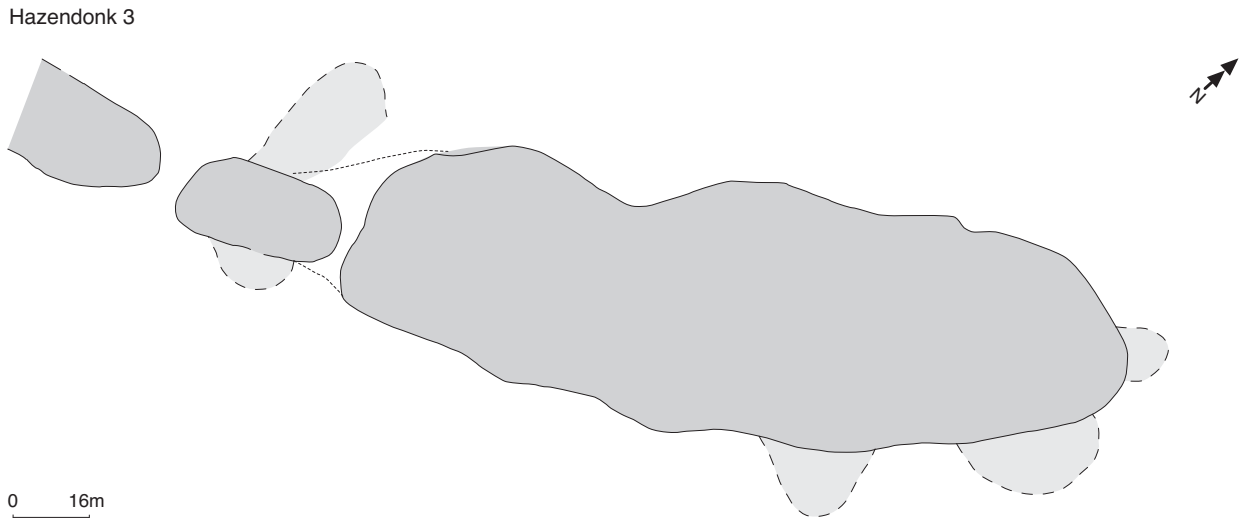


Fig. 4.1. Spatial distribution of the Hazendonk 3 occupation layer. Reproduced with kind permission of M. Verbruggen. Drawing P. de Jong.

occasions that Michelsberg material culture is found in non-Michelsberg contexts (see Ten Anscher (in prep.)). As a rule, it is difficult to distinguish locally-produced Michelsberg-style artefacts from artefacts acquired through exchange relations. In the absence of fabric analyses, the only exception may be the polished flint and stone axes and other flint artefacts of raw material sources located at a great distance from the Swifterbant sites, within Michelsberg territory.
In Swifterbant contexts, elements of Michelsberg material idiom are found in both pottery characteristics and flint tool types. In the Hazendonk 2 find layer, a tulip beaker, a storage vessel and a *Tupfenleist* rim are reminders of the Michelsberg material idiom (section 2.4.2), while in the various Brandwijk find layers, one rim fragment with *Lochbuckel* decoration and drop-shaped and leaf-shaped points may be seen in a similar light. In Hüde I, there are again *Tupfenleist* rims, while clay discs are also reported (section 3.5.5). The fragments of polished flint axes from S3, Brandwijk L50 base and L50 top, Hazendonk 2, Hüde I, Schokkerhaven and P14 (tables 3.10, 3.23, 3.25, 3.32 and sections 3.5.6, 3.6.4 and 3.6.10) are a further indication of the incorporation of Michelsberg material culture into Swifterbant society. The numerous stone axes with oval cross-sections in the western part of the North European Plain (fig. 3.36) make it clear that this entire area was involved in exchange networks reaching into the area of the Michelsberg Culture.
In Northern Europe, a similar situation occurred. Not only are stone axes with an oval cross-section widespread in Lower Saxony, but Michelsberg-style material culture is also found at various early Funnel Beaker Culture sites (*früheste Trichterbecher*, see section 4.5.1.2). From Hamburg-Boberg 15, these include pointed blades and a *Tupfenleist* rim (Schindler 1953, table III.23, IX.3); from Boberg 20, again pointed blades (Schindler 1961, fig. 5.4), see section 4.5.1.3. In Schleswig-Holstein, the Rosenhof site yielded Michelsberg-like pottery (Schwabedissen 1979, 2.8 and 2.10), while at Siggeneben-Süd a Michelsberg-style clay disc was recovered (Meurers-Balke 1983, fig. 35.13). On a more general level, the morphology of early Funnel Beaker clay discs seems to be identical to that of Michelsberg clay discs (Davidsen 1973), which again reflects the spread of Michelsberg material culture to non-Michelsberg contexts. The archaeological record in these areas suggests that the identification of material culture in Michelsberg style is primarily an identification of the period in which the material culture operated, rather than proof of the presence of people of the Michelsberg Culture.
A final characteristic of the Michelsberg Culture presented here, is the subsistence strategy as reflected in the bone spectra and macro remains. Five Michelsberg causewayed enclosures yielded bone refuse in which bones of domestic animals predominate (79-99%), especially cattle (46-68%), while sheep/goat (4-45%) and domestic pig (6-28%) are also common. Red deer (0-6%) and roe deer (0-3%) are the major wild species (Bergheim: Nobis 1968, table 1; Hetzenberg: Beier 1972, table 1; Maizy: Hachem 1989, 70; Salzkotten: Weinstock in Schyle 1997, table 39; Thieussies: Van Neer 1981, table 1). A comparison with the data on Mairy (Arbogast 1989, table 1) and other settlement sites reveals a

		Organic temper				*Grog temper*				*Grit temper*				*Total*
		0	1	2	3	0	1	2	3	0	1	2	3	
Number		143	102	225	46	426	30	28	31	40	140	121	215	516
Percentage		27.7	19.8	43.6	8.9	82.5	5.8	5.4	6.0	7.7	27.1	23.4	41.7	100
Weight (g)		2891	2142	4357	923	8362	535	533	883	763	3176	2325	4049	10313
Percentage		28.0	20.8	42.2	8.9	81.1	5.2	5.2	8.6	7.4	30.8	22.5	39.3	100
Average weight (g)		20.2	21.0	19.4	20.1	19.6	17.8	19.0	28.5	19.1	22.7	19.2	18.8	20.0
Average size of temper particles (mm)		–	–	–	–	–	2.6	2.6	3.4	–	2.3	3.1	3.5	–
Average wall thickness (mm)		8.6	9.5	8.5	8.4	8.8	8.6	8.1	8.7	7.9	8.6	8.7	9.0	8.7
Types of join:	H-joins	48	22	58	5	117	5	4	7	12	45	27	49	133
	N-joins	17	8	25	3	47	4	2	–	4	19	15	15	53
	Z-joins	1	1	–	–	2	–	–	–	–	–	–	2	2
Surface finish:	Uneven	76	63	146	36	256	20	20	25	30	107	84	100	321
	Roughened	47	24	46	4	111	4	3	3	3	11	21	86	121
	Smoothed	4	6	23	–	19	1	1	2	2	9	4	8	23
	Besenstrich	–	1	–	–	1	–	–	–	–	–	–	1	1
Body decoration:	Single fingertip	30	3	13	2	43	3	1	1	2	33	7	6	48
	Grooves	9	11	21	4	34	6	5	–	6	11	11	17	45
	Spatula	2	5	21	4	29	3	–	–	12	4	9	7	32
	Hollow spatula	–	–	3	3	4	–	2	–	–	4	2	–	6
Rim decoration:	Spatula	–	–	1	–	1	–	–	–	–	–	–	1	1

Table 4.1. Hazendonk 3. The characteristics of the pottery sample.

similar low percentage of bones from wild mammals (*id*., fig. 35). The cereal remains are varied and show that emmer wheat, einkorn, bread wheat and naked barley were cultivated (Bakels 1991a, table 2).

4.4.3 HAZENDONK 3 AT HAZENDONK

Introduction

The third occupation phase in the Hazendonk sequence, Hazendonk 3, produced debris in five areas adjoining the river dune: two areas on the western slope and three distinct areas on its southeastern and eastern flanks (fig. 4.1). The total surface of these areas is about 730 m^2, while the average thickness of the Hazendonk 3 layer is 6 cm (Verbruggen in prep.). The corresponding ^{14}C dates from Unit C are listed in appendix 3; the probable date of the Hazendonk 3 occupation is the reduced calendar age: 3670-3610 BC (Verbruggen 1992). This means that the hiatus between the Hazendonk 2 and Hazendonk 3 occupations is at least 130 years. During the Hazendonk 3 phase, the expansion of the lakes reached a maximum, at the expense of the alder-swamp forest. In this fluvio-lacustrine environment, small streams connected the lakes, thus creating a water-dominated environment (Van der Woude 1983: 88-90).

Pottery

The Hazendonk 3 sample yielded 516 sherds, weighing 10,313 gr. The characteristics of these sherds are listed in table 4.1. The table shows first of all that the number and weight percentages are very similar. Thus, the fragmentation of the pottery was not influenced by the amount and type of temper. Grit is present in 92% of the sherds, while organic material is also frequent: 72% of the sherds were tempered with this tempering agent. Grog was used as well: 19% of the sherds contained medium or large quantities of grog. Coil-building is visible in many sherds (36%). H-joins are most frequent (71%), but N-joins are also present (28%). The frequent fracture of the pottery on the joins is characteristic of this type of pottery: apparently the joining of the coils was done without much care (Louwe Kooijmans 1974, 150). Most sherds have an uneven surface (69%), others have a roughened (26%), or smoothed surface (5%). One sherd is finished with *Besenstrich*. Sherds with a roughened surface are more often tempered with grit and less often with grog or organic material, in comparison to the assemblage as a whole.

Rims are rarely decorated: only one out of 62 rim sherds is decorated (2%). This rim was decorated both on the top

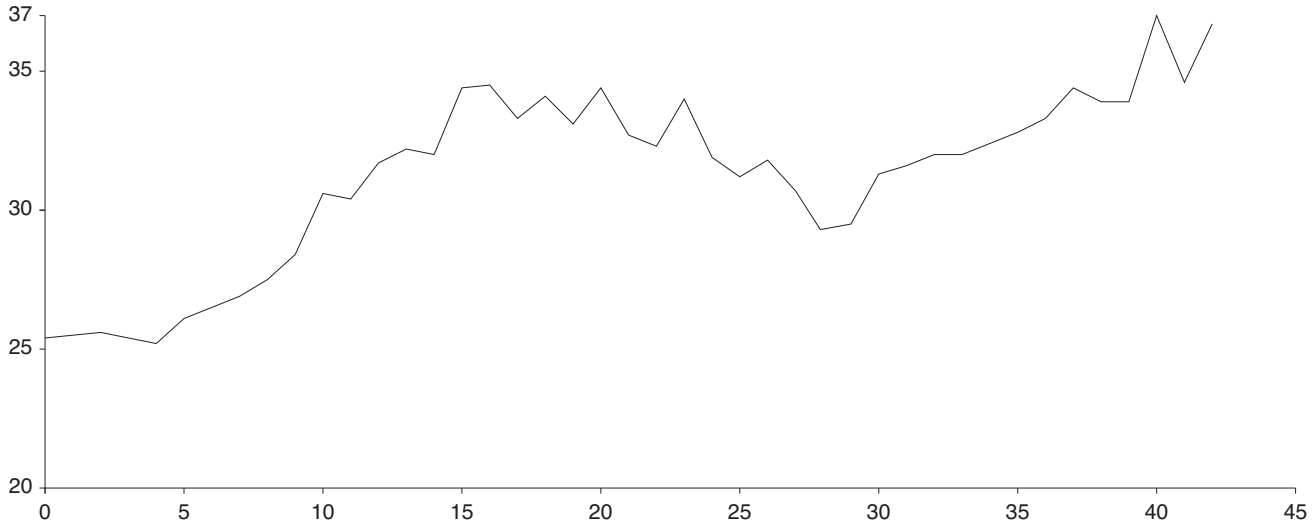


Fig. 4.2. Relation between minimal sherd size in gr. (horizontal) and decoration percentages (vertical) for Hazendonk 3. Drawing P. de Jong.

(with a row of incisions) and on the outside (with a single row of scratched impressions). By contrast, body decoration is very common: 131 sherds are decorated by various techniques (25%). A further analysis shows that the percentage of body decoration increases to about 30-35% when only large sherds are included in the analysis (fig. 4.2). This percentage probably reflects the percentage of decorated pots. The Hazendonk 3 pottery is richly decorated by a variety of techniques. Many decorations were applied using fingertips or nails as instruments (37%). Fingernails were used to produce crescent-shaped impressions (pot 13; fig. 4.3), while fingertips were used in two ways: to make simple impressions, as seen in pots 13 and 20 and to create scratched impressions, fig. 4.3. Instruments were used as well (63%). The most frequent type of decoration is grooves (34%, pot 22). Other impressions were created with spatulas: these include scratched impressions, comparable to those made with fingertips; impressions made with a crescent-shaped spatula (pots 4, 8, 10 and 26) and simple spatula impressions (pots 5 and 22, total 24%). A hollow spatula was used on a few sherds (4%).
One lug can be dated to this occupation phase as well, fig. 4.3. Other pots (3, 5 and 12) had knobs.

This list of illustrated pottery fragments in fig. 4.3 is arranged according to the morphological division developed by Louwe Kooijmans for the pottery of Het Vormer (1980b, 143-146, 201).

Type IIA: S-sectioned beakers

Pot 1. Pot tempered with a large quantity of grit (average particle size 4 mm). Pinched. Uneven surface.

Type IIB: carinated beakers

Pot 2. Pot tempered with a large quantity of grit (average particle size 4 mm) and a medium quantity of organic material. Pinched bowl with pronounced shoulder. Smoothed surface.

Type II: beakers

Pot 3. Barrel-shaped pot tempered with a small quantity of grit (average particle size 3 mm). A horizontally elongated knob is positioned on the shoulder. Uneven surface.

Type IIIA: Barrel forms with out-turned lips

Pot 4. Bucket-shaped pot tempered with large quantities of grit (average particle size 4 mm) and organic material. Body surface decorated with a crescent-shaped spatula. Uneven surface.

Pot 5. Barrel-shaped pot tempered with a large quantity of grit (average particle size 3 mm) and a medium quantity of organic material. A horizontally elongated knob is positioned on the shoulder. Body surface decorated with a small spatula. Uneven surface.

Pot 6. Bucket-shaped pot tempered with medium quantities of grit (average particle size 3 mm) and organic material and a small quantity of grog (average particle size 3 mm). Roughened surface.

Pot 7. Barrel-shaped pot tempered with medium quantities of grit (average particle size 3 mm) and organic material. Smoothed surface.

Pot 8. Barrel-shaped pot tempered with medium quantities of organic material and grog (average particle size 3 mm) and a small quantity of grit (average particle size 3 mm).

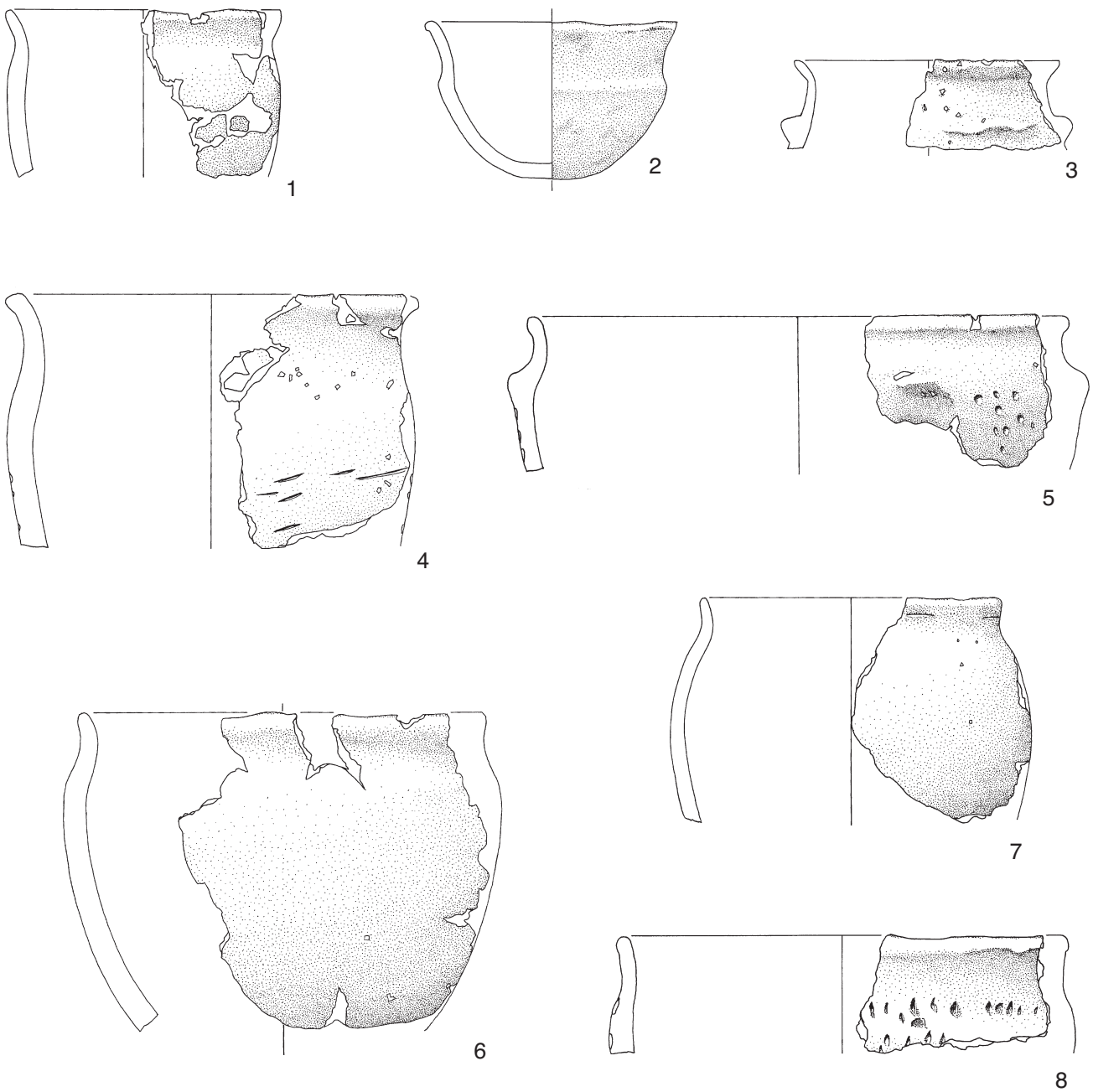
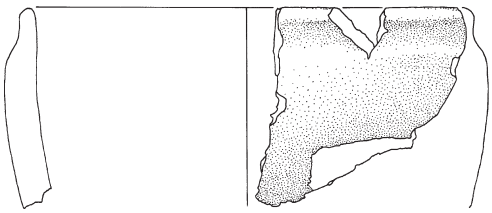


Fig. 4.3. Hazendonk 3 pottery. Scale 1:3. Numbers refer to text. Drawings L. Verhart.



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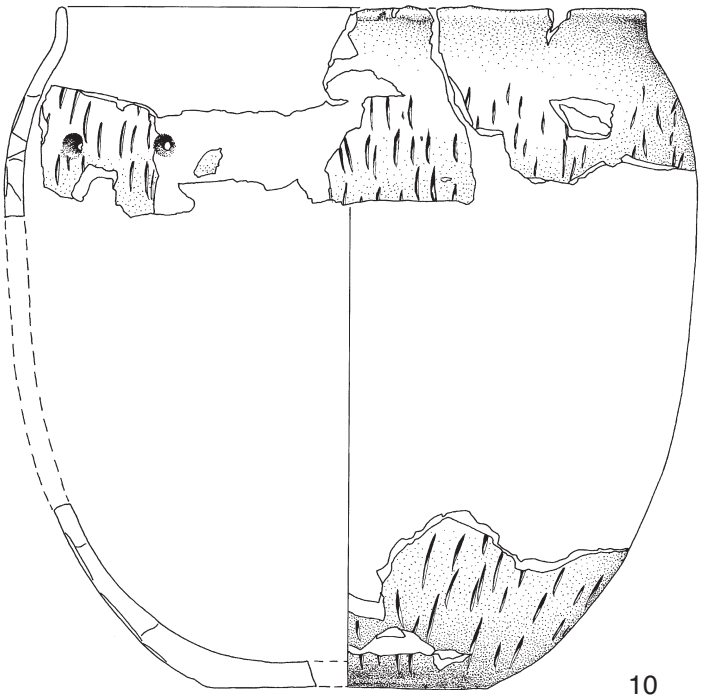

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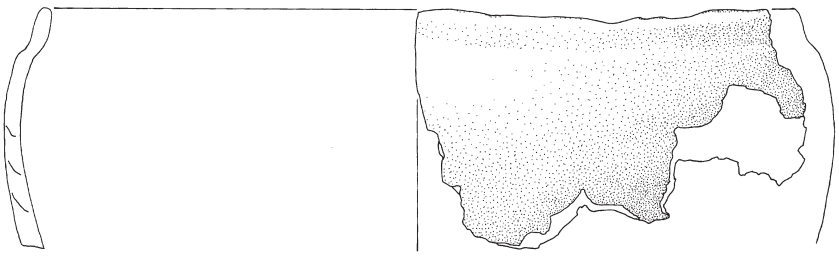

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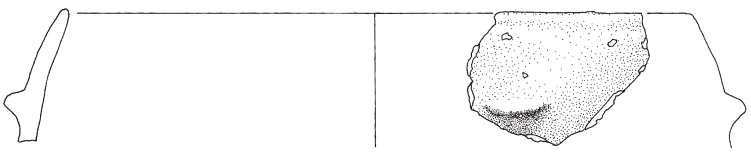

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Fig. 4.3. Continued.

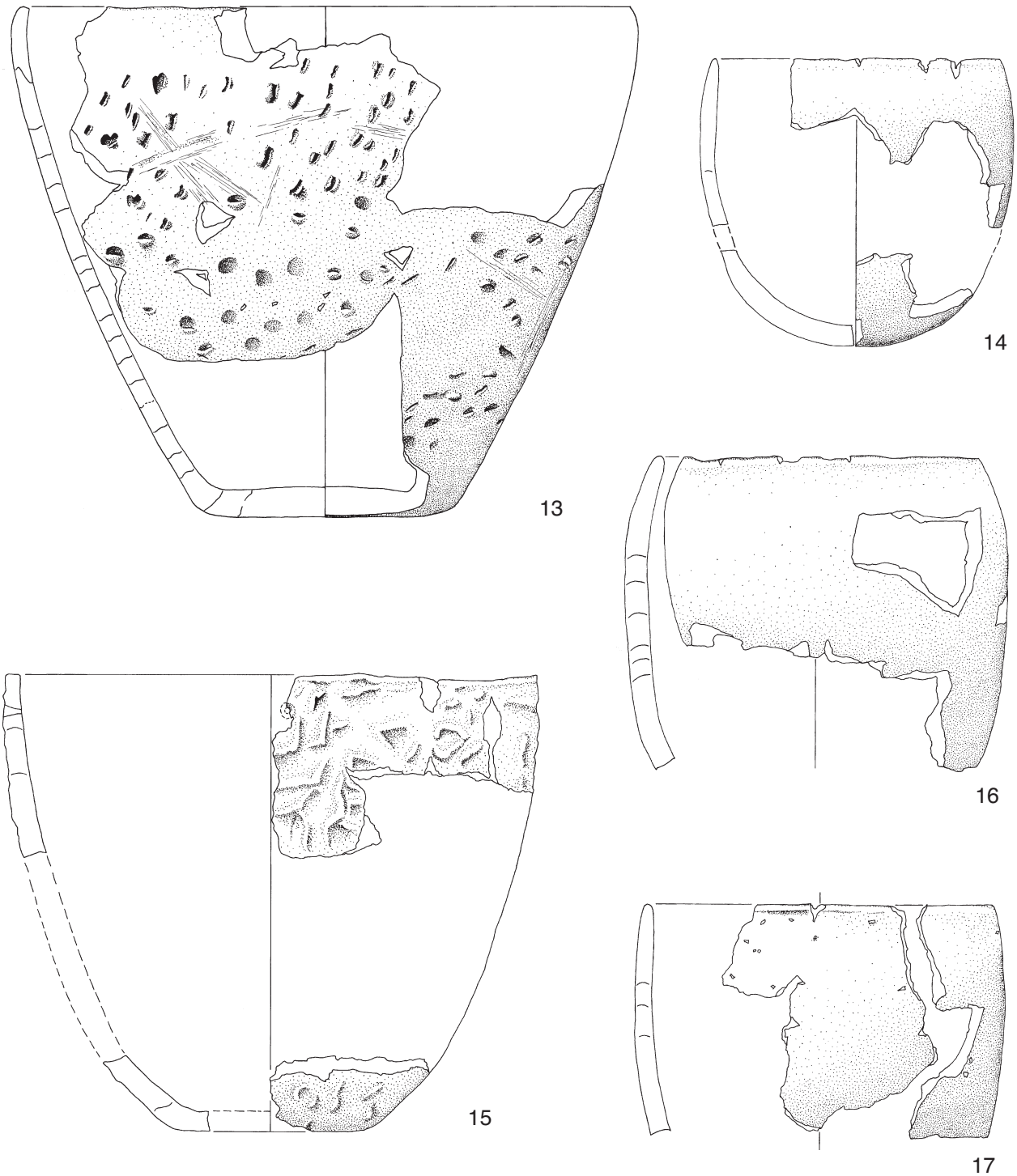

Fig. 4.3. Continued.

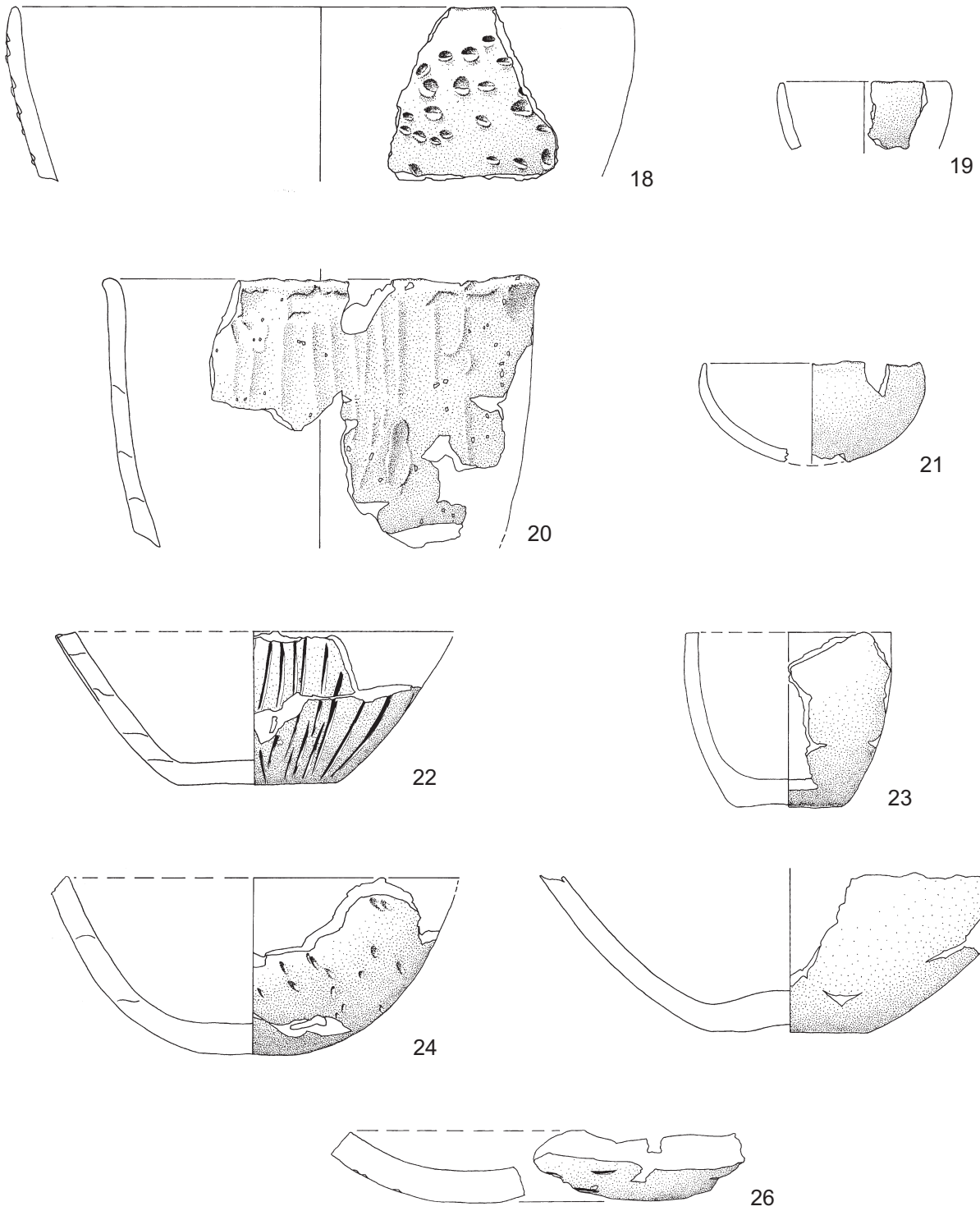

Fig. 4.3. Continued.

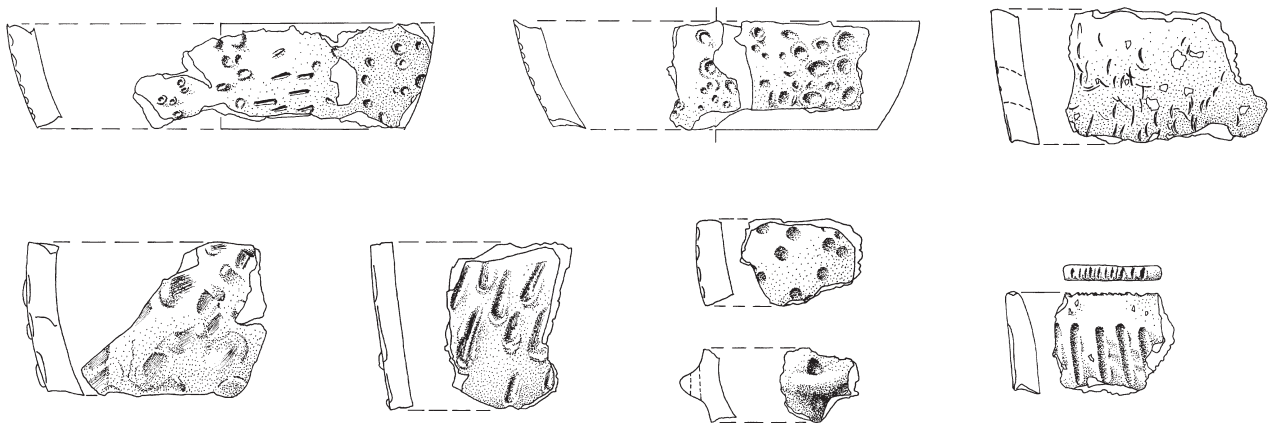

Fig. 4.3. Continued.

Body surface decorated with a crescent-shaped spatula. Uneven surface

Pot 9. Bucket-shaped pot tempered with a medium quantity of grog (average particle size 3 mm) and a small quantity of organic material. Smoothed surface.

Pot 10. Barrel-shaped pot tempered with small quantities of grit (average particle size 2 mm) and organic material. Coil-built with H-joins. Body surface decorated with a crescent-shaped spatula. Two 'repair holes' are located on the shoulder. Roughened surface.

Pot 11. Barrel-shaped pot tempered with a medium quantity of grit (average particle size 3 mm). Coil-built with N-joins. Uneven surface.

Type IIIB: straight-walled or very gently S-sectioned barrel forms

Pot 12. Barrel-shaped pot tempered with a large quantity of grit (average particle size 3 mm) and small quantities of grog (average particle size 2 mm) and organic material. A horizontal knob is positioned on its shoulder. Roughened surface.

Pot 13. Bucket-shaped pot tempered with a small quantity of grit (average particle size 2 mm). Coil-built with H-joins. Lower part of the belly decorated with fingertips, top part with nails. Flat-based pot. Uneven surface.

Pot 14. Barrel-shaped pot tempered with small quantities of grit (average particle size 4 mm) and organic material. Coil-built with H-joins. Uneven surface.

Pot 15. Bucket-shaped pot tempered with a large quantity of bone material. Smeared surface.

Pot 16. Barrel-shaped pot tempered with a medium quantity of organic material and a small quantity of grit (average particle size 2 mm). Coil-built with H-joins. Uneven surface.

Pot 17. Barrel-shaped pot tempered with a large quantity of grog (average particle size 3 mm), a medium quantity of grit (average particle size 3 mm) and a small quantity of organic material. Coil-built with H-joins. Uneven surface.

Pot 18. Bucket-shaped pot tempered with a large quantity of grit (average particle size 4 mm) and a medium quantity of organic material. Coil-built with H-joins. Body surface decorated with fingertips. Roughened surface.

Pot 19. Pinched bowl tempered with a large quantity of grit (average particle size 3 mm) and a medium quantity of organic material. Uneven surface.

Pot 20. Bucket-shaped pot tempered with a medium quantity of grit (average particle size 3 mm). Body surface decorated with long, shallow vertical grooves produced with fingers. Roughened surface.

Type IV: rest

Pot 21. Pinched bowl tempered with a large quantity of grit (average particle size 3.5 mm) and organic material in a medium quantity. Uneven surface.

Base fragments

Pot 22. Fragment of flat base tempered with medium quantities of organic material and grog (average particle size 4 mm) and a small quantity of grit (average particle size 4 mm). Decorated with a spatula. Uneven surface.

Pot 23. Fragment of hollow base tempered with a medium quantity of grit (average particle size 2 mm) and a small quantity of organic material. Coil-built with H-joins. Smoothed surface.

Pot 24. Fragment of flat base tempered with a large quantity of grit (average particle size 4 mm). Coil-built with N-joins. Body surface decorated with grooves. Uneven surface.

Pot 25. Fragment of hollow base tempered with a medium quantity of organic material. Uneven surface.
Pot 26. Round base tempered with a large quantity of grit (average particle size 3 mm). Body surface decorated with a crescent-shaped spatula. Uneven surface.

It can be concluded that the Hazendonk 3 pottery assemblage consists of pinched bowls, bucket-shaped pots and barrel-shaped pots. These last two forms are abundantly decorated: the body surface is completely covered, but the short rim zone is as a rule not decorated. The material is mostly richly tempered with grit, but also with organic material and grog. One pot is tempered with burnt bone. Coil-building was done in a 'careless' way. Hazendonk was the first excavation that yielded this type of pottery and it became the type-site of the Hazendonk pottery (Louwe Kooijmans 1974, 150-155). Later, this material was renamed *Hazendonk 3 pottery* as two older assemblages with different pottery were excavated at Hazendonk (Louwe Kooijmans 1976a, 255-271; section 3.4.2).

Flint artefacts
The Hazendonk 3 flint assemblage consists of 269 artefacts of flint types acquired over both short and long distances. The group labelled as 'long-distance flint' comprises forty fragments of flint axes, one small piece of light-grey Belgian flint and two flakes which are too large to have been made on the pebble-sized Terrace flint or pebble-Meuse eggs.
In the Hazendonk 3 occupation phase, the proportion of burnt flint is considerably higher than in the earlier occupation phases (compare tables 3.30, 3.32 and 4.2).
In the Hazendonk 3 occupation phase, flake technology is dominant: the assemblage contains 111 flakes and 32 blades, table 4.3. The remainder of the assemblage consists of blocks, chips, nodules and material whose basic morphology could not be determined. The predominance of flake technology over blade technology is reflected in the absence of blade cores: all cores are flake cores. The average length of the sixteen complete blades from this assemblage is 2.8 cm; when only the retouched blades are considered (n=3), this figure increases to 3.5 cm. Complete flakes are on average 2.3 cm long (n=97), while the retouched ones have an average length of 3.4 cm.
The list of tool types in table 4.4 shows that retouched blades and flakes are the major tool categories. Five scrapers are present in the assemblage, of which the three thumbnail-shaped scrapers have an average length of 2.3 cm. The other two are blade scrapers. One is 5.0 cm long and has one scraper-end, the other has two scraper-ends and is 4.7 cm long. Two flint artefacts have been identified as points.
The first point is triangular with a concave base and retouch covering half of the dorsal surface.[2] The second point is a transverse arrowhead with a straight base and allover retouch. Two burins and one flake borer complete the list of tools. The forty fragments of polished flint axes originate from approximately six axes. Unfortunately, owing to the small size of these fragments, it is impossible to reconstruct any specific axe type, although one axe fragment with a facetted cross-section shows that some type of polished flint axe with an oval cross-section was used (fig. 4.4s).

	Number	*%*	*Weight (g)*	*%*
Short-distance flint				
Terrace flint	39	47	365.8	65
Pebble-Meuse eggs	1	1	19.3	3
Long-distance flint				
Light-grey Belgian	1	1	2.8	0
Polished fragments of indet. material	40	48	121.7	21
Other long-distance flint	2	2	55.9	10
Totals	83	99	565.5	99
Indet.	186		423.3	
Unburnt	130	48.3	586.6	59.3
Gloss	4	1.5	15.2	1.5
Red	5	1.8	34.3	3.5
Crackled	22	8.2	35.1	3.5
Potlidded	108	40.1	317.6	32.1
Totals	269	99.9	988.8	99.9

Table 4.2. Hazendonk 3. The raw materials and proportion of burnt flint.

	Number	*%*
Flakes	111	41.3
Blocks	88	32.7
Blades	32	11.9
Chips	24	8.9
Cores	5	1.8
Terrace flint nodules	4	1.5
Indet.	5	1.8
Totals	269	100.0

Table 4.3. Hazendonk 3. The basic morphology of the flint artefacts.

Subsistence strategies
In comparison to the previous occupation phases of Hazendonk, cattle was proportionally less frequent in the bone spectrum. Other domestic animals present are pig, dogs and sheep/goat. Beaver bones constitute the majority of the

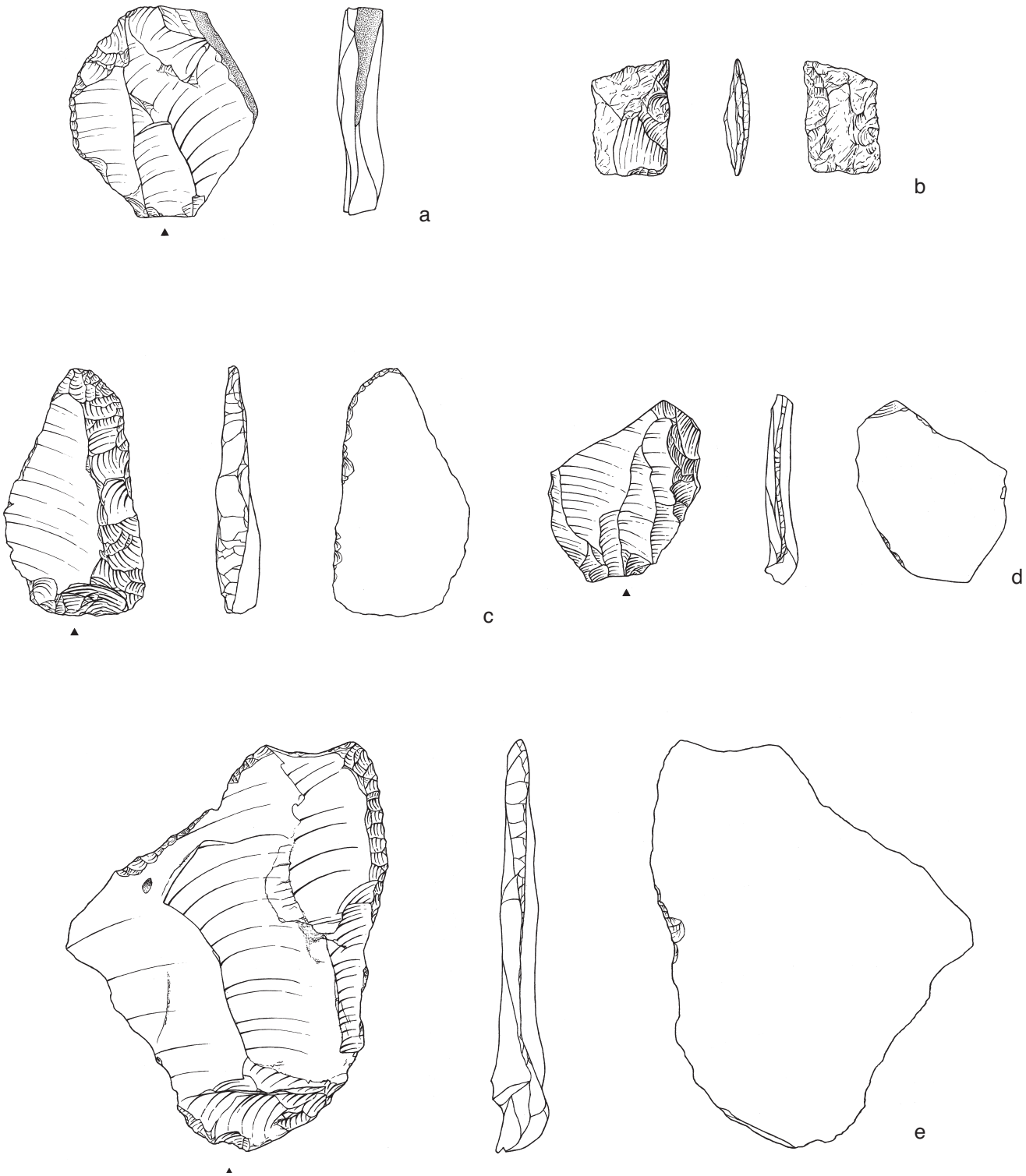

Fig. 4.4. Hazendonk 3 flint artefacts. a-e: retouched blades. Scale 1:1. Drawings C. Dijkstra.

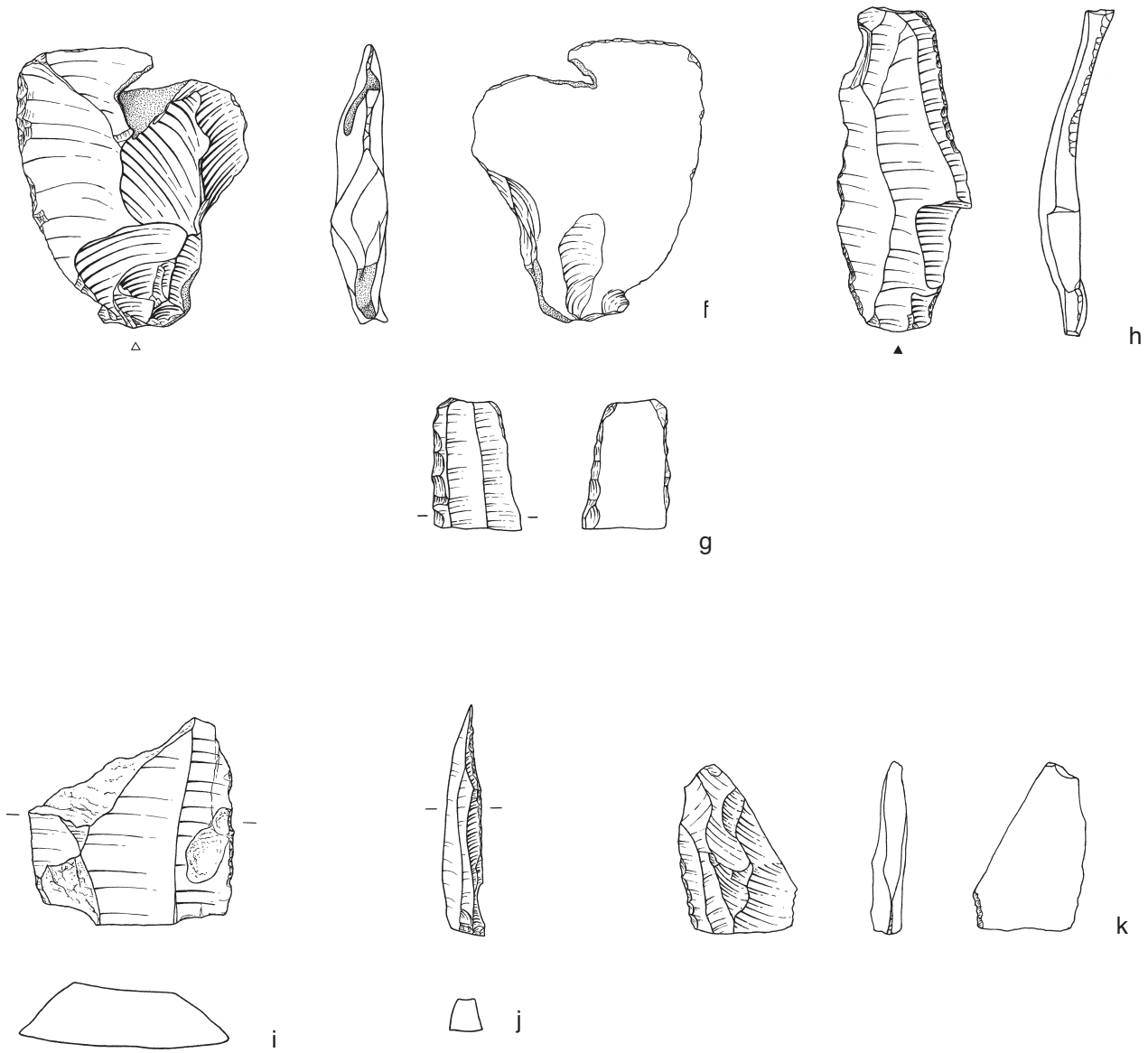

Fig. 4.4. Continued. f-h: retouched blades, i-k: retouched flakes.

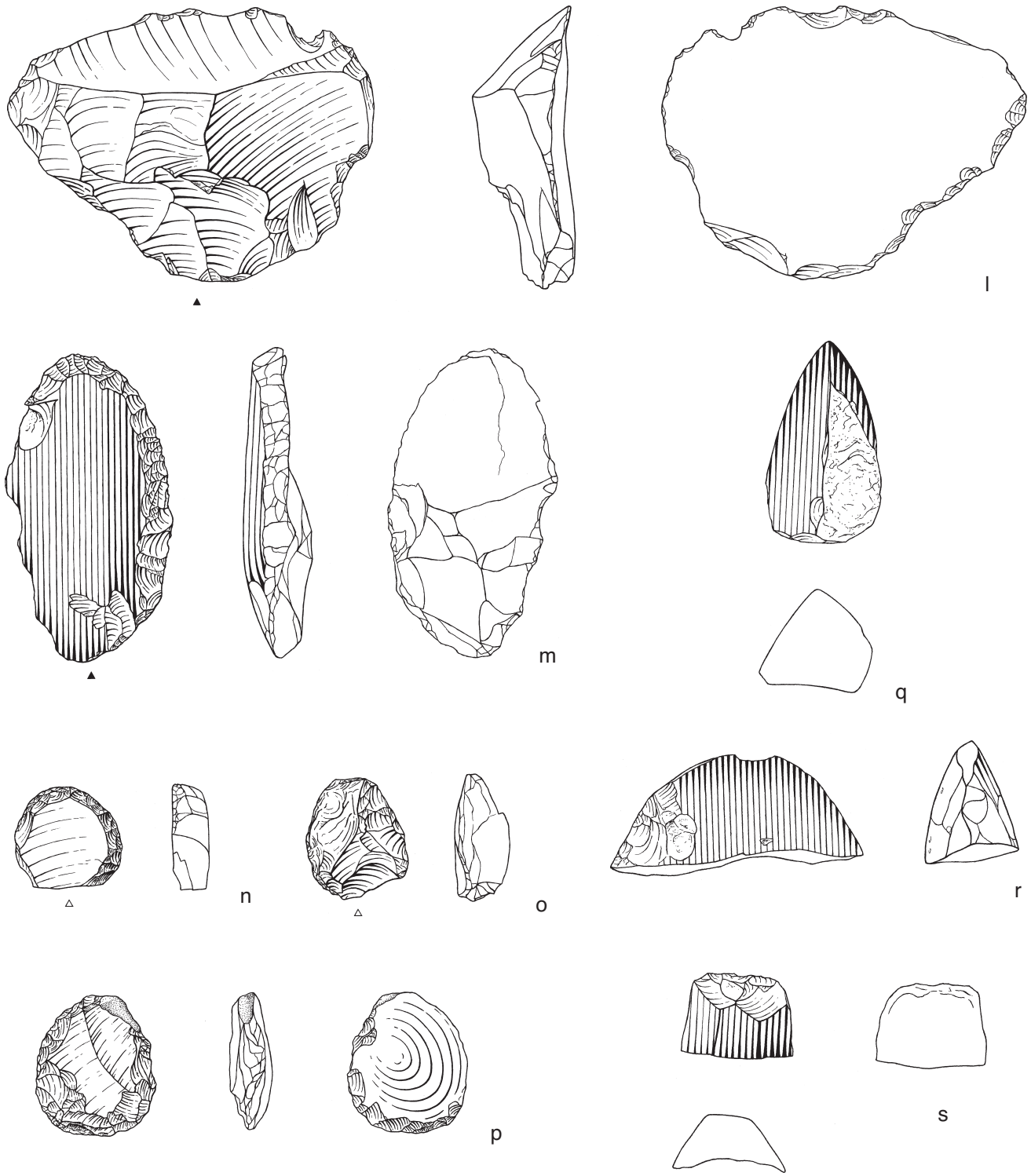

Fig. 4.4. Continued. l-p: scrapers, q-s: fragments of polished axes.

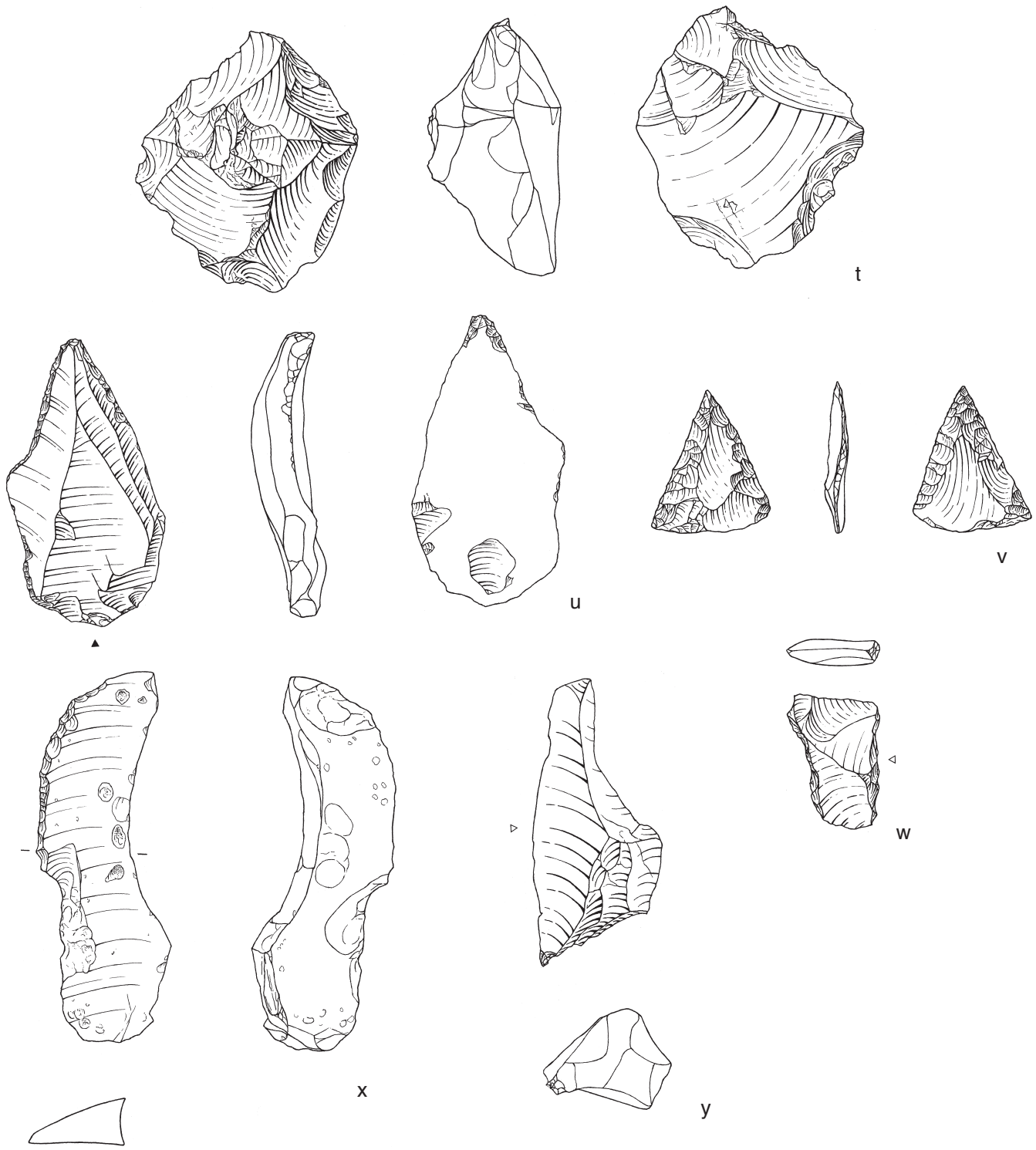

Fig. 4.4. Continued. t: core, u: pointed blade, v: triangular arrowhead, w: transverse point, x: splintered piece, y: borer.

	Number	*Tool category*	*%*	*Identified raw materials*
Points		**2**	**6**	
Triangular	1			
Transverse	1			
Borers		**1**	**3**	
Flake borer	1			
Burins		**2**	**6**	
AA-burin	1			
Multiple burin	1			
Scrapers		**5**	**15**	
Single blade scraper	1			1 × polished fragment
Double blade scraper	1			1 × polished fragment
Thumbnail scraper	3			1 × Light-grey Belgian
Retouched blades		**8**	**24**	
Retouch > 1 mm	2			
Retouch < 1 mm	6			1 × polished fragment
Retouched flakes		**14**	**42**	
Retouch > 1 mm	7			2 × polished fragment
				1 × terrace flint
Retouch < 1 mm	5			2 × polished fragment
Flake with surface retouch	2			1 × polished fragment
Retouched blocks and preparation flakes		**1**	**3**	
Retouched core rejuvination flake	1			
Totals		**33**	**99**	

Table 4.4. Hazendonk 3. The flint tools and identified raw materials.

mammal bones and reveal that beavers were probably hunted both for fur and meat. Bones of other wild species present in large quantities are of red deer and otter (table 4.5). The five bone fragments of mute swan or whooper swan are the only bird bones whose species could be identified (Zeiler 1987, 255-260; 1991, table 4). Emmer wheat and naked barley were used, but were probably not cultivated at the site: by this phase the surface area of the river dune had considerably diminished, because of the continuous sedimentation of clay and peat (Bakels 1981, 143; 1986, 5).

4.4.4 THE HAZENDONK 3 GROUP

Introduction

In section 3.4.2 of this study, it was concluded that, contrary to the traditional interpretation, the Hazendonk 2 pottery assemblage should not be seen as "locally made in Michelsberg style" (Louwe Kooijmans 1976a, 266). Rather, the majority of the sherds are of Swifterbant character, while some Michelsberg elements constitute the remainder of the pottery. As a result of this re-interpretation of the Hazendonk 2 assemblage, one may wonder what traits do characterise this intermediate period between the Hazendonk 1 assemblage (Swifterbant Culture; section 3.4.2) and the Hazendonk 3 assemblage described above. In my opinion, there are two alternatives. The first is that a *Michelsberg Northwest Group* existed in which Kraaienberg is the major assemblage (*cf.* Louwe Kooijmans *in press* b). In this view, the Michelsberg Northwest Group (consisting of a Hazendonk 2 and a Hazendonk 3 phase) as proposed by Louwe Kooijmans/ Verhart (1990, 83) is maintained, with Kraaienberg as the most important assemblage for the Hazendonk 2 phase instead of the Hazendonk 2 assemblage. Alternatively, the combination of Swifterbant and Michelsberg pottery elements as documented in the Hazendonk 2 assemblage is seen as characteristic of this phase. In this scenario, the Hazendonk 3 material culture follows directly upon the Swifterbant tradition, rather than being separted from it by a period with pure Michelsberg material culture (option 1).

The choice between these two options is centred on Kraaienberg. If one stresses its differences from the Hazendonk 3 assemblage, one could propose that these differences typify the Michelsberg Northwest Group (option 1). If, on the other hand, one should underline the similarities of Kraaienberg to Hazendonk 3 site, one could suggest that Kraaienberg be incorporated into the Hazendonk 3 Group, which is option 2. On the basis of Kraaienberg alone, the choice between

	Hazendonk 3		*Wateringen 4*	
	Number	%	Number	%
Domestic				
Cattle (*Bos taurus*)	21	4.3	284	43.2
Dog (*Canis familiaris*)	10	2.0	40	6.1
Sheep/goat (*Ovis/Capra*)	4	0.8	–	–
Pig (*Sus domesticus*)	2	0.4	–	–
Wild/domestic				
Pig/wild boar (*Sus domesticus/scrofa*)	52	10.6	153	23.3
Large cervid/bovid (Cervidae/Bovidae)	7	1.4	–	–
Wild				
Beaver (*Castor fiber*)	259	52.8	10	1.5
Red deer (*Cervus elaphus*)	71	14.5	155	23.6
Otter (*Lutra lutra*)	43	8.8	7	1.1
Wild boar (*Sus scrofa*)	8	1.6	–	–
Roe deer (*Capreolus capreolus*)	4	0.8	–	–
Polecat (*Putorius putorius*)	1	0.2	–	–
Wild cat (*Felis silvestris*)	–	–	3	0.4
Mole (*Talpa europaea*)	–	–	2	0.3
Water vole (*Arvicola terrestris*)	–	–	1	0.1
Grey seal (*Halichoerus grypus*)	–	–	1	0.1
Cervidae	7	1.4	–	–
Carnivore	1	0.2	1	0.1
Totals	**490**	**99.8**	**657**	**99.8**

Table 4.5. The mammal bone spectra from Hazendonk 3 (Zeiler 1991, table 4) and Wateringen 4 (Raemaekers *et al.* 1997, table 3).

options 1 and 2 remains uncertain: there are both clear differences and similarities. Option 2 is favoured here because it makes it easier to understand the parallels in material culture between the southern Group of the Swifterbant Culture (Middle Phase) and the Hazendonk 3 Group (section 4.4.5).

The sites of the Hazendonk 3 Group are located along the river valleys which border the Pleistocene sand area of the southern Netherlands and eastern Belgium. Apart from the Hazendonk ^{14}C dates, the dates from Wateringen 4 (Raemaekers *et al*. 1997, fig. 3) determine the age of the Hazendonk 3 Group. The occupation of the Wateringen 4 settlement may be dated sometime between 3625 and 3400 BC. These dates suggest that the Hazendonk 3 Group at the least dates between 3700 and 3600 BC, but a continuation into the following centuries remains possible. The single house plan of the Hazendonk 3 Group, that from Wateringen 4, constitutes a 4.1 × 10.9 m plan with axial posts.

Pottery

A characterisation of the pottery from the Hazendonk 3 Group should be based on those sites whose integrity is ascertained on the basis of their geological setting. In other words, those sites that could not have been occupied prior to the Hazendonk 3 period and which were sealed by sediment shortly after this occupation. This leaves Hazendonk and Wateringen 4 for constructing a characterisation with which the pottery from the other sites of the Hazendonk 3 Group may then be compared. Compared with the limited number of large pottery fragments from Wateringen 4, the larger number from Hazendonk probably allows a better overview of the pottery types of the Hazendonk 3 Group.

The pottery from the Hazendonk 3 Group is characterised by barrel-shaped and bucket-shaped storage vessels, beakers, and at most sites various open forms. Other morphological elements are *Tupfenleist* rims (at Kraaienberg) and knobs and lugs (at all sites). It is predominantly tempered with grit, but organic temper is also widespread. Grog and burnt bone are rarer tempering agents. Coil-building is most frequently carried out with H-joins, but N-joins and Z-joins are also found in all pottery assemblages. While rim decoration is nearly absent, body decoration is very frequent at many sites. The proportion of decorated body sherds differs dramatically, from >0.5% at Kraaienberg to 25% at Hazendonk. Body decoration techniques are varied and encompass

	Vormer	*Pater Berthier*	*Gassel*	*Kraaienberg*	*Hazendonk 3*	*Wateringen 4*
Pottery forms						
Open forms						
Ia straight-walled internally thickened rim	5	–	–	–	–	–
Ib S-sectioned	4	+	–	2	–	–
Ic carinated	4	–	+	3	–	–
Id straight-walled externally thickened rim	4	–	–	–	–	–
Beakers						
IIa S-sectioned	5	+	+	1	+	+
IIb carinated	3	–	+	–	+	–
Barrel-forms						
IIIa without everted lip	8	+	+	2	+	+
IIIb straight-walled or with gentle S-section	16	+	+	2	+	+
Sherds (n)	558	396	2225	825	516	3063
Decorated sherds (n)	>62	35	>56	>4	131	684
Decorated sherds (%)	>11.1	8.8	>2.5	>0.5	25.4	22.3
Types of body decoration:						
Nails/fingertips	+	+	+	–	34%	66%
Scratched	+	–	+	–	+	–
Spatulas	+	+	+	–	24%	34%
Pin-pricks	+	–	–	3	?	+
Groove-lines	+	+	+	–	34%	–
Nails/fingertips+spatulas	+	–	–	–	?	–
Lumbs	+	+	+	–	–	–
Tupfenleist rims	–	–	–	4	–	–
Lugs	–	1	1	1	1	–
Knobs	7	1	+	1	2	1
Joins						
H-joins	71%	+	+	64%	71%	75%
N-joins	22%	+	+	31%	28%	21%
Z-joins	7%	–	+	4%	1%	4%
Temper						
Grit	100%	+	'dominant'	100%	92%	88%
Grog	88/94%	+	+	18%	18%	47%
Organic material	–	–	–	–	72%	69%
Burnt bone	–	–	+	2	+	–

Table 4.6. The pottery characteristics of the various sites of the Hazendonk 3 Group. After Louwe Kooijmans 1980b; Verhart 1989; Verhart/Louwe Kooijmans 1989; Louwe Kooijmans/Verhart 1990; Louwe Kooijmans 1974 and section 3.4.3.2 and Raemaekers in Raemaekers *et al.* 1997.

impressions by nails/fingertips and spatulas (including pin-pricks). Characteristic decoration techniques are scratched impressions and groove-lines (table 4.6).
If the morphological terminology developed by Louwe Kooijmans for the pottery of Het Vormer (1980b) is used to characterise the Hazendonk 3 pottery, it is evident that the various open forms present at Het Vormer are lacking at Hazendonk and Wateringen 4 (table 4.6). This means that these open forms constitute a component of Het Vormer and other assemblages of the Hazendonk 3 Group that needs further attention, since they are a second, 'non-Hazendonk 3', component. In search of parallels for these bowls, Louwe Kooijmans' quest for parallels of the pottery from Het Vormer is illuminating (1980b, 172-204). Without reproducing his argumentation, I quote his conclusion that the open forms IA, IB and IC are known from contemporary English

	Vormer	*Pater Berthierstraat*	*Gassel*	*Kraaienberg*	*Hazendonk 3*	*Wateringen 4*
Flint artefacts (n)	205	107	216	380	269	1065
Raw material						
Short-distance	69%	+	56%	52%	68%	88%
Long-distance	31%	'dominant'	42%	48%	32%	12%
Basic technology						
Flake technology	93%	?	92%	81%	78%	96%
Blade technology	7%	?	8%	19%	22%	4%
Flint tools						
Number	15	20	35	48	38	117
% of assemblage	7.3%	18.7%	16.2%	12.6%	14.1%	11.0%
% long-distance	27%	100%	?	83%	37%	22%
Point types						
Triangular	2	1	2	2	1	19
Leaf-shaped	–	–	2	1	–	1
Drop-shaped	–	–	–	1	–	3
Transverse arrowheads	–	–	–	–	1	4

Table 4.7. The characteristics of the flint artefacts from the various sites of the Hazendonk 3 Group. After Louwe Kooijmans 1980b; Verhart 1989; Verhart/Louwe Kooijmans 1989; Louwe Kooijmans/Verhart 1990; Louwe Kooijmans 1974 and section 3.4.3.2 of this study and Van Gijn in Raemaekers *et al.* 1997. Raw material percentages of Gassel and Kraaienberg based on Schreurs (in prep.).

sites (see also Herne 1988), while the IA form is also common in the French Chasséen. In the Michelsberg Culture, open form IA resembles Lüning's *Schüssel* type 2.1a (1967, appendix 8). All in all, it appears that these open forms are found in various cultural settings and reflect contacts between both sides of the southern North Sea (Louwe Kooijmans 1980b, 197-198, 202-204).[3] The occurrence of open forms in these varied contexts suggests that it is not necessary to interpret these finds at various sites of the Hazendonk 3 Group in terms of re-occupation and contamination of Hazendonk 3 finds with earlier or later material. In other words, for most of the sites of the Hazendonk 3 Group, a single-phase occupation may be proposed.[4]

Flint artefacts

The proportional importance of various sources of raw flint does not differ dramatically from site to site: locally collected flint is present at Pater Berthierstraat, while the percentage of it varies from 52% at Kraaienberg to 88% at Wateringen 4. It is concluded that all sites have yielded flint material acquired over short and long distances. The latter category encompasses flint from Rijckholt/Rullen (0%-88%), Orsbach (0%-18%), Light-grey Belgian (0-6%), Lixhe (0%-2%), Valkenburg (0%-2%), Vetschauer (0%-1%) and Zevenwegen (0%-1%). All sites reveal a combination of flake and blade technology, in which flake technology is always predominant. The tool spectra encompass retouched blades and flakes, scrapers, points, borers, reamers and burins. Scraper types include side scrapers, end scrapers, multiple scrapers and round scrapers. Point types are equally varied and encompass triangular points, leaf-shaped points, drop-shaped points and transverse arrowheads. A comparison of the percentages of tools produced on long-distance flint types with the percentages relating to the entire assemblages reveals no striking differences. It has to be concluded that the long-distance flint was not specifically favoured for the production of tools (table 4.7).

Subsistence strategies

In both Wateringen 4 and Rijswijk, the same cereals were recovered as in the Hazendonk 3 find layer: emmer wheat and barley (Bakels in Raemaekers *et al*. 1997; pers.comm. C. Bakels 1997). In the mammal bone spectrum from Wateringen 4, cattle is considerably more frequent than in the Hazendonk 3 bone spectrum, while pig and dog are also more common (table 4.5). Sheep/goat is absent in Wateringen 4. Beaver bones, which are the major category at Hazendonk, are present in small numbers at Wateringen 4. Otters are likewise less widespread. The last major category of wild mammals, red deer, is more frequent in the Wateringen 4 bone spectrum than in its Hazendonk 3 counterpart. On the basis of these two bone spectra, it is difficult to determine whether the observed differences are the result of differences in site function or site location (or both). A comparison of these two bone spectra with those from the subsequent Vlaardingen Group reveals certain similarities: the Hazendonk 3 sites appear to fit into the pattern, well-known from the sites of the Vlaardingen Group, that reflects a link

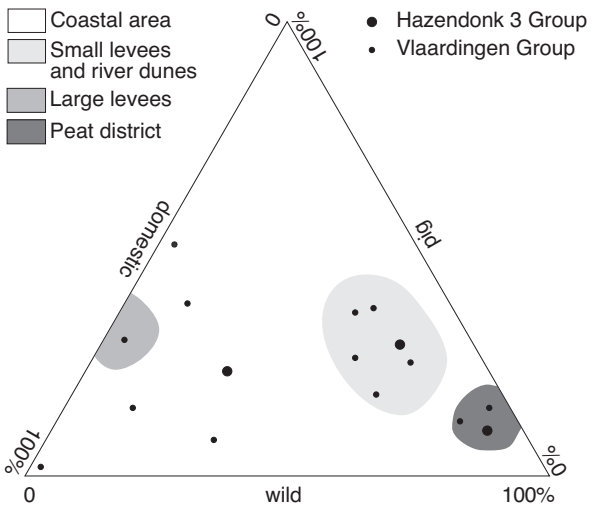

Fig. 4.5. Triangular diagram of mammal bone spectra from sites of the Hazendonk 3 Group and Vlaardingen Group. From Raemaekers *et al.* 1997, fig. 21.

between the natural environment and the mammal bone spectra (fig. 4.5). For the Vlaardingen Group, this variation is generally interpreted in terms of site function and length of occupation (seasonality) (Gehasse 1995, 219-220; Louwe Kooijmans 1993a, 103; Zeiler 1997, 99-103). In my opinion, the observed similarities between the Hazendonk 3 and the Vlaardingen spectra suggest that this explanation may be extended to the Hazendonk 3 Group (Raemaekers in Raemaekers *et al*. 1997, 186).

4.4.5 THE HAZENDONK 3 GROUP BETWEEN SWIFTERBANT AND MICHELSBERG

In the previous sections, a description of some artefactual characteristics of both the Michelsberg Culture and Hazendonk 3 Group was presented. In this section, it is argued that contrary to the general opinion (especially Louwe Kooijmans/Verhart 1990, 83), the Hazendonk 3 Group also has strong roots in the Swifterbant Culture, especially in the southern Group of the Middle Phase (section 3.8.2.3; Ten Anscher in prep.; Louwe Kooijmans 1976a, 269).[5] A comparison of the Hazendonk 3 Group and its likely sources in terms of material expression (i.e., the Michelsberg Culture and the southern Group of the Middle phase of the Swifterbant Culture) will lead to a more specific model for the articulation of the Hazendonk 3 Group material culture.
In an analysis of the cultural roots of the Hazendonk 3 Group, a series of artefact categories has to be left out, because they are found in both Michelsberg and Swiftebant contexts: these include polished stone axes with oval cross-sections, polished flint axes, drop-shaped, leaf-shaped and triangular points and *Tupfenleist* rims. The co-occurrence of blade and flake technology is another widespread non-culture-specific phenomenon (fig. 4.6). A second category which does not shed a light on the origins of the Hazendonk 3 material expressions are the culture-specific characteristics. The morphology of the Hazendonk 3 pottery (the barrel-shaped and bucket-shaped storage vessels) does not find parallels in either Michelsberg or Swifterbant pottery. This leaves two sets of material culture which may reveal the cultural roots of the Hazendonk 3 material culture: artefact categories and characteristics only found in Swifterbant and Hazendonk 3 contexts, and other artefact categories and characteristics which are only known from Hazendonk 3 and Michelsberg contexts.
Artefactual expressions which link the Swifterbant Culture and Hazendonk 3 Group are the frequent presence of organic material as a tempering agent and allover body decoration. The occurrence of transverse arrowheads completes this list. It is important to realise that it is especially the pottery from the southern Group of the Middle Phase of the Swifterbant Culture which is decorated in this way, since these sites are located within the area later occupied by the Hazendonk 3 Group. By contrast, material culture characteristics shared by the Hazendonk 3 Group and the Michelsberg Culture are also found. These include the near-absence of rim decoration, the presence of Michelsberg-style forms such as beakers and knobs and the occasional occurrence of *Besenstrich* surface finish on Hazendonk 3 pottery.
Of course it is impossible to weigh the relative importance of these similarities and differences: should the Hazendonk 3 Group be seen as a Michelsberg-derived group or instead as a Swifterbant offshoot? An answer to this question would bypass the most interesting conclusions of this exercise. First of all, it is intriguing to see that part of the area in which the remains of the Hazendonk 3 Group are found was at an earlier stage inhabited by people with a distinctly different material culture (the southern Group of the Middle Phase of the Swifterbant Culture). The observed similarities in site location and subsistence base are crosscut by clear differences in material expression. Secondly, one could state that the Hazendonk 3 Group is located in the area of the southern Group of the Middle Phase of the Swifterbant Culture because it is in the material culture from the latter sites that Michelsberg-influenced material is found. In other words, the Hazendonk material culture is based on both Swifterbant and Michelsberg material culture. A third conclusion is that the material culture of the Hazendonk 3 Group should not be seen as derived, but rather as constructed from the material expressions available. The Hazendonk 3 Group material culture deliberately incorporated specific elements (with their connotations) and merged them into a new style referring to known connotations, but at the same

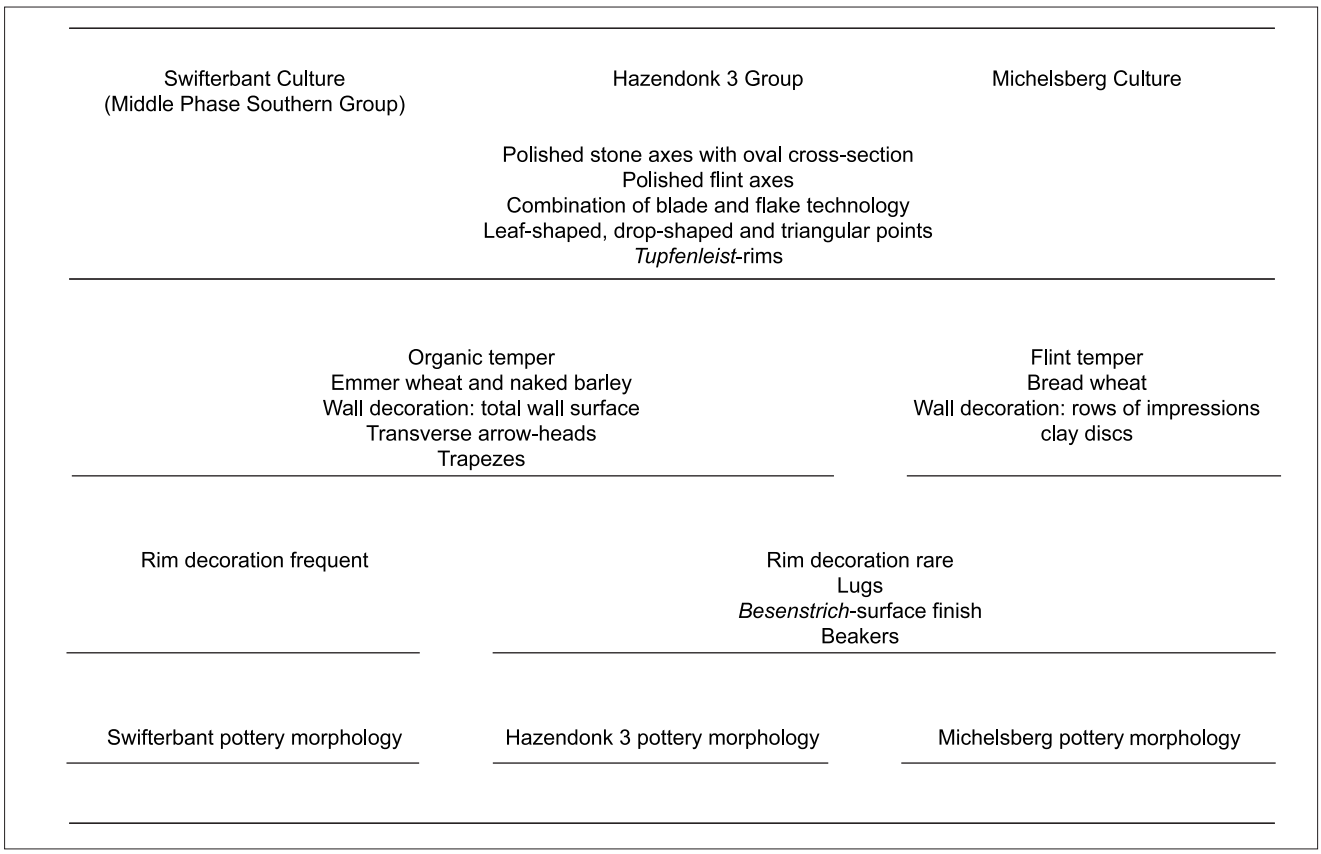

Fig. 4.6. The similarities and differences between the Hazendonk 3 Group and the Swifterbant Culture (especially the middle phase of the southern Group) and the Michelsberg Culture.

time restructuring these. In this light, it is equally significant that other material expressions (with other connotations) were not incorporated: apparently these connotations did not fit into the scheme of cultural construction. This *bricolage* (section 2.3) of old meanings into a new system of meaning suggests that the Hazendonk 3 Group should not be seen as an offshoot of either Swifterbant or Michelsberg, but rather a distinctly new phenomenon. By means of the *bricolage* of the Hazendonk 3 material culture, people seem to have deliberately stressed the differences they experienced in relation to both people of the Michelsberg Culture and people of the northern Group of the Swifterbant Culture.

4.5 Beyond the Swifterbant Culture: the Funnel Beaker Culture West Group and the Vlaardingen Group

4.5.1 THE START OF THE FUNNEL BEAKER CULTURE

4.5.1.1 Introduction

The origins of the West Group of the Funnel Beaker Culture have traditionally been sought outside the Netherlands. The absence of ^{14}C dates for the centuries predating the start of the Drouwen phase of the Funnel Beaker Culture (Waterbolk 1985, 280) and the clear differences between the pottery from the Swifterbant cluster and Drouwen pottery suggest that the "earliest TRB pottery arrived in the area of the West Group during the transitional stage of the Haasel-Fuchsberg and Troldebjerg Groups" (Bakker 1979, 115; Brindley 1986, 103; Fokkens 1998, 97). The recent finds from Schokkerhaven (Hogestijn 1990; section 3.6.4) and P14 (Ten Anscher *et al.* 1993; Ten Anscher in prep.; section 3.6.10) not only bridge the chronological gap between the occupation of the Swifterbant cluster and the start of the Drouwen Funnel Beaker Culture, these assemblages also indicate that the supposed cultural discontinuity might need re-evaluation. Such new analysis should not only take into consideration the new Dutch evidence, it should also encompass contemporary developments in northern Germany and Denmark and focus on the early phase of the Funnel Beaker Culture. In this way, the question may be answered as to whether the emergence of the Funnel Beaker Culture in northern

Germany is reflected in the material remains of the Swifterbant Culture.

4.5.1.2 Northern Germany

A study of the early stage of the Funnel Beaker Culture has to focus on a limited number of sites in Schleswig-Holstein (northern Germany), because it is in this area, between southern Scandinavia and the loess zone of Central Europe, that the earliest dates for the presence of domestic animals and cereals are expected and indeed found. The three stages of the early Funnel Beaker Culture in this area are named after three sites: Rosenhof, Siggeneben-Süd and Satrup (Südensee-Damm). These are all settlement sites, sparking a continuing debate on the duration of their occupation. The excavators propose a single-phased, short-term occupation for these sites, whereas other archaeologists suggest a longer occupation period. This discussion centres on the distinct heterogeneity of the material, which may be adduced as an argument against short-term occupation, but may also be seen as an aspect of the specific material culture of this period. Perhaps the best way to resolve this discussion is to accept that the length of the occupation period is reflected in the range of ^{14}C dates pertaining to the settlement.

The first site to be discussed here is Rosenhof, of which the Rosenhof occupation phase is dated with a 2σ range to 4360- 4020 BC (1σ range: 4300-4160 BC; Meurers-Balke/Weniger 1994, 258).[6] The mammal bones from this site are unpublished, but bones of domestic cattle and pig constitute some 5% of the mammal bones (Nobis 1983, table 3). Cereal cultivation is assumed on the basis of cereal pollen, while no cereal macro-remains were found (Schütrumpf 1972, figs 2-3). Apart from core axes, no flint artefacts have been attributed to this assemblage. The pottery assemblage consists of beakers with short necks and flat or round bases; the rim diameter and belly diameter roughly equal the height of the vessels. Decoration consists of a row of impressions on the top and/or outside of the rim. This pottery is accompanied by oval bowls ('lamps') similar to specimens from the Ertebølle Culture, and amphorae and lugged vessels which are similar to Baalberg and Michelsberg pottery respectively. Similar *Arkaden* rims are found in pottery of the Michelsberg Culture.[7] Coil-building was done with N-joins (Schwabedissen 1972; 1979; Hoika 1994, fig. 4). In this context, it is important to realise that elements of Michelsberg material culture are frequently found outside the area of the Michelsberg Culture itself (see section 4.4.2). It may well be that the pottery in Michelsberg style is an element of the material culture of the Rosenhof phase, rather than an indication of multi-period occupation of the site (early Funnel Beaker Culture and Michelsberg Culture). In other words, the heterogeneity of the Rosenhof assemblage does not necessarily mean that a long period of occupation is reflected in the archaeological record: it may well be that the complete pottery assemblage represents one short period of occupation.

The site of Siggeneben-Süd represents the next phase of the early Funnel Beaker Culture. Its occupation is dated with a 2σ range to 4240-3450 BC (1σ range: 4010-3750 BC; Meurers-Balke/Weniger 1994, 261). Domestic animals are more common than at Rosenhof: cattle (24%), pig (19%) and sheep/goat (3%) are all present in the Siggeneben mammal bone spectrum (Nobis 1983, table 1). The cultivation of cereals is again attested by cereal pollen rather than macro remains (Meurers-Balke 1983, 87).[8] The flint artefacts were produced on locally available material and take the form of flakes (86%), blades (6%), cores (3%) and retouched pieces (4%). This last category consists of core and flake axes, polished flint axes, borers, chisels, retouched flakes and blades, large triangular points and transverse arrowheads (Meurers-Balke 1983, 56-79). The pottery forms are again varied, but funnel beakers are the predominant category: they constitute 90% of the identified pottery. Amphorae, lamps, clay discs and one lugged beaker constitute the remaining 10%. The funnel beakers have similar proportions to those from Rosenhof, with short necks and flat bases. Some 5% of the pots are decorated, mostly on the rim zone rather than the body (62% and 38% respectively). Rim decoration consists of a row of impressions on top of the rim or on the outside, while one sherd has a series of perforations below the rim. *Arkaden* rims are also found. The body decoration consists of *Bauchfransen*: vertical lines which cover the shoulder area and are applied as a number of impressions, rope impressions or groove lines. The pottery is mostly tempered with grit, but sand, grog and organic temper are also found. Coil-building was done with N-joins (Meurers-Balke 1983, 40-56). A comparison of the Siggeneben-Süd pottery with that from Rosenhof suggests that the latter may be interpreted as a subset of the Siggeneben pottery (Hoika 1994, fig. 1): all characteristics of the Rosenhof pottery are also found in the pottery from Siggeneben-Süd. Given these similarities and the partly overlapping ^{14}C dates (2σ ranges), it may be proposed that the two assemblages are contemporary rather than consecutive. Midgley suggests that the observed differences between the assemblages may be functional rather than chronological (1992, 82).[9] It therefore seems premature to speak of two distinct phases of the early Funnel Beaker Culture.

If Rosenhof and Siggeneben-Süd constitute the first and second phases of the early Funnel Beaker Culture (as proposed by Hoika 1994; Meurers-Balke/Weniger 1994), the third phase is named after the settlement cluster bordering the Satrup peat bogs of eastern Holstein. The principal site of the Satrup phase in this area is Südensee-Damm, dated with a 2σ range of 3940-3260 BC and a 1σ range of 3650-

3440 BC (Meurers-Balke/Weniger 1994, 256). The mammal bone spectrum is dominated by domestic cattle, while pig and sheep/goat are also found (Nobis 1983, table 3). The flint inventory from Südensee-Damm encompasses flake axes and transverse arrowheads, while the funnel-beaker pottery has long necks and flat or sagging bases and is decorated with *Bauchfransen* (Schwabedissen 1957/1958, 7). The characterisation of the Satrup phase may be expanded on the basis of the finds from Bistoft LA 11, located in Schleswig. The three ^{14}C dates indicate that there were two distinct periods of occupation: the first is dated with 2σ certainty between 4220 and 3810 BC, while the second is dated to around 3630-3350 BC (Meurers-Balke/Weniger 1994, table 12). These dates suggest that Bistoft is partly contemporaneous with Siggeneben-Süd and partly with Südensee-Damm. The mammal bones comprise wild (45%) and domestic animals (cattle and sheep/goat; 39%), while bones of pigs (*Sus* sp.; 16%) constitute the remainder of the assemblage (Gehasse 1995, table 9.8). There are no indications for cereal cultivation (Johansson 1981, 108). The flint tool spectrum comprises polished flint axes, core and flake axes, flake and blade scrapers, burins, borers, large triangular points and transverse arrowheads. A singular find is a small drop-shaped point, also known from Michelsberg contexts (see section 4.4.2; Johansson 1981, 96-98). The pottery encompasses round or flat-based funnel beakers with long necks, lugged beakers, collared flasks and clay discs and is tempered with granite grit. The body decoration consists of *Bauchfransen*, either restricted to groups of vertical lines or spanning the circumference of the funnel beakers. Rim decoration consists of impressions on the outside of the rims in many different varieties. In comparison to Siggeneben-Süd, rim decoration is less common and body decoration more frequent. While the proportion of decorated sherds has increased to 18% of the sherds, rim decoration constitutes only 28% of these decorated sherds (Johansson 1981, 98-101).

The above presentation of the key sites of the early Funnel Beaker Culture in northern Germany and adjacent Denmark was needed for a characterisation of the early Funnel Beaker Culture (table 4.8). In section 4.5.2.3, this characterisation will be used for a comparison with the contemporary Swifterbant Culture. From the Rosenhof phase onwards, domestic cattle are present, while sheep/goat and domestic pig are attested at Siggeneben. The cereal pollen from Rosenhof and Siggeneben may indicate that cereal cultivation took place at these sites. The flint tool spectrum from the above-mentioned sites is fairly uniform in its inclusion of core and flake axes, polished flint axes and transverse arrowheads and the dominance of flake technology over blade technology. Greater differences are found in the pottery forms. The occurrence of short-necked funnel beakers, lamps and amphoras is restricted to the Rosenhof and Siggeneben phases, while the funnel beakers with long necks seem to be a later phenomenon. *Bauchfransen* seem to start in the Siggeneben phase, along with clay discs and collared flasks. Lugged beakers and *Arkaden* rims are found at most of the sites presented above. A comparison of Bistoft with Siggeneben-Süd reveals that the frequency of decoration seems to increase through time, while at the same time the focus of this decoration shifts from the rim to the body (see also Hoika 1994, fig. 4).

During the final phase of the early Funnel Beaker Culture, the Fuchsberg phase, the Funnel Beaker Culture West Group commences with Bakker's Drouwen A or Brindley's Horizon 1 around 3400 BC (Lanting/Mook 1977, 79). The start of the Fuchsberg phase in Jutland is dated to around 3500 BC (Meurers-Balke/Weniger 1994, 280), corresponding with the earliest ^{14}C dates pertaining to the West Group (Brindley 1986: Odoorn, Odoorn D32c, Harderwijk-Beekhuizerzand). The parallels between the earliest West Group pottery and the Fuchsberg material are already well-attested (Brindley 1986, 103) and will not be further discussed here. The subsequent developments in the material culture of the Funnel Beaker Culture are also beyond the scope of this study.

4.5.1.3 Hamburg-Boberg

Introduction

In this study, the site cluster of Hamburg-Boberg was to be sampled in a similar way to the sites described in chapter 2. On the basis of various references, I assumed that the Hamburg-Boberg sites had yielded material remains related to those from the Swifterbant cluster. While Van der Waals saw similarities in the decoration with round and vertical spatula impressions, groove lines and the presence of inward-curving rims (1972, 167), De Roever mentions the fingertip impressions covering the body as a parallel between Swifterbant and Hamburg-Boberg (1979, 23; see also Ten Anscher in prep.). Yet, these similarities appear to be of minor importance, while the Hamburg-Boberg finds are more easily interpreted in terms of emergence of the early Funnel Beaker Culture of northern Germany.

The Hamburg-Boberg area is part of the northeastern side of the Elbe river basin. During the Late Pleistocene and Early Holocene, small river dunes were formed in this area (Schindler 1962, 246). Finds from the Ahrensburger Culture show that these dunes were occupied intermittently from this period onwards (Schindler 1953, 4). Their occupation history ended with the deposition of a clay cover during the Bronze Age (Averdieck 1953: 20). Here, the two sites with the best-documented evidence of Neolithic occupation are important: 15 (including 15 Ost) and 20. From 1951-1953 and again in 1960, Hamburg-Boberg 15 was researched by Lienau (Laux 1986: 19). The eastern end of this dune, 15 Ost, was

	Rosenhof	*Siggeneben*	*Bistoft*	*Südensee-Damm*
Cattle (*Bos taurus*)	+	+	+	+
Pig (*Sus domesticus*)	?	+	+	+
Sheep/goat (*Ovis/Capra*)	–	+	+	+
Cereal pollen	+	+	–	?
Cereal macro remains	–	–	–	?
Core axes	+	+	+	–
Flake axes	–	+	+	+
Polished flint axes	–	+	+	–
Transverse arrowheads	–	+	+	+
Funnel beakers				
Short necks	+	+	–	–
Long necks	–	–	+	+
Decoration percentage	?	5%	18%	?
Rim decoration	?	62%	28%	?
Body decoration	?	38%	72%	?
Bauchfransen	–	+	+	+
Lamps	+	+	–	–
Amphoras	+	+	+	–
Clay discs	–	+	+	+
Lugged beakers	–	+	+	–
Collared flasks	–	–	+	–
Arkaden rims	+	+	+	–
Perforations below the rim	–	+	–	–

Table 4.8. Various characteristics of five sites of the early Funnel Beaker Culture in northern Germany and adjacent Denmark. See text for references.

sampled in 1959 (Laux 1986: 18). Hamburg-Boberg 20 is located some one hundred metres to the east of this dune. About 2000 m^2 of the top of Boberg 20 were excavated by Lienau in 1959 (Schindler 1961, 9), while H. Lübke made three test trenches on the margins of the site. The following description of the material culture is based on Schindler (1953; 1961; 1962) and Laux 1986.

Hamburg-Boberg 15

Pottery. On the basis of the pottery remains, it is impossible to ascertain the presence of an occupation phase during the period of the Ertebølle Culture. The large number of point and pointed bases from this assemblage may be interpreted as remains of pots of the Ertebølle Culture, but these bases may also represent pots in other styles, as the absence of large fragments prohibits definitive identification. Small lamps, typical of the Ertebølle Culture, are found, but these may also be dated to the period of the early Funnel Beaker Culture (see above). Pottery attributed to the Funnel Beaker Culture includes funnel beakers with both short and long necks, collared flasks and vessels with *Arkaden* rims. Decoration is restricted to the rim zone and *Bauchfransen*, which suggests that this pottery assemblage from the Funnel Beaker Culture is dated to the pre-Fuchsberg period.

Spectacular is the find of a small number of Rössen pots (Schindler 1961; 1962). This is the northernmost find of Rössen pottery. The final component is less easily defined: the S-shaped pottery with fingertip decoration that covers the body and with small flat bases may be a locally developed pottery style (Louwe Kooijmans 1976a, 262).

Flint artefacts. The flint tools depicted with the various articles show trapezes, tanged and transverse arrowheads, pointed blades, blade and flake scrapers of various types, core and flake axes, polished flint axes, retouched blades and scrapers with concave end retouch. The blades with concave end retouch, retouched blades and pointed blades probably date to an occupation phase of the Ertebølle Culture, although this is not corroborated by pottery finds. The various tools produced on flakes and the polished flint axes indicate an occupation phase during the period of the (early?) Funnel Beaker Culture. The core and flake axes may date to either of these occupation phases. The tanged arrowhead will be of a later date. The trapeze is exotic in this context, but is known from both Swifterbant and Rössen contexts (sections 3.8.2.3 and 4.3.2, respectively).

Dating evidence. A single ^{14}C date relates to Hamburg-Boberg 15 Ost, which puts part of its occupation history in the Rosenhof phase of the Funnel Beaker Culture (appendix 3).

Hamburg-Boberg 20

Pottery. The pottery from Hamburg-Boberg 20 is clearly heterogeneous. The oldest elements present in this assemblage are from the Ertebølle Culture and include a large rim-belly fragment with a long neck and H-joins. One Rössen *Kugeltopf* was also found. Pottery dated to the early Funnel Beaker Culture is recognised in a rim-belly sherd similar to a find from Siggeneben (compare Meurers-Balke 1983, table 27.3) and an amphora. *Bauchfransen* and clay discs are absent, which suggests that this occupation phase should be dated to the Rosenhof phase. The 1991 excavation shows that younger material is present as well; this is no surprise as it is known that the Boberg dunes were not covered with clay until the Bronze Age. This younger material consists of a dish with zig-zag decoration on the inside (dated to a later phase of the Funnel Beaker Culture) and a number of sherds from the Single Grave Culture.

Flint tools. The list of tool types encompasses flake and core axes, blade scrapers, pointed blades, blade borers, retouched blades and transverse arrowheads. The tools produced on blades probably date to the Ertebølle occupation, while the axes and transverse arrowhead may date from either the Ertebølle Culture or the early Funnel Beaker Culture.

Dating evidence. Of the five ^{14}C dates, the two oldest date charred food remains on sherds (attributed to the Ertebølle Culture) to the period of the Rosenhof phase (appendix 3). It may well be that these particular sherds are wrongly interpreted as Ertebølle material, and should instead be placed in the Rosenhof phase, during which the site was probably occupied. The third date relates to the Satrup phase of the early Funnel Beaker Culture, while the two youngest dates may be related to the later phases of occupation. If these ^{14}C dates are taken together with the archaeological evidence, it seems that Hamburg-Boberg 20 was occupied intermittent during the period of the Ertebølle Culture, the Rosenhof and Satrup phases of the early Funnel Beaker Culture and during the period of the Single Grave Culture.

Swifterbant parallels in Hamburg-Boberg?

After the inventories presented above, one may wonder whether there are any reasons to identify material remains of the Swifterbant Culture at Hamburg-Boberg. A significant feature of pottery of the Swifterbant Culture Middle Phase (northern Group) is decoration on the inside of the rim, which is absent in the Hamburg-Boberg cluster, while other characteristics such as overall fingertip impressions (mentioned in the introduction of this section as a parallel between the pottery from Hamburg-Boberg and that from the Swifterbant cluster) and base forms seem to be of limited relevance. These traits are found in widely different settings and may therefore not be used to propose structural similarities between the Hamburg-Boberg sites and the Swifterbant Culture. The flint tools from Hamburg-Boberg do not suggest stronger ties: only the presence of trapezes at Hamburg-Boberg 15 could be considered indicative of a western influence in the material culture of Hamburg-Boberg. On the basis of these restricted and superficial similarities, it is concluded that the Hamburg-Boberg finds are more easily fitted into the north European sequence, in which the Ertebølle Culture is followed by the early Funnel Beaker Culture, than linked to the Swifterbant Culture. A similar interpretation was already proposed by Louwe Kooijmans in 1976, when he regarded these assemblages as a mix of material with characteristics of both the Ertebølle Culture and early Funnel Beaker Culture, in combination with a locally developed pottery style (1976a, 262).

4.5.1.4 A comparison with the Swifterbant Culture

After the above description of developments north-east of the river Elbe, it is time to turn to the contemporary evidence of the Swifterbant Culture. The central question is whether the development of the early Funnel Beaker Culture into the North Group of the Funnel Beaker Culture is mirrored by a similar development in the western part of the North European Plain. In other words, whether there are indications in the archaeological record of the Swifterbant Culture to suggest that the emergence of the West Group of the Funnel Beaker Culture had indigenous cultural roots rather than being based on the influx of a new material idiom (cf. Bakker 1979; Brindley 1986; Fokkens 1998).

The sparse data on the Late Phase of the Swifterbant Culture are restricted to the Schokkerhaven site and selected elements from the mixed assemblages of Hüde I and P14 (section 3.8.2.2). An analysis of the differences and parallels between these assemblages and the oldest of the West Group of the Funnel Beaker Culture would instantly show that the extent of the similarities is limited. If, on the other hand, parallel and interrelated developments between the areas to the southwest and northeast of the river Elbe are assumed, as is generally the case for the period of the Fuchsberg phase of the Funnel Beaker Culture, then any parallels between the Late Swifterbant assemblages and their counterparts of the early Funnel Beaker Culture across the Elbe become of interest. In this perspective, such similarities might indicate that comparable developments took place on both sides of the Elbe and that cultural roots for the West Group may indeed be found in the Late Swifterbant Culture.

The similarity of the Schokkerhaven flint assemblage to those from contemporary sites of the early Funnel Beaker Culture is restricted to the predominance of flake technology over blade technology. The pottery contains more clues in its grit temper, flat and round bases, its range of shapes from funnel beaker to S-shaped with both short and long necks and meagre decoration. Rim decoration consists of a series

of impressions on the outside, while body decoration is restricted to a few random spatula impressions. One round-based pot with a short neck and a height that equals both the rim and belly circumference is a more specific parallel to the funnel beakers from the Rosenhof and Siggeneben phases (Hogestijn 1990, 171-174; sections 3.6.4 and 3.8.2.2).[10]
The P14 assemblage contains numerous transverse arrowheads, cord-impressed pottery, knobs and lugs, collared flasks and vertical groove lines (*Bauchfransen*?), which might date to either the early or developed Funnel Beaker Culture (Ten Anscher *et al*. 1993, 463-465, fig. 2; Wilhelm 1996, 3; Ten Anscher in prep.; see section 3.6.10).
The large numbers of finds from Hüde I allow more parallels to be drawn. First of all, it is important to realise that a number of ^{14}C dates indicate that the site was occupied during the period of the early Funnel Beaker Culture (Meurers-Balke/Weniger 1994, table 10). Stapel interprets the rhombic borers and *Bogenmesser* from Hüde as parallels to the northern Funnel Beaker Culture sequence, while the transverse arrowheads, core borers and round scrapers are found in both the North Group and West Group (1991, 174-175). Kampffmeyer's pottery catalogue (1991) illustrates various sherds similar to early Funnel Beaker Culture pottery: funnel beakers with short necks (no 29899), amphoras (3039, 4741), collared flasks (1417, 23521) and decorative motifs such as *Bauchfransen* (N567, 29740), *Arkaden* rims (32, 2326) and series of perforations below the rim (749, 19940).[11] Lugged beakers and lamps are absent from Hüde.[12]
The above reveals that up to a point, there are similarities in pottery characteristics, while the differences in the accompanying flint assemblages are obvious: the characteristic flake axes are unknown from Swifterbant Culture contexts, while its dominant point type, the trapeze, is not found in the assemblages of the early Funnel Beaker Culture. In other words, the historical and structural differences between the Swifterbant Culture and the Ertebølle Culture (see section 5.2.3) are still reflected in the flint material, while according to Ten Anscher the design of the pottery of the early Funnel Beaker Culture and the Late Phase of the Swifterbant Culture are indistinguishable (Ten Anscher *in prep*.). Nevertheless, the relevance of the similarities may be questioned: the flint artefacts are different, while only few characteristics of the Swifterbant pottery appear to connect it with northern Germany.

4.5.2 THE VLAARDINGEN GROUP

4.5.2.1 General characteristics of the Vlaardingen Group

Introduction

The Vlaardingen Group requires attention in this study for a number of reasons. First of all, the remains of the Vlaardingen Group are found in a large part of the area in which evidence of the Swifterbant Culture was found. The arguments in favour of and against an interpretation of the Vlaardingen Group as not only the geographical successor, but also the cultural inheritor of the Swifterbant tradition are of major importance for the appreciation of the Swifterbant phenomenon. A secondary reason for paying attention to the Vlaardingen Group is that Hazendonk-Unit C, apart from the two Swifterbant assemblages (Hazendonk 1 and 2) and one Hazendonk 3 assemblage, yielded two late occupation phases, both of the Vlaardingen Group. The first of these assemblages is the oldest known Vlaardingen assemblage and as such plays a crucial role in any analysis of the origins of the Vlaardingen Group.
The Vlaardingen Group is dated between 3500 BC and 2500 BC (Louwe Kooijmans 1993a, fig. 9), of which the earliest dates relate to the Hazendonk-Vlaardingen 1a assemblage. The sites are found in the Rhine-Meuse Delta: "the extensive complex of marine, estuarine, organic, lacustrine, fluviatile, and even aeolian deposits which form a large and irregular triangle with its apex in the environs of Nijmegen and its base along the coastline between Zealand Flanders and the Isle of Texel" (Louwe Kooijmans 1987, 227-229). In this large wetland area, Vlaardingen sites are found on coastal dunes, levees of small creeks and large rivers, river dunes and intertidal flats (see, for example, Zeiler 1997, 88-95; Van Gijn/Bakker in press). This diversity of natural environments is reflected in the archaeological remains on the sites, especially the extreme diversity in bone spectra. This variation is considered below.

Subsistence strategies

The subsistence base of the Vlaardingen Group is comparatively well understood, thanks to the large number of excavated sites with often excellent preservation conditions. A combination of emmer and naked barley is found at Hazendonk-Vlaardingen 1b (Bakels 1981, 141; section 3.5.4.3), Hekelingen III (Bakels 1986, 2), Zandwerven (Van Zeist 1968, table 3) and Vlaardingen, while the last site also yielded remains of bread wheat (Van Zeist 1968, table 1). Barley remains were also recovered from the Hazendonk-Vlaardingen 2b occupation debris (Bakels 1981, 143). The absence of macro remains from the other Vlaardingen sites is not to be interpreted as evidence that cereals played no role in the subsistence strategies at these sites, because during the excavations no soil was sieved or sampled (Bakels/Zeiler in press).
A consideration of the mammal bone spectra of the Vlaardingen Group sites has to take into account the differing natural environments in which the sites are located (Louwe Kooijmans 1993a, fig. 6.9; Raemaekers *et al*. 1997, fig. 21; Zeiler 1997,: table 79; Bakels/Zeiler in press). As table 4.9 shows, the variation in mammal bone spectra is considerable. For example, the proportional importance of cattle varies

	Tidal flats	*Coastal dunes*	*Fluviatile levees*	*Estuarine levees*	*River dunes*
Cattle (*Bos* sp.)	91.6	43.2 - 61.0	34.9	11.6 - 22.2	1.2 - 3.6
Pig (*Sus* sp.)	2.1	5.9 - 51.3	37.0	25.5 - 36.8	12.3 - 15.7
Sheep/goat (*Ovis/Capra*)	4.2	2.7 - 7.3	20.9	0.8 - 6.5	0.0 - 1.4
Red deer (*Cervus elaphus*)	0	0 - 17.6	4.2	25.1 - 33.2	1.2 - 31.5
Roe deer (*Capreolus capreolus*)	0	0 - 11.8	0.7	1.0 - 11.5	11.4 - 32.1
Beaver (*Cator fiber*)	0	0	0.3	7.1 - 9.2	22.5 - 33.2
Otter (*Lutra lutra*)	0	0 - 1.3	0	0.8 - 1.6	8.5 - 11.6

Table 4.9. he proportional presence of bones from three domestic animal species and the four major wild animals in eleven settlement sites of the Vlaardingen Group. Tidal flats: Zandwerven (Clason 1967, table 5); coastal dunes: Leidschendam and Voorschoten-Boschgeest (Groenman-van Waateringe *et al.* 1968, tables 2 and 1 respectively) and Voorschoten-De Donk (Deckers 1991); fluviatile levees: Ewijk (Clason 1990, table 4); estuarine levees: Hekelingen I and Vlaardingen (Clason 1967, tables 3 and 1 respectively) and Hekelingen III (Prummel 1987, table 1) and river dunes: Hazendonk-Vlaardingen 1b and 2b (Zeiler 1991, tables 5 and 6).

from 1.2% to 91.6%, while that of wild mammals also differs dramatically. This diversity is primarily found at the inter-regional level, while it is considerably less among sites located in the same habitat. This suggests that there is a relation between natural environment and mammal bone spectra, or rather a relation between the natural environment and the activities reflected in these spectra. Difference in site function and length of occupation (seasonality) are generally put forward to explain this variation (Louwe Kooijmans 1993a, 103; Gehasse 1995, 219-220; Raemaekers in Raemaekers 1997 *et al*., 187; Zeiler 1997, 99-103). A settlement system in which residential sites occupied the year-round and seasonally occupied special activity sites are combined might be interpreted as a logistic mobility system (section 3.8.4.1).

Marine mammal bones are found in small numbers at several sites: Hekelingen I (Clason 1967, table 3), Hekelingen III (Prummel 1987, table 1), Leidschendam (Groenman-van Waateringe *et al*. 1968, table 2), Vlaardingen (Clason 1967, table 1), Voorschoten- Boschgeest (Groenman-van Waateringe *et al*. 1968, table 1) and Zandwerven (Clason 1967, table 5). While the nutritional importance of these mammals was probably limited (only very few bones are found), the occurrence of these bones at so many sites stands in striking contrast to the sites from the preceding period: both S3 and Wateringen 4 yielded one marine-mammal bone each (Zeiler 1991, table 1; Raemaekers *et al*. 1997, table 3), while such bones are lacking from the remainder of the sites of this period. This difference is to a large degree the result of the near-absence of coastal sites from the pre-Vlaardingen period, but it is also possible that marine resources were more intensively exploited by the people of the Vlaardingen Group.

Pottery

Glasbergen initially characterised the Vlaardingen pottery as "large, flat-based, truncated pear-shaped to more or less cylindrical pots with more or less strongly everted rims [...], below which is occasionally a row of perforations or pits [...], and with a few [...] knobs of different types [...]; spoons with solid handle [...]; ornamented discs [...]; collared flasks [...]; rarely round-based pots [...]" (Glasbergen in Van Regteren Altena *et al*. 1962/1963, 101); since then, chronological subdivisions have been proposed. In 1967, the Voorschoten excavations produced a section in which pottery appeared in a stratigraphical sequence of what is now named Vlaardingen 1 ('classical pre-Single Grave Culture'), Vlaardingen 2a ('devolved pre-Single Grave Culture') and Vlaardingen 2b ('devolved phase contemporary with the Single Grave Culture'). The difference between the 'classical' and 'devolved' pottery is found in the replacement of grit by grog as the predominant kind of temper and the absence of various decorative elements in Vlaardingen 2 pottery, such as knobs, deep circular impressions and perforations under the rim and incised lines (Glasbergen *et al*. 1967, 26-27). As a result of the Hazendonk excavations, the Vlaardingen 1 phase could be further subdivided into a Vlaardingen 1a and 1b phase (section 4.5.2.2). The characterisation of the Vlaardingen 1a pottery is solely based on the small assemblage from Hazendonk, to which Louwe Kooijmans added two more pots from other sites on the basis of their similarities (1976a, 280). A comparison of the Vlaardingen 1a and 1b pottery from Hazendonk Unit C makes it clear that the differences between these two assemblages are limited to the morphology of one pot: Vlaardingen 1a pot 1, with its flaring rim, is unparallelled in the Vlaardingen 1b sample. The two other pots and the base fragment of the Vlaardingen 1a sample would fit into to the later Vlaardingen 1b material. The limited number of Vlaardingen 1a sherds prohibits a sound interpretation of the observed differences between the two assemblages in the importance of organic temper and the prevalence of the different types of join (compare tables 4.10 and 4.11). I am

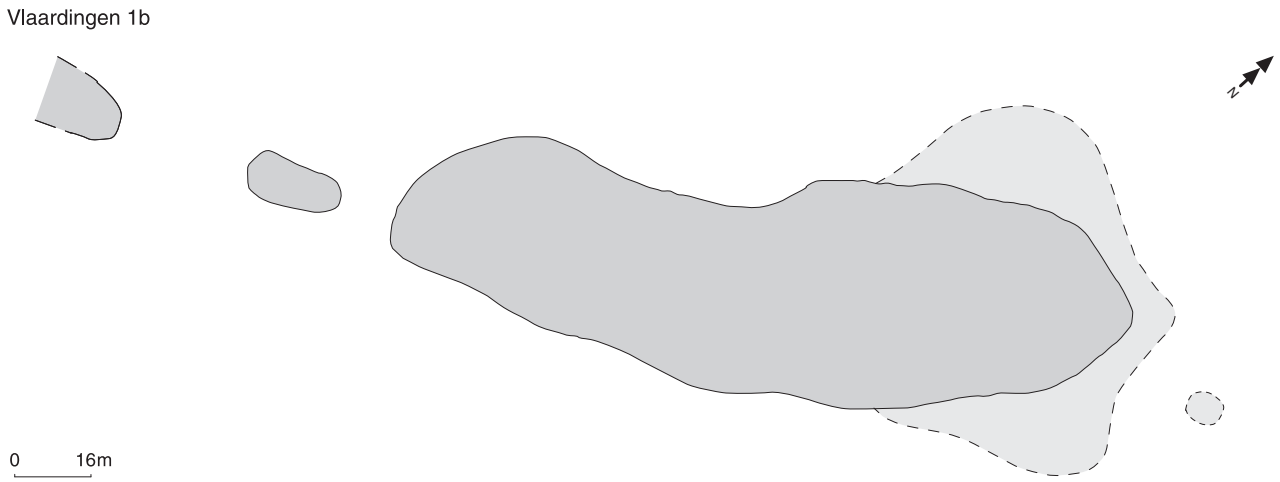

Fig. 4.7. Spatial distribution of the Vlaardingen 1b occupation layer from Hazendonk. Reproduced with kind permission of M. Verbruggen. Drawing P. de Jong.

inclined to conclude that the difference between Vlaardingen 1a and Vlaardingen 1b pottery is mainly a difference in age rather than a difference in pottery traits.
There is a considerable inter-site variability in the above mentioned characteristics: the proportional frequency of rim perforations varies significantly from site to site, while specific pottery categories such as collared flasks, spoons and clay discs are not found at all sites, even if pottery is recovered in large amounts (Van Regteren Altena *et al*. 1962/1963, fig. 11). To some extent, these differences may be interpreted in terms of stylistic development (for example: Vlaardingen 2 pottery has no knobs, in contrast to Vlaardingen 1 pottery), but there are also distinct differences between contemporary assemblages: the proportional importance of rim perforations is much greater in the Hazendonk-Vlaardingen 1b assemblage than in the pottery from Vlaardingen (Verhart 1992, 94). It could be said that the Vlaardingen Group pottery constitutes a spectrum of material expressions, specific subsets of which are found in different settings.
A focus on this inter-site variability seems to reveal that the differences between the pottery of the Stein Group of Dutch Limburg and adjacent areas seems to fall within this variability. Louwe Kooijmans and Verhart remark that, in comparison to the pottery of the Vlaardingen Group, that of the Stein Group has fewer knobs, rim perforations and collared flasks, while clay discs are lacking in these assemblages. The grit temper, the smoothed undecorated surfaces, flat bases and high and lower S-shapes of the Stein Group pottery are also found in Vlaardingen Group pottery (1990, 66-69). In their words: "to what degree the Stein Group and Vlaardingen Group belong together and whether the distinction is meaningful, is as yet difficult to determine" (1990, 68; my translation). In an earlier publication, Louwe Kooijmans proposed that we should speak of a 'Stein-Vlaardingen-complex' to underlines the similarities (1983). This suggestion does proper justice to the intersite variability observed in the pottery.[13]

Flint artefacts
Flint technology was based on flakes, which are the major morphological category in all assemblages. These flakes were worked into small scrapers, borers and various points: predominantly transverse arrowheads, but also leaf-shaped and tanged points. While the components of the tool spectra are fairly uniform, the sources of raw material are varied. At some sites, flint types which may have been acquired relatively nearby (pebble-Meuse eggs and terrace flint) are the only kinds present (the sites on the coastal dunes); while at other sites, flint types from long-distance sources constitute some 20-30% (Hazendonk and Vlaardingen) or even 100% of the assemblage (Hekelingen III). For all sites, excluding Zandwerven, the long-distance component consists of southern flint types. By contrast, the long-distance flint material from Zandwerven is erratic flint (Glasbergen in Van Regteren Altena *et al*. 1962/1963, 101; Glasbergen *et al*. 1967, 23-25, 110; Verhart 1992, 94; Van Gijn 1989; Van Gijn/Bakker in press). The flint artefacts of the Stein Group may be described in similar terms: transverse arrowheads and small scrapers are the most frequent tool types, but leaf-shaped and tanged points are also found (Louwe Kooijmans/Verhart 1990, 62-64).[14]

		Organic temper				*Grog temper*				*Grit temper*				*Total*
		0	1	2	3	0	1	2	3	0	1	2	3	
Number		16	1	4	2	22	–	1	–	8	5	7	3	23
Percentage		69.6	4.3	17.4	8.7	95.6	–	4.3	–	34.8	21.7	30.4	13.0	100
Weight (g)		260	8	93	37	380	–	18	–	126	119	124	29	398
Percentage		65.3	2.0	23.4	9.3	95.5	–	4.5	–	31.6	29.9	31.1	7.3	100
Average weight (g)		16.2	8.0	23.2	18.5	17.3	–	18.0	–	15.7	23.8	17.7	9.7	17.3
Average size of temper particles (mm)		–	–	–	–	–	–	3.0	–	–	2.2	2.7	2.8	
Average wall thickness (mm)		8.9	10.0	8.0	9.0	8.9	–	7.0	–	9.5	5.4	9.7	10.7	8.8
Types of join:	N-joins	–	–	1	–	1	–	–	–	–	1	–	–	1
	Z-joins	4	–	–	–	4	–	–	–	–	–	2	2	4
Surface finish:	Uneven	12	1	2	1	15	–	1	–	6	3	5	2	16
	Smoothed	2	–	–	1	3	–	–	–	1	–	1	1	3
	Roughened	1	–	–	–	1	–	–	–	–	–	1	–	1

Table 4.10. Hazendonk-Vlaardingen 1a. The characteristics of the pottery sample.

		Organic temper				*Grog temper*				*Grit temper*				*Total*
		0	1	2	3	0	1	2	3	0	1	2	3	
Number		157	157	486	138	857	34	38	9	269	265	200	204	938
Percentage		16.7	16.7	51.8	14.7	91.4	3.6	4.0	0.9	28.7	28.2	21.3	21.7	100
Weight (g)		4301	3387	11162	3835	20668	789	995	251	5667	6510	5124	5402	22703
Percentage		18.9	14.9	49.2	17.0	91.0	3.5	4.4	1.1	25.0	28.7	22.6	23.8	100
Average weight (g)		27.4	21.6	23.0	27.9	24.1	23.2	26.2	28.2	21.1	24.6	25.6	26.5	24.2
Average size of temper particles (mm)		–	–	–	–	–	2.6	2.6	3.0	–	1.9	2.7	3.0	–
Average wall thickness (mm)		9.5	8.2	8.9	10.5	9.1	8.8	9.1	9.7	8.8	8.8	9.5	9.5	9.1
Types of join:	H-joins	4	3	14	4	24	1	–	–	7	6	9	3	25
	N-joins	5	7	26	6	40	1	2	1	16	11	8	9	44
	Z-joins	14	14	16	1	40	2	2	1	4	20	13	8	45
Surface finish:	Uneven	112	108	340	106	604	26	29	7	198	195	144	129	666
	Smoothed	9	9	35	8	56	1	2	2	17	22	8	14	61
	Roughened	10	6	23	4	42	–	1	–	–	7	12	24	43

Table 4.11. Hazendonk-Vlaardingen 1b. The characteristics of the pottery sample.

4.5.2.2 Hazendonk-Vlaardingen 1a and 1b

Introduction

Above the Hazendonk 3 occupation at the site, a small scatter of material was found which was named Vlaardingen 1a. This scatter did not constitute a find layer to be identified in the augering campaign. The diffuse, discontinuous character of this scatter prevented Jonkers (1993) from distinguishing this material stratigraphically from the Hazendonk 3 and the subsequent Vlaardingen 1b find layers. As the subdivision of the Vlaardingen 1 material into an 'initial' and a 'classical' phase (Vlaardingen 1a and 1b, respectively) is based on this very material (Louwe Kooijmans 1976a, 279-286), this subdivision is followed here in order to assess the value of this distinction. The Vlaardingen 1a and 1b samples were produced by first selecting all finds identified by Jonkers as 'Vlaardingen', that is all material situated above the Hazendonk 3 find layer. This selection was then subdivided on the basis of the results of earlier efforts to allocate the finds from Unit C, thus yielding two samples: Vlaardingen 1a and Vlaardingen 1b (see 3.4.1).

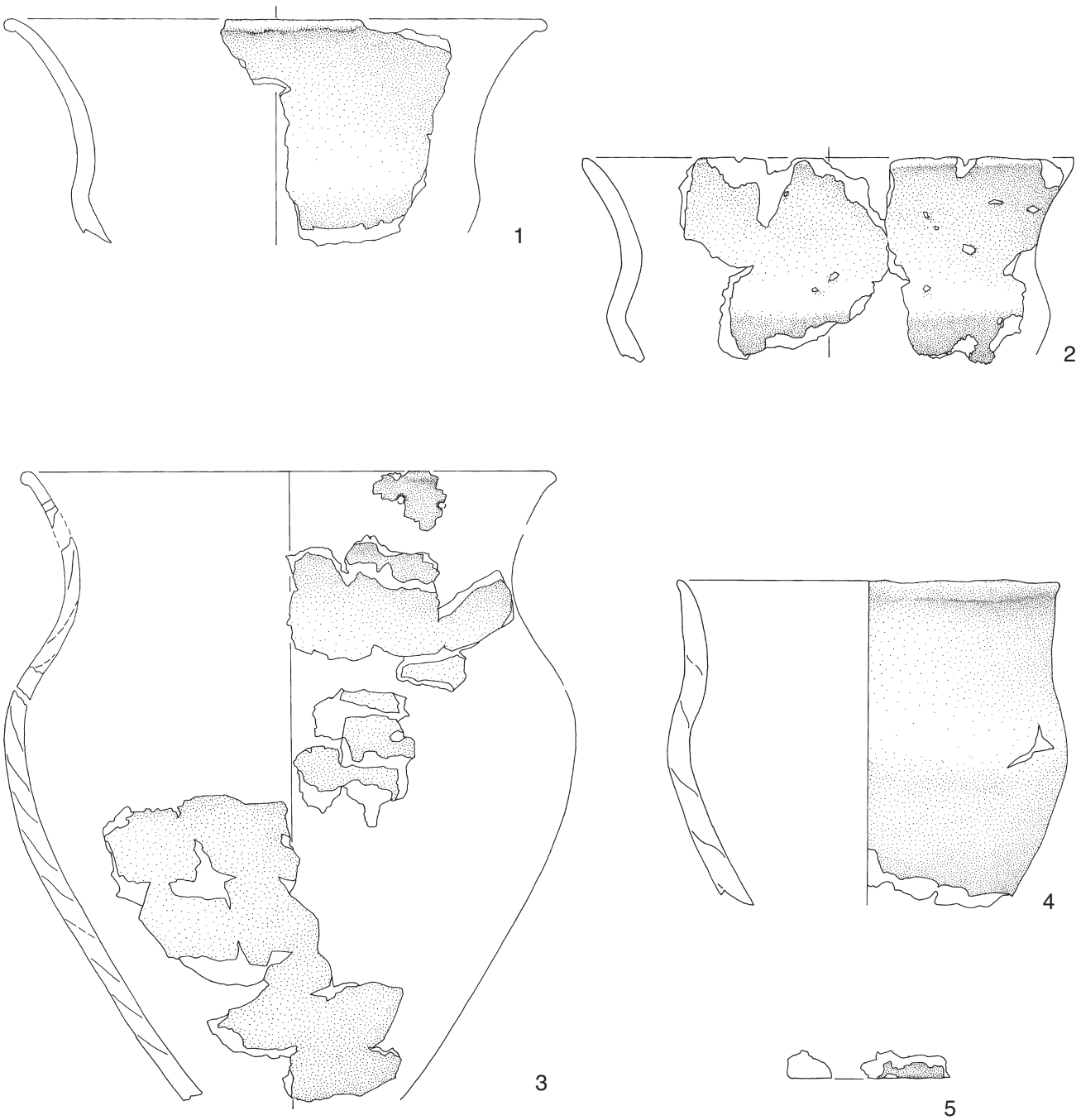

Fig. 4.8. Hazendonk. Vlaardingen 1a pottery. Scale 1:3. Numbers refer to text. Drawings L. Verhart.

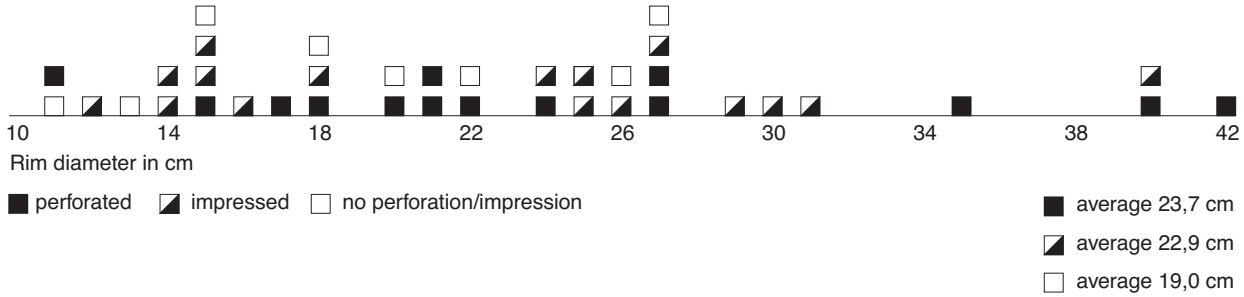

Fig. 4.9. Relation between rim diameter and presence of perforatons or pits in Hazendonk-Vlaardingen 1b pottery. Drawing P. de Jong.

The ^{14}C dates corresponding to the Vlaardingen 1a material are listed in appendix 3. The dating of this occupation phase is difficult, because of the lack of overlap of the two dates. A date between 3500 and 3300 BC seems most plausible, when the datings of the Hazendonk 3 and Vlaardingen 1b phases are taken into account.
The youngest occupation phase reflected in Unit C was a continuous scatter of finds in a thick and distinct refuse layer, called Vlaardingen 1b (Louwe Kooijmans 1976a, 280, 286). This Vlaardingen 1b layer surrounded the northeastern part of the river dune (fig. 4.7), had a surface area of about 760 m^2, and was on average 8 cm thick (Verbruggen in prep.). The ^{14}C dates from Unit C are listed in appendix 3; the reduced calendar age of this Vlaardingen 1b occupation phase is between 3260 and 2960 BC (Verbruggen 1992). In the time between the Hazendonk 3 and Vlaardingen 1b occupation phases, the lakes were gradually overgrown with shore vegetation leading to an expansion of the alder swamp forest (Van der Woude 1983: 91). The Vlaardingen 1b bone assemblage is dominated by bone from wild mammals. Domestic cattle and pig are found in proportions similar to those in the Hazendonk 3 assemblage. Beaver has become less important, while the bones of red deer predominate (Zeiler 1991, table 5). As in the previous occupation phase, evidence was found of emmer wheat and naked barley (Bakels 1981, 143).

Pottery: Vlaardingen 1a
The Vlaardingen 1a sample consists of 23 sherds, with a total weight of 398 g. (table 4.10). These sherds were predominantly tempered with grit, but organic material and grog were also used. The average wall thickness is 8.8 mm, while H-joins and decoration are absent. The pottery mostly has an uneven surface.

List of illustrated pottery fragments (fig. 4.8):
Pot 1. S-shaped pot tempered with a large quantity of grit (average particle size 3 mm). Coil-built with N-joins. Smoothed surface.[15]
Pot 2. Beaker tempered with a medium quantity of grit (average particle size 3 mm). Roughened surface.
Pot 3. S-shaped pot tempered with a medium quantity of grit (average particle size 2 mm). Perforated rim zone. Smoothed surface.
Pot 4. Pot tempered with a medium quantity of grog (average particle size 2 mm). Coil-built with Z-joins. S-shaped pot with everted rim. Smoothed surface.
Pot 5. Fragment of protruding-foot base tempered with small quantities of grit (average particle size 2 mm) and grog (average particle size 2 mm). Uneven surface.

Pottery: Vlaardingen 1b
A total of 938 sherds, weighing 22,703 g, can be attributed to the fifth Hazendonk occupation phase (table 4.11). These sherds are less extensively described here because of the limited relevance of this material to the present study of the Swifterbant Culture. Moreover, other assemblages with similar material are quite adequately published (Hekelingen I (Modderman 1953); Leidschendam (Glasbergen *et al*. 1967, 97-120); Vlaardingen (Van Regteren Altena *et al*. 1962, 23-32) and Voorschoten-Boschgeest (Glasbergen *et al*. 1967, 3-31)). The pottery was mostly tempered with grit or organic material, while grog was rarely used. Coils were visible on 12% of the sherds and were mostly joined with N-joins and Z-joins. Most sherds have an uneven surface. There seems to be no relation between the amount and types of temper on the one hand and the kind of surface treatment on the other. Decoration is absent; the only decorative element is the row of perforations or of deep circular impressions on the rim zone which is present in a large majority of the pottery.
The pottery forms can be described as elongated S-shaped with straight to everted rims. Bases are flat, hollow or have a protruding foot. Fragments of a clay disc and a small cup or spoon complete the assemblage, fig. 4.10.
Figure 4.9 depicts the rim diameters of 38 identified pots. The rim diameters are seen as indicative of the size (capacity) of the vessels, for lack of the vesselss' heights. These

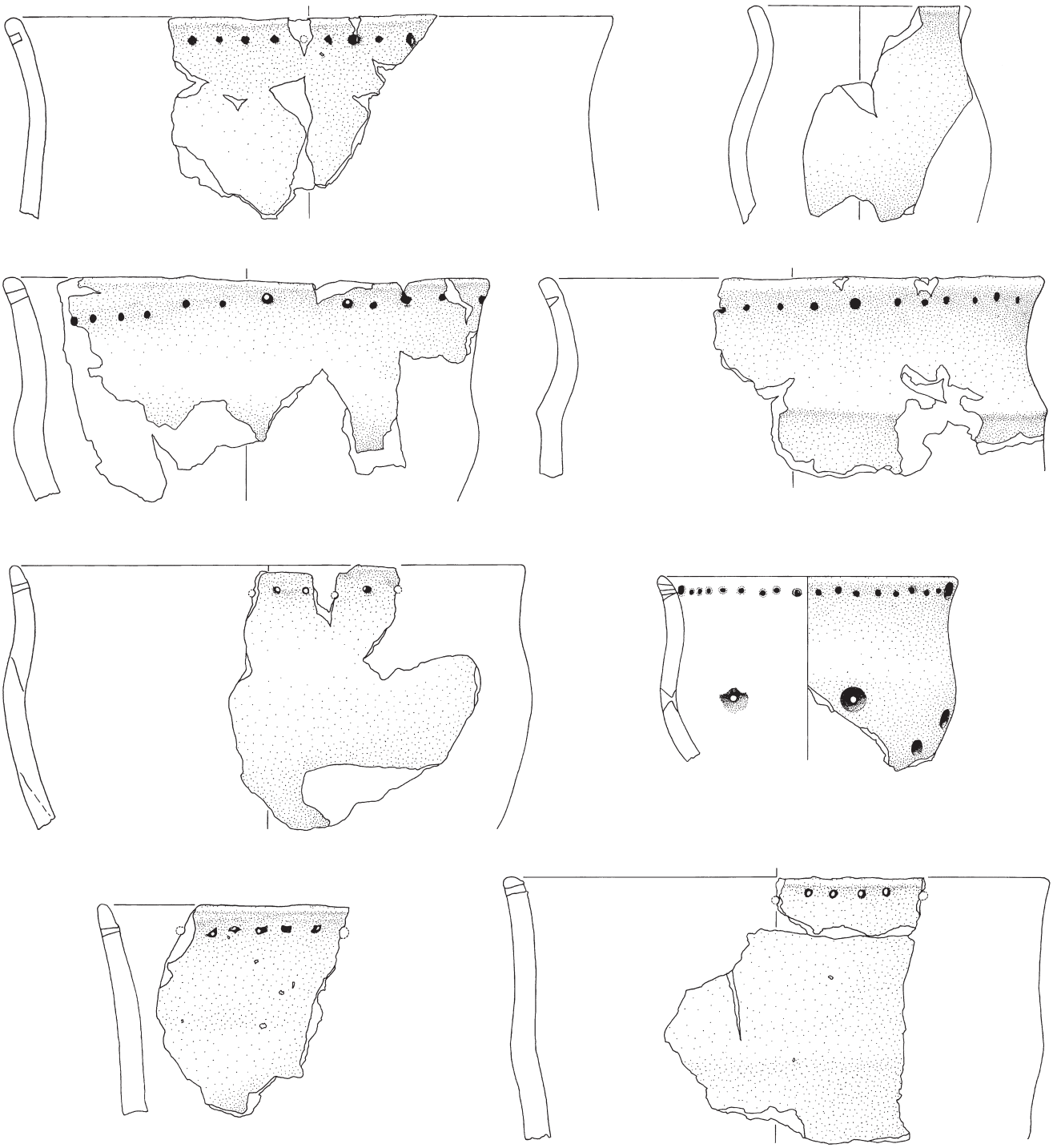

Fig. 4.10. Hazendonk. Vlaardingen 1b pottery. Scale 1:3. Drawings L. Verhart.

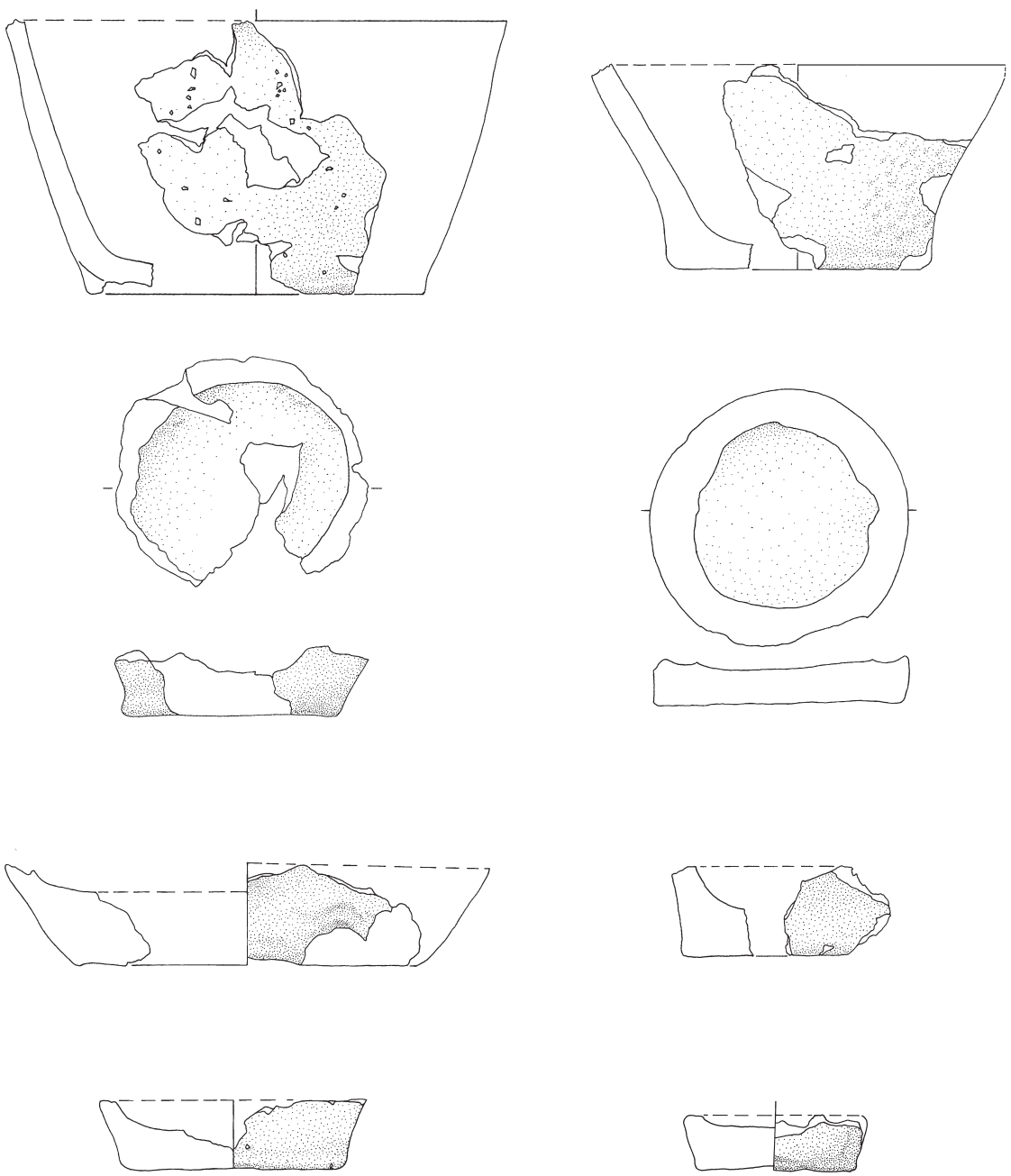

Fig. 4.10. Continued.

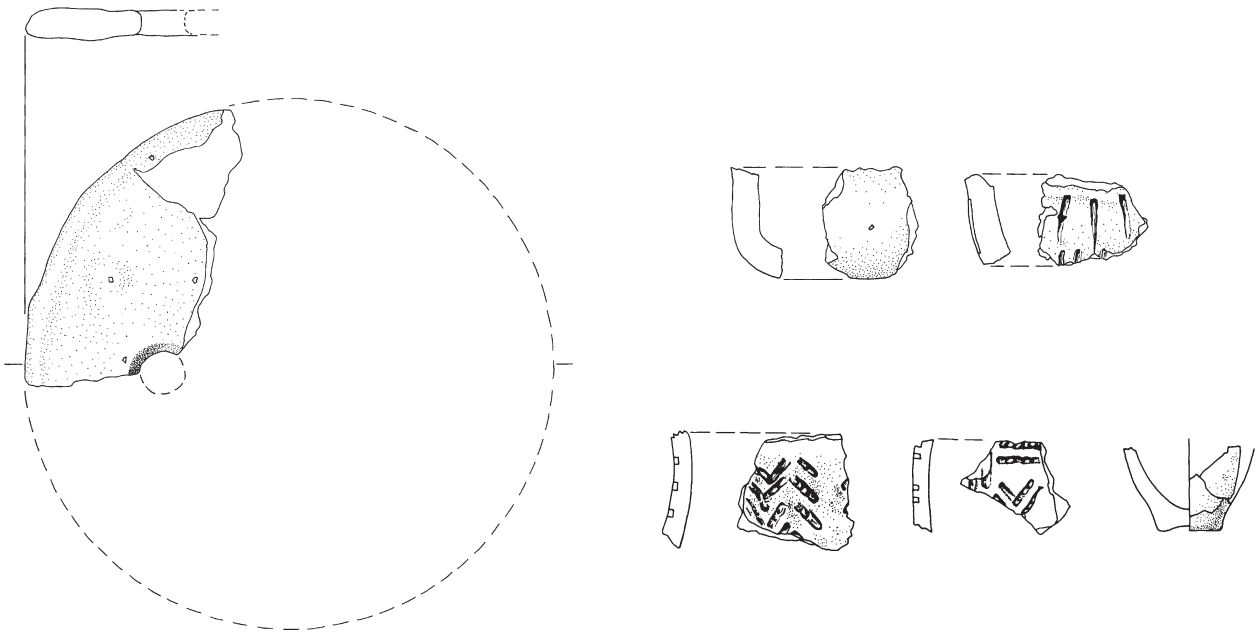

Fig. 4.10. Continued.

diameters were further analysed to determine whether there was a relation between the size of the pots and the presence of perforations or deep circular impressions below the rim. If this were the case, a functional interpretation of the presence or absence of rim perforations might be suggested (storage, cooking etc.). It would appear that pots with perforations in the rim zone are on average somewhat larger than those with incomplete or no perforations; this difference, however, is not statistically significant (Chi-square: 0,5<<0,2). A functional interpretation of rim perforation in terms of pot dimensions therefore seems unlikely.

Flint artefacts: Vlaardingen 1a

The sample of Vlaardingen 1a flint consists of only 7 pieces: five flakes (of which three have use-retouch), one block and one flake core. The average length of the five complete flakes is 3.4 cm. Tables 4.12 and 4.13 show that flint of Rijckholt and Light-grey Belgian type was used, and that flake technology was practised. The two artefacts of flint which was acquired over a long distance are both fragments of polished flint axes, of which one can be typified as an axe with oval cross-section. The other fragment is one of the use-retouched flakes (fig. 4.11).

Flint artefacts: Vlaardingen 1b

A total of 189 flint artefacts are dated to this occupation phase, with a combined weight of 755.1 gr. The assemblage is above all composed of terrace flint, while it also contains pieces of Pebble-Meuse eggs, Light-grey Belgian and Rijckholt flint and fragments of polished flint axes. In this phase, the proportion of burnt artefacts is smaller than in the Hazendonk 3 phase (table 4.14).

Flake technology predominates, which is perhaps related to the small size of the terrace flint: this material inhibits the production of long blades. The average length of complete blades is 2,9 cm (n=7), that of complete flakes is 2.4 cm (n=110). When only the complete pieces with retouch are measured, these figures do not change. Thirty-eight blocks, five flake cores, four nodules, three chips, and one fragment whose basic morphology could not be determined complete the primary classification (table 4.12).

Tools were produced on all flint types and it appears that material which was acquired over a long distance was not specifically favoured for tool production: the percentage of tools made from long-distance raw material (33.3%) is quite similar to the overall porportion of long-distance flint (31.6%, table 4.15). Retouched flakes constitute the majority of the tools: 4 flakes were intentionally retouched, 24 have use retouch. The group of retouched blades consists of 3 intentionally retouched blades and 3 with use retouch. The group of scrapers comprises two flake scrapers with an average length of 2.3 cm, two flake scrapers with side-retouch with an average length of 2.6 cm and one scraper fragment. Only one point was identified. This transverse

	Vlaardingen 1a Number	Vlaardingen 1b	
		Number	%
No cortex	5	106	56.7
Smooth cortex < 50%	1	12	6.4
Smooth cortex > 50%	–	14	7.5
Rough cortex < 50%	1	41	21.9
Rough cortex > 50%	–	14	7.5
Totals	7	187	100.0
Indet.		2	
Flakes	5	125	66.3
Blocks	1	38	20.1
Blades	–	13	6.9
Cores	1	5	2.6
Terrace flint nodules	–	4	2.1
Chips	–	3	1.6
Indet.	–	1	0.5
Totals	7	189	100.1

Table 4.12. Hazendonk-Vlaardingen 1a and 1b. The extent and kind of cortex and basic morphology of the flint artefacts.

	Number	Weight (g)
Long-distance flint		
Light-grey Belgian	1	56.7
Rijckholt	1	7.9
Totals	2	64.6
Indet.	5	6.0
Not burnt	5	68.4
Potlidded	2	2.2
Totals	7	70.6

Table 4.13. Hazendonk-Vlaardingen 1a. Raw materials and proportion of burnt flint.

	Number	%	Weight (g)	%
Short-distance flint				
Terrace flint	39	51	404.2	71
Pebble-Meuse eggs	13	17	62.2	11
Long-distance flint				
Light-grey Belgian	7	9	24.9	4
Rijckholt	4	5	14.4	2
Polished fragments of indet. material	13	17	65.2	11
Totals	76	99	570.9	99
Indet.	113		184.2	
Unburnt	119	63.0	542.9	71.9
Red	3	1.6	4.5	0.6
Crackled	12	6.3	54.8	7.2
Potlidded	55	29.1	152.9	20.2
Totals	189	100.0	755.1	99.9

Table 4.14. Hazendonk-Vlaardingen 1b. Raw materials and proportion of burnt flint.

arrowhead with convex base was produced on a flake. The thirteen fragments of polished flint axes are the remnants of probably four axes, two of Rijckholt and two of Light-grey Belgian flint. Although the small size of these fragments prohibits the reconstruction of specific axe types, the cross-section of the core in fig. 4.11 points to the presence of axes with oval cross-sections; there is no evidence of axes with rectangular cross-sections.

4.5.2.3 The origins of the Vlaardingen Group

In this study, the cultural roots of the Vlaardingen and Stein Groups are of primary importance. Are they to be found in the Swifterbant Culture (cf. Ten Anscher in prep.) and what is the role of the Hazendonk 3 Group, now liberated from its Michelsberg-derived image? (see section 4.4.5). A comparison of the economic data on the Vlaardingen Group with those from the preceding Swifterbant Culture and Hazendonk 3 Group reveals both similarities and differences of emphasis. First, it is significant that the major cereal types of the Vlaardingen Group (emmer wheat and naked barley) are identical to those of both the Swifterbant Culture and the Hazendonk 3 Group. A second striking similarity is the frequent co-occurrence of remains of domestic and wild animals in the bone spectra. However, a closer examination of these data makes it clear that the variety in the Vlaardingen bone spectra is not equalled in the Swifterbant data. In this perspective, P14 is illuminating. The size of this boulder-clay outcrop would have allowed substantial crop cultivation and animal husbandry, but the ecological data suggest that these subsistence strategies were no more important here than at sites such as S3, located on a small levee. The scanty evidence on Hazendonk 3 mammal bone spectra seems to suggest that the diversity of bone spectra marking the Vlaardingen Group might apply to the Hazendonk 3 Group as well (Raemaekers in Raemaekers 1997 *et al*., 187).
The pottery of the Vlaardingen Group has a character of its own with a specific morphology, rim perforations and knobs. Typical finds include collared flasks, clay discs and spoons, as are also found in other contemporary contexts. Nonetheless, some aspects of the pottery of the Swifterbant Culture (cf. Ten Anscher in prep.) and Hazendonk 3 Group are shared by Vlaardingen pottery: the S-shaped pottery of the

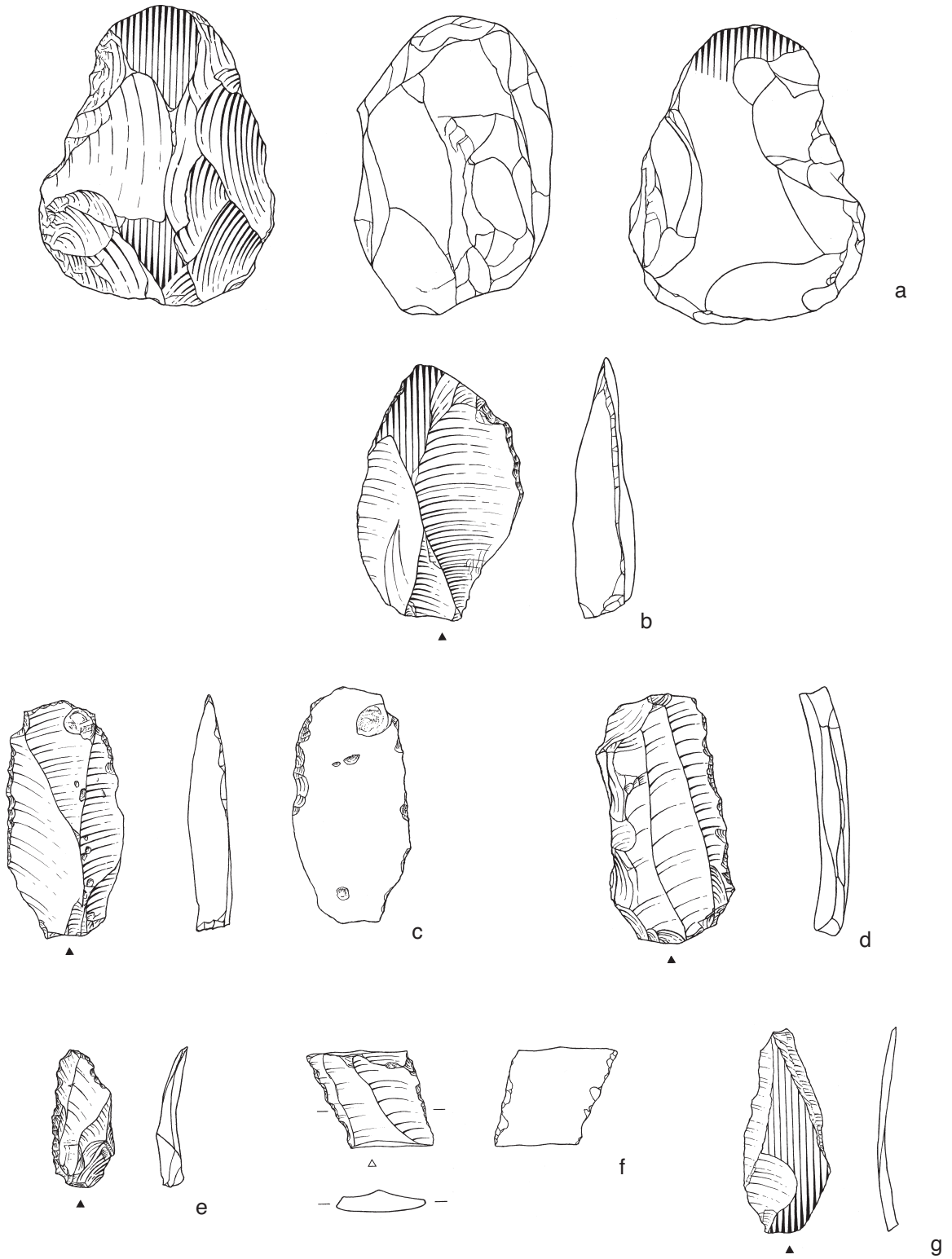

Fig. 4.11. Hazendonk. Vlaardingen 1a and 1b flint artefacts. Vlaardingen 1a: a: core on polished axe fragment, b: retouched blade on polished axe fragment; Vlaardingen 1b: c-f: retouched blades, g: blade on polished axe fragment. Scale 1:1. Drawings C. Dijkstra.

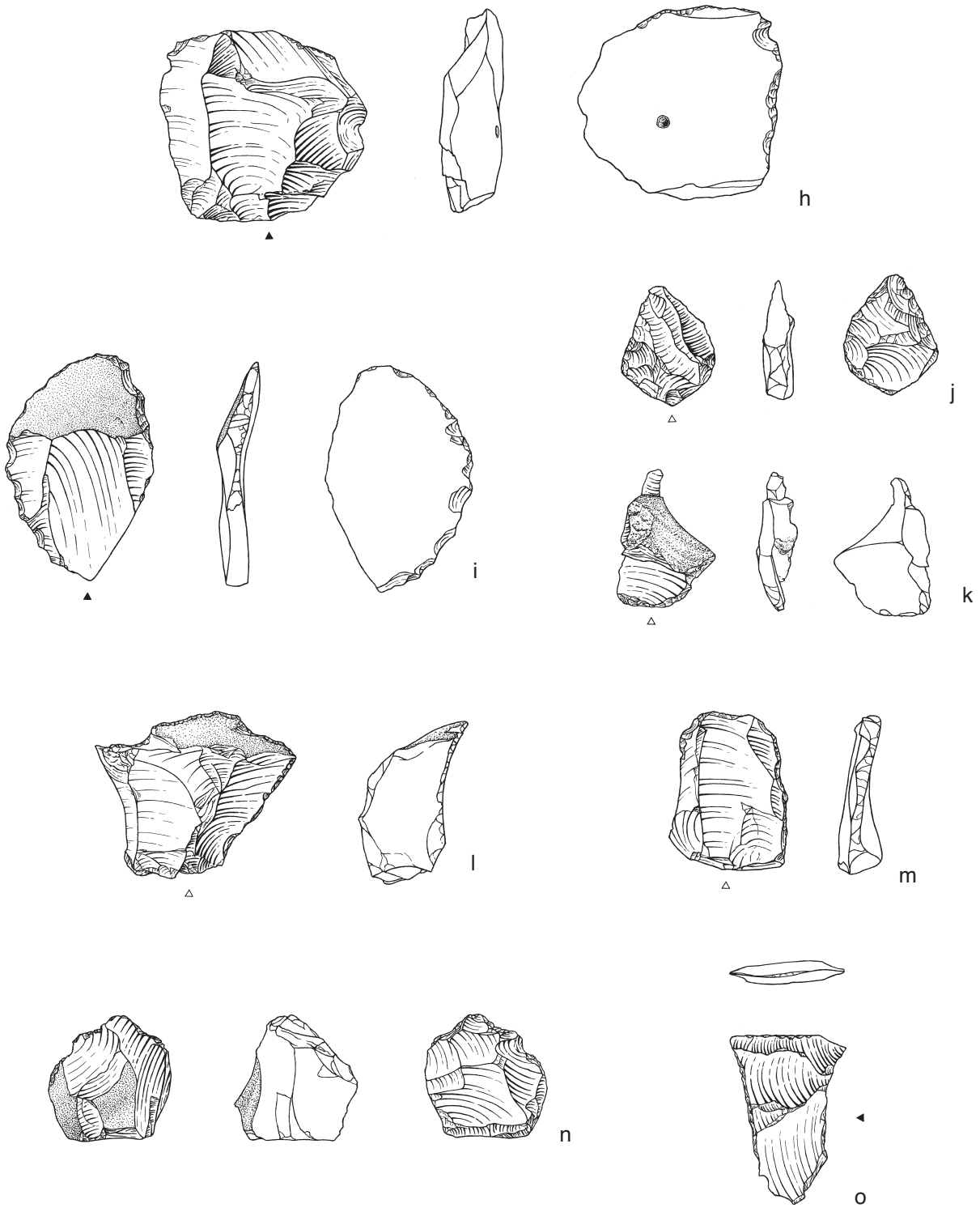

Fig. 4.11. Continued. h-k: retouched flakes, l-m: scrapers, n: core, o: transverse point.

	number	number	%	Identified import materials
Points		**1**	**2**	
Transverse arrowhead with pointed base	1			
Scrapers		**5**	**12**	
Flake scrapers	2			
Flake scrapers with retouched sides	2			1 × Light-grey Belgian
Indet.	1			
Retouched blades		**6**	**15**	
Retouch > 1 mm	3			1 × Rijckholt
Retouch < 1 mm	3			
Retouched flakes		**28**	**70**	
Retouch > 1 mm	4			
Retouch < 1 mm	24			2 × Light-grey Belgian
Totals		**40**	**99**	

Table 4.15. Hazendonk-Vlaardingen 1b. Flint tools and raw materials.

Vlaardingen Group is anticipated in some of the Swifterbant forms, while rim perforation is also sparsely found in these contexts (Brandwijk L50 base's *Lochbuckel* might be seen in this light, while P14 also yielded rims with Vlaardingen-like perforations). The coil-building with N-joins or Z-joins observed in the pottery of the Vlaardingen Group is less common in the pottery of the Swifterbant Culture, but it does become more frequent from 0% in the Early Phase to 8-55% in the Middle Phase (table 3.46). In the pottery of the Hazendonk 3 Group, N-joins and Z-joins constitute some 25-35% of the joins (table 4.6). Grit temper, typical of the pottery from the Vlaardingen 1 phase, is also typical of Late Swifterbant and Hazendonk 3 pottery (tables 3.46 and 4.6). One gets the impression that Vlaardingen pottery combines those aspects of Swifterbant and Hazendonk 3 pottery which are least invested with meaning. In other words, technological features such as tempering agents and coil-building are continued, along with perforations and S-shapes. At the same time, the decoration of Late Swifterbant and Hazendonk 3 pottery is abandoned, which may indicate that their connotations with a specific social life are purposely avoided.
The flake technology of the Vlaardingen Group is again also found in Late Swifterbant (section 3.8.2.2) and Hazendonk 3 contexts (table 4.7). Transverse arrowheads and leaf-shaped points are also known from both the Swifterbant Culture (table 3.47) and the Hazendonk 3 Group (table 4.7). A final parallel with both preceding archaeological cultures is the frequent combination of short-distance and long-distance flint types.
A comparison of the material culture of the Vlaardingen Group with that of the late Swifterbant Culture (Schokkerhaven) and the Hazendonk 3 Group may to some extent explain the cultural roots of the Vlaardingen Group. In geographical terms, the Vlaardingen and Stein Groups are clearly the successors of both the Swifterbant Culture and the Hazendonk 3 Group. The above-mentioned similarities in subsistence data, pottery and flint artefacts of the Vlaardingen (and Stein) Group to the preceding Swifterbant Culture and Hazendonk 3 Group make it clear that the *bricolage* (see section 2.3) of this new cultural phenomenon may largely have been based on available cultural 'raw material' of the Swifterbant Culture and the Hazendonk 3 Group, combined with new elements such as clay discs, collared flasks and specific knob forms. It is primarily the morphology of the pottery in which the new cultural entity of the Vlaardingen and Stein Groups is expressed, while many of the other variables of material culture reveal that cultural elements from the Swifterbant Culture and the Hazendonk 3 Group were incorporated into the material idiom of the Vlaardingen and Stein Groups. I think it is significant that especially those elements were incorporated that are found both in Swifterbant and in Hazendonk 3 contexts. Culture-specific elements such as trapezes, triangular points, allover body decoration on pots and round bases were 'discarded' in the *bricolage* of the Vlaardingen-Stein Groups, as if the common ground in the material expression of the Late Swifterbant and Hazendonk 3 communities was more important than their differences. In my opinion, this suggests that the similarity of the Late Swifterbant and Hazendonk 3 communities was emphasised in the construction of the material culture of the Vlaardingen and Stein communities.

4.5.3 THE VLAARDINGEN GROUP AND FUNNEL BEAKER CULTURE WEST GROUP

Contacts between the people of the Vlaardingen Group and those of the Funnel Beaker Culture West Group are reflected

in the occurrence of collared flasks (in Vlaardingen contexts undecorated and in Funnel Beaker contexts often decorated) and identical clay discs in both contexts. According to Bakker (1979, 57-59), the clay discs are identical to those of the Funnel Beaker Culture North Group. If we take into account that clay discs do not occur in Swifterbant and Hazendonk 3 contexts, then the conclusion has to be that during that period, the Michelsberg connotation of clay discs prohibited the introduction of such items in these societies; however during the subsequent period of the Vlaardingen Group, the Funnel Beaker Culture West Group connotation was apparently less problematic or perhaps even desirable. The two sherds in *Tiefstich* tradition of Hazendonk (Louwe Kooijmans 1976a, fig. 23, fig. 4.10) and the polished flint axes of Buren type are other indications of contacts between the people of the Vlaardingen Group and those of the West Group (Bakker 1982).

Traditionally, contacts between the people of the Vlaardingen Group and those of the Funnel Beaker Culture West Group are thought to have been limited (e.g., Van Gijn/Bakker *in press*). In my opinion, this conclusion has a serious flaw. The problem is that our evidence about the Vlaardingen Group derives from settlement material, while the heavily decorated Funnel Beaker pottery and associated artefacts are best known from various megalithic chamber assemblages. The pottery of Funnel Beaker settlements is poorly known. Bakker's description of that from the Beekhuizerzand settlement (Bakker in Modderman *et al*. 1976, 43-57) reveals that, apart from the decorated *Tiefstich* ceramics, there are also many undecorated sherds[16], which are comparable to pottery from sites of the Vlaardingen Group (Bakker in Modderman *et al*. 1976, 51). Bakker even suggests that there may have been no typological or cultural contrast between early Havelte Funnel Beaker Culture pottery and Vlaardingen pottery.[17] If Beekhuizerzand had been located in the Dutch wetlands, the modest amount of rim perforations and the absence of knobs would place the undecorated pottery of Beekhuizerzand in the Vlaardingen 2 phase, while the grit temper would put it in the Vlaardingen 1 phase. The pottery from this site suggests that the similarities between the pottery of the Vlaardingen Group and the Funnel Beaker West Group are not restricted to the collared flasks and clay discs, but may indeed encompass a substantial part of the pottery used in domestic contexts.

In previous sections, it was argued that parts of the material culture of both the Vlaardingen Group and the West Group of the Funnel Beaker Culture were constructed from elements already found in the Swifterbant Culture and the Hazendonk 3 Group (sections 4.5.2.3 and 4.4.5 respectively). If this common source is accepted, the above-mentioned similarities in parts of the material culture of the Vlaardingen Group and the Funnel Beaker Culture West Group appear in a different light. In my opinion, the clear differences in material culture between the Vlaardingen Group and the West Group should not be interpreted in terms of 'indigenous' (Vlaardingen) – 'immigrant' (West Group) relations[18], but rather as a deliberate construction of oppositions between two peoples with common ancestors and frequent contacts (cf. Ten Anscher in prep.).

notes

1 According to Brounen and De Jong, it is Limburg pottery. Its identification as La Hoguette pottery was proposed by Van Berg 1990 (fig. 9, 10-11) and is followed here.

2 Louwe Kooijmans dated this point to the Hazendonk 2 occupation phase (1976a, 265).

3 If it is accepted that the open forms are of supra-regional importance, the isolated finds of these pottery forms in Flanders (Antwerp: Lüning 1967, table 2.E; Lommel: De Laet/Mariën 1950, fig. 41; Lüning 1967, 2.D) do no longer allow a certain attribution to the Hazendonk 3 Group (compare Louwe Kooijmans 1980b, 184).

4 Meeuwen-Donderslagheide (Creemers/Vermeersch 1989) is certainly no single-phase site and consequently is not considered here. The presence of Hazendonk 3 pottery is clearly attested at Meeuwen, but there is no stratigraphy to separate it from the remainder of the finds.

5 History repeats itself. In 1974, Louwe Kooijmans proposed that the roots of the Hazendonk 3 pottery might be found in the pottery from Swifterbant. At the time, the lack of finds (the Hazendonk 1 and 2 find layers had not yet been excavated!) prevented a detailed comparison (1974, 162).

6 A find layer with material of the Ertebølle Culture was found beneath this layer (Schwabedissen 1972; 1979).

7 In my opinion, the differences between *Tupfenleist* and *Arkaden* rims are of degree rather than kind. These terms describe the ends of a continuous spectrum of rim construction techniques between clear arcade-like impressions below a thickened rim (*Arkaden*) and a thickened rim produced by double-folding the clay, producing a clearly Z-shaped section (*Tupfenleist*).

8 The pollen diagrams of Rosenhof (Schütrumpf 1972) and Siggeneben-Süd (Meurers-Balke 1983) indicate that at the time of occupation of the sites, a more open landscape came into being. While this may have been the result of human action, it certainly resulted in better conservation chances for grass pollen, cereals and non-cereals alike. The translation of cereal-like pollen into crop cultivation is strengthened by the co-appearance of *Plantago lanceolata* (pers. comm. C.C. Bakels 1998). Crop cultivation in the early Funnel Beaker Culture is also attested by macro remains of naked barley, emmer and einkorn at Stengade II on Langeland (Hjelmqvist 1975, table 1). Stengade II is contemporaneous with either Rosenhof or Siggeneben-Süd (Skaarup 1975, 193).

9 An interpretation of the Siggeneben-Süd pottery in terms of multiple occupations is to be found in Nielsen 1986.

10 According to Hogestijn, there were minor differences between the material culture of the Swifterbant cluster and the Ertebølle Culture. During the subsequent period of the Schokkerhaven occupation, The Swifterbant Culture increasingly came to differ from the early Funnel Beaker Culture (1990, 174). I would like to argue that the reverse is true: the structural differences between the Swifterbant Culture and Ertebølle Culture were bridged by the formation of the Funnel Beaker Culture (see below).

11 Numbers refer to Kampffmeyer's catalogue.

12 These parallels between pottery from Hüde I and assemblages from the early Funnel Beaker Culture are not new (Ten Anscher in prep.; Kampffmeyer 1991, 258-260; Meurers-Balke 1983, 94).

13 The relations with the Wartberg Group in Hessen (Germany) are less clear-cut. The pottery bears certain similarities to the Vlaardingen-Stein pottery, but there are also striking differences in other categories of material culture. The stone axes with rectangular cross-section of the Wartberg Group (for example Schwellnus 1979, table 16) are not known from Vlaardingen/Stein contexts, but in the Netherlands are confined to the Funnel Beaker Culture, while the transverse arrowheads of the Vlaardingen and Stein Groups are absent in Wartberg contexts (Louwe Kooijmans 1976a, 277; 1983, 64).

14 See note 12 for a comparison with the Wartberg Group.

15 Louwe Kooijmans 1976a: Hazendonk 2 (fig. 13). In 1989, Verhart and Louwe Kooijmans redated this pot to the Vlaardingen 1a occupation phase (1989, note 27).

16 Unfortunately, the percentage of decorated sherds is not mentioned. What proportion of the Beekhuizerzand pottery bears a resemblance to Vlaardingen Group pottery is therefore uncertain.

17 One Beekhuizerzand pot is a close parallel to the third Hazendonk-Vlaardingen 1a pot (compare fig. 4.8 and Modderman *et al*. 1976, fig. 6.3).

18 Louwe Kooijmans (1993a, 129) speaks of northern TRB and southern Vlaardingen 'cultures'.