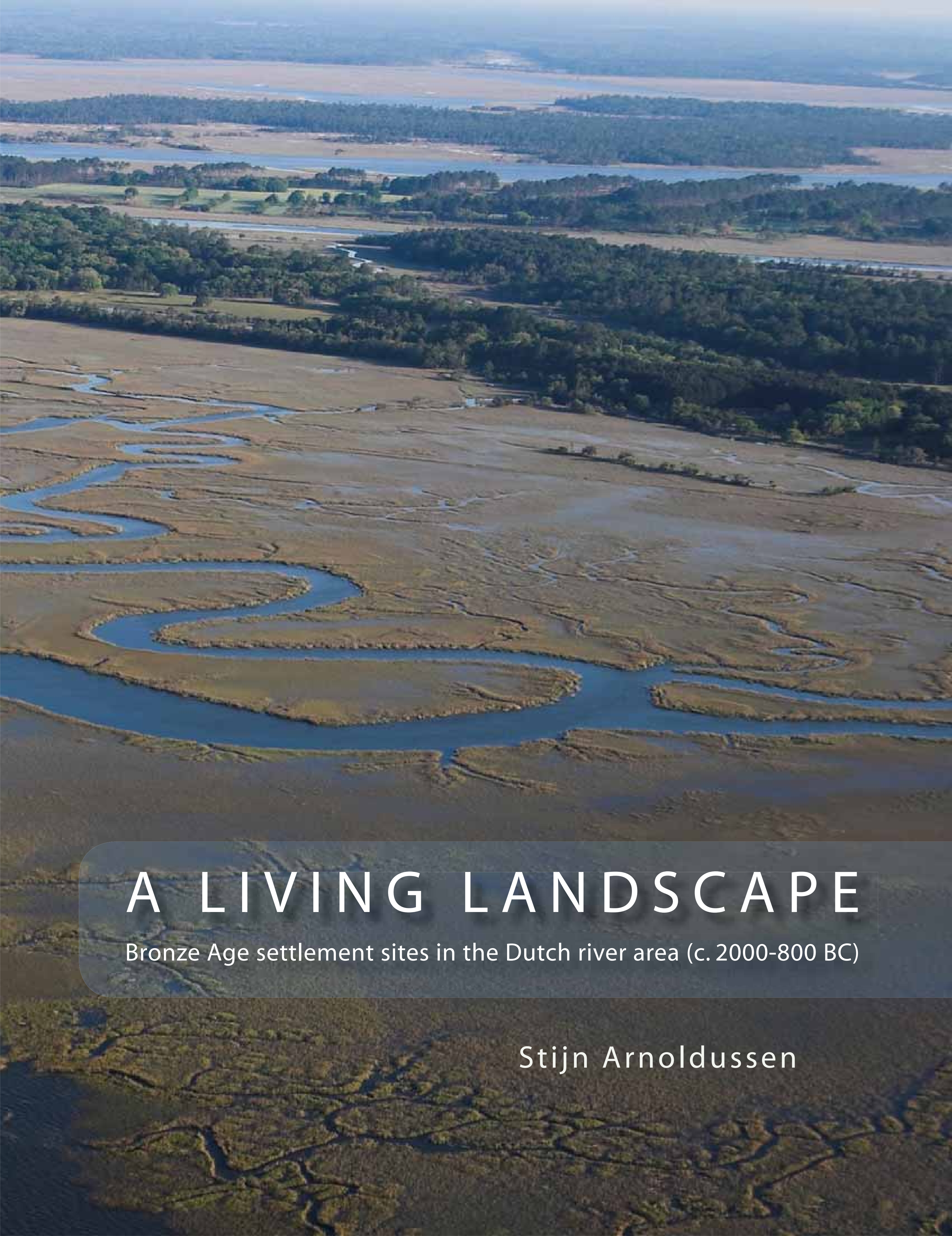

A LIVING LANDSCAPE

Bronze Age settlement sites in the Dutch river area (c. 2000-800 BC)

Stijn Arnoldussen

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'Qu'il parle donc, ce sol, à défaut des hommes qui se refusent.'
C. Lévi-Strauss (1955, 384)

Contents

Preface

This is a book about the nature and dynamics of Dutch Bronze Age settlement sites. The change from the third to the second millennium BC, saw the introduction of a new metal alloy, bronze, which was more frequently interred in graves and depositions. The introduction of this tin-copper alloy is seen as the defining trait of a twelve hundred-year era (*c*. 2000-800 BC) which lends it its name. To see the introduction and gradually more frequent circulation and production of bronzes as something that captures the essence of cultural groups during the Bronze Age, however seems disproportionate. The initial numbers of bronze artefacts that entered the Low Countries was probably low and did not lead to a wholesale replacement of flint (as the dominant material used for cutting implements). Moreover, these bronze items were presumably just one of many items and practises that were shared in the pre-existing networks of contacts. In addition, for local communities on a daily basis, the importance of bronze may have been limited. In self-sufficient small scale agricultural communities, a significant amount of time and labour is invested in the execution of agricultural and domestic tasks. Tending to fields (warding off animals, ard-ploughing, weeding) and processing and storing produce, favoured an increase in the permanency of settlements. Presumably, from the Neolithic onwards, settlements were the foci around which 90 % of life revolved (Louwe Kooijmans 2000, 324).

However, while much of Neolithic as well as later Bronze Age everyday life may indeed have been played out in – or was centred on – settlements, according to established views, the nature (*i.e.* composition) and dynamics of the settlements differ distinctly between these two periods. Neolithic settlements are generally seen as a concentration and palimpsest of different activities and activity areas, in which little internal structure is discernible after time. Feature distribution maps generally show dense posthole clutters that are overlapped or surrounded by relatively dense and homogenous finds-distributions. Individual settlement site elements such as houses and outbuildings can only very infrequently be reconstructed on settlement sites from the Middle and Late Neolithic. In addition, it is thought that not all Neolithic settlements were settled permanently (*i.e.* year-round) and that domestic sites are supplemented by a range of special activity sites such as fishing spots and hunting camps.

Bronze Age settlement sites, again according to established views, have a decidedly different appearance. Agricultural settlements now show clearly identifiable houses and outbuildings that are placed within physically defined farmsteads. In some regions, systems of fences or ditches parcelled an extensive part of the areas beyond the houses. This image of an agricultural landscape with clear-cut parcels, large byre-houses and outbuildings placed within farmsteads, displays a distinct familiarity to the historic (pre-World War II) rural Dutch landscape. It is thought that during the (Middle) Bronze Age, isolated farmsteads and small clusters of two (possibly three) houses dotted the landscape. These were the central places in which the everyday tasks of food preparation and the chores innate to a subsistence base of inter-dependant livestock rearing and crop-cultivation were undertaken. After a limited period of occupation, usually equated to a human generation or a 25-30 year period, houses were relocated. The driving forces behind such periodical relocations are generally assumed to be soil-depletion, limited durability of construction wood, or changes in household composition.

But are such interpretations of Bronze Age settlements essentially correct? The answer is ambivalent, as many aspects of Bronze Age settlements are still ill-understood. Why, for example, are houses from the Early Bronze Age and Middle Bronze Age-A scarcely known, while we have an abundance of evidence for Middle Bronze Age-B houses? What did the direct vicinity of Bronze Age farmhouses look like? Were these indeed structured and fenced-off house-environments, or are we being misguided by false analogies to (sub-)modern farmsteads? What are the consequences for ideas on settlement mobility, if Bronze Age houses could have lasted between five decades to a century? If periodical relocation of houses was indeed the norm, why are houses in the river area often situated so close to each other, with comparable orientation and placed within similarly orientated fence-systems? Should the nucleation of (contemporary) house-sites be considered a valid option here? What does it mean that Middle Bronze Age-B houses from different regions were in some aspects very similarly built, while the long-term use-histories of their house-sites differed distinctly between regions? These are just a few examples of the various questions that still need to be answered in order to acquire a better understanding of the nature and dynamics of Bronze Age settlement sites.

In this study therefore, the image of the Bronze Age cultural landscape and particularly the domestic elements in it, is critically evaluated, and attempts are made to answer questions like those presented above. The approach is essentially three-pronged. First, backgrounds to the traditions and premises current in Bronze Age settlement archaeology and the archaeological and geological particularities of the study area are discussed. Second, an in-depth discussion of the different Bronze Age settlement site elements and their implications for site function, use-life and chronology are evaluated. Third, the interrelation of these different elements is studied in relation to diachronic perspectives on the nature of houses, structured house environs and settlement sites as a whole. Thereafter, the conclusions are synthesized in order to characterize in more detail the nature (*i.e.* composition) and dynamics of Bronze Age settlements in the Dutch river area, and they are placed in broader perspective.

1 Introduction: Living in a dynamic (cultural) landscape

1.1 Introduction

The Netherlands comprise a wide range of landscapes that present specific advantages, but also hazards to its occupants. Undoubtedly, this was also the case in prehistory, yet the struggles in the recent past by the Dutch to cope with floods and dyke breaches may have created a misleading image of (pre)historic man as being in constant fight with the elements (*e.g.* Waterbolk 1981; Brandt 1986; Stol 1993; fig. 1.1). The Netherlands are even described by the geographer Roberts as '… a battleground between land and sea (…)' and '(…) a difficult and often inhospitable environment.' (Roberts 1996, 135, *cf.* Hendrikx 1989, 31). Possibly, the apparent idiocy of occupying a fluvial landscape without the reassuring presence of dykes may even have discouraged initial archaeological interest in the Dutch river area, something which was not the case for the adjacent Pleistocene upland areas. Thus, despite a somewhat belated start, recent archaeological studies show that the Holocene river area offered as much – or even more? – of a suitable landscape to prehistoric occupants as did the Pleistocene areas.

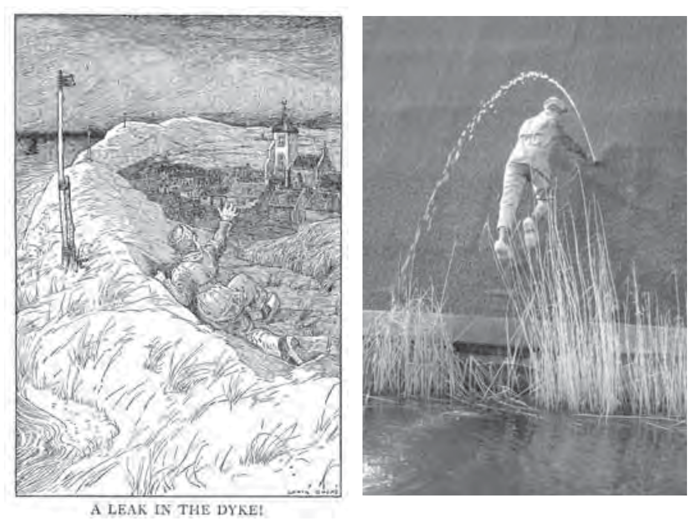

Fig. 1.1 The 'Hero of Haarlem'. The fictitious narrative (Dodge 1924, 126-132) of a single Dutch boy preventing a dyke breach has become a popular folk image for the Dutch struggle against the water. Left: original illustration (Dodge 1924, 129), right: recreation as sculpture, part of Dutch theme park Madurodam.

Excavations of river dunes and levee deposits have documented the presence of man in the Dutch river area from the Mesolithic onward. In the Mesolithic and Neolithic periods the occupation seems to have consisted of briefly used or semi-permanent campsites on levees and river dunes.[1] Upon entering the second millennium BC, however, the general nature of the human presence in the landscape changed, both within and outside the Dutch river area. Excavation results testify to a more extensive and more diverse shaping of the landscape than hitherto known. Large elongated farmhouses were erected and in the vicinity of these farmhouses large areas became fenced, or parcelled by ditches. Additionally, palisades were constructed and burned areas of ill-understood function were reported, as were bog tracks, and even a possible cult shrine.[2] In particular, the vast extent to which land was marked by man-made structures differs remarkably from the preceding Neolithic period. Perhaps this should be interpreted as a development in which local communities utilized new ways of expressing their perception(s) of their environs. This appears to involve notions of incorporating or integrating the wider environment into the settlement site space, as opposed to a Neolithic tradition of setting apart (delimiting) settlement space with man-made structures.

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1 Louwe Kooijmans 1974; 2001a-b; Louwe Kooijmans & Jongste 2006; Amkreutz *in prep.*, *cf.* section 7.2. A few palaeolithic finds are also known.

2 See Chapter 5 on Bronze Age palisades, fences and burned areas. For Bronze Age bog tracks see Casparie 1987; Van der Sanden 2002, for the possible shrine see Van Zeist & Waterbolk 1960; Van der Sanden 2000.

It is probable that the transition towards a subsistence strategy based on fully interdependent livestock herding and crop cultivation ('true mixed farming'; *sensu* Louwe Kooijmans 1993), which is thought to characterize Bronze Age subsistence, supported or even necessitated such different perspectives towards the surroundings of domestic sites in the Bronze Age, compared to preceding periods. The known extensive Bronze Age systems of land divisions, whether constructed as reaves, ditches or systems of fences, may be a tangible reflection thereof.

The dynamics of settlement sites change significantly after the Neolithic period. In addition to single phase or short-term occupied Bronze Age settlement sites – which seem to have been abandoned after a certain (*e.g.* generational) life-span – locations appear that witness prolonged or repeated occupation, although the dating and duration of such phases are often ill-understood. In any case, not all settlement sites seem to shift their position in the landscape after a single habitation phase, as the commonly used model of the 'wandering farmsteads' suggests (Fokkens & Roymans 1991; Schinkel 1998; *cf.* section 3.3.1; table 7.2).

Within the reconstructed Bronze Age settlement sites, the presence of a new type of rural domestic unit – the farmstead – is postulated. According to common definition (see section 3.1), a farmstead is an agricultural compound comprising a longhouse, some outbuildings and sometimes pits, a well or a funerary monument. It is generally assumed that structures such as fences or ditches were used to physically as well as conceptually set such a domestic unit apart within the wider landscape. The validity of this assumption is dealt with in detail in Chapter 6 and section 8.2.1.

The main building within the farmstead is the farmhouse. Long houses, often over 20 m in length, which are scarcely known from the final quarter of the third millennium BC, become general and widespread during the Bronze Age (Chapter 5). The assumed durability of these houses is taken as an indication for permanent (*i.e.* year-round) occupation. In the length and structural properties of these longhouses, archaeologists see(k for) evidence of livestock stalling. The housing of cattle under the same roof as one's living quarters is thought to be a crucial factor in distinguishing between Late Neolithic and Bronze Age farming communities, as it is thought that this (long-lasting) concept of the 'byre-house' was introduced during the Bronze Age.[3]

To summarize, several important changes in the way settlement sites functioned within their wider natural and cultural surroundings take place at the start of the second millennium BC. Settlement sites are seen as points in the landscape that remained the focal point of domestic activity for periods in the order of a human generation. Compared to the preceding Neolithic, a reduced number of contemporaneous (yet functionally different) site types is reconstructed. In other words, 'Neolithic site types' such as 'special activity sites', 'procurement sites' and 'hunting camps' are regarded as having become obsolete, or at least to have been reduced greatly in number and importance (see section 7.2.2). The Bronze Age settlement site is a focal point for people bound to their land by livestock herding and ard-agriculture. More so than in Neolithic times, it seems to have been important to adhere to rules of placement for man-made structures in the direct vicinity of a house, such as outbuildings and fences. The large – and in the Middle Bronze Age-B regular (see section 5.2) – Bronze Age farmhouse, may have been the central element determining the layout and perception of the immediately adjacent area; the 'farmstead' (see section 3.2.2 and Chapter 6).

Unfortunately, the changes taking place at settlement sites dated to the periods directly preceding and directly after the Bronze Age have seen little systematic investigation. Although a large number of Bronze Age settlement sites is known from the Netherlands (n > 64, > 308 houses known), research questions directly addressing the composition (nature) or dynamics of these settlement sites as a whole are only infrequently encountered. In this study, an effort is made to correct this unequal distribution between the abundance of data available and the paucity of direct analyses of settlement site nature and dynamics. This will be done by studying an extensive and well-documented data set of Bronze Age settlement sites from the Dutch river area (see Chapter 4). In the sections below, the importance of studying Bronze Age settlement sites is pointed out, followed by a discussion of the selection of the Dutch river area as the area of study.

3 Waterbolk 1975, 393; Roymans & Fokkens 1991, 6; Huijts 1992, 199; Harsema 1997a, 139; Rasmussen 1999; Zimmermann 1999; Fokkens 1999; 2003; 12; Gerritsen 2003, 67; but see also Arnoldussen & Fontijn 2006, 295-296 and section 5.2.3.

1.2 Why study Bronze Age settlements?

The lure of the landscape
The Bronze Age in the Netherlands is traditionally regarded as the culmination of the processes of neolithisation and sedentism. For the first time, a picture of a deceptively familiar cultural landscape can be drawn (Arnoldussen & Fontijn 2006, *cf.* Brück 1999b, 273-274). This familiarity is most visibly expressed in the reconstruction drawings of Bronze Age settlement sites made for the general public (fig. 1.2).

Several of the depicted aspects find parallels in the present-day Dutch landscapes. Large farmhouses in which the livestock was housed under one roof with human occupants were used in the Netherlands until the 19th and early 20th century AD.[4] The mixed farming system, with interdependent livestock rearing and crop cultivation, formed the subsistence base for the majority of the Dutch prior to the industrial revolution.[5] The parcelling and fencing of the settlement (surroundings) depicted in figure 1.2 mirrors the utilitarian and compartmentalized present-day Dutch agrarian landscape. But exactly because of these similarities, it is legitimate to remain cautious as to what extent the reconstructions of Bronze Age agricultural landscapes by Dutch archaeologists may have been influenced by the vivid, yet possibly false, analogy that the (sub-)contemporary Dutch landscape itself poses. Such a point of view, calls for detailed and systematic study of the landscape features of prehistoric settlement sites. In other words, how certain can we be that the images presented above are typical, or even essentially correct?

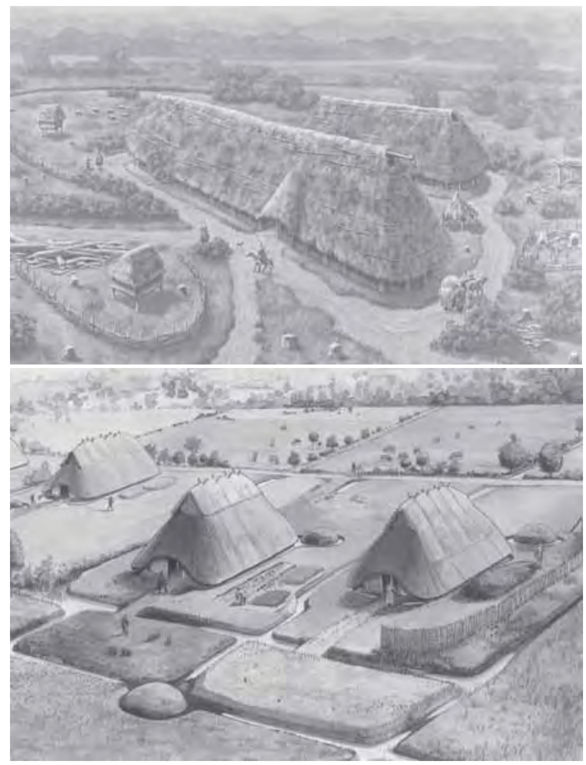

Fig. 1.2 Artists reconstructions of the Middle- to Late Bronze Age occupation at Elp (top: painting by Simon Drost, copyright Drents Museum, Assen) and Bovenkarpsel (bottom: drawing by Koen van der Velde, from Louwe Kooijmans 1998, 336 fig. 10).

Studying Bronze Age prehistoric settlement sites
Prehistoric settlement sites have been, and will remain, extremely valuable sources for archaeological research. Especially for the Bronze Age, they provide a much-needed counterbalance to the – more numerous – studies on bronze deposition and funerary monuments. Whereas recent studies of the latter two fields have proven to reflect very incidental (once to a few times per generation, possibly less) actions of the local communities under study (Fontijn 2003; Lohof 1991; Theunissen 1999), settlement sites were at the heart of everyday life. Or as Louwe Kooijmans (2000, 324) stated:

> *'However important monuments, ritual places and cemeteries might appear, we should realize that 90 per cent of life revolved in and around the settlement.'.*

Settlement sites formed the focal point for a diverse group of everyday domestic activities, or as Rasmussen & Adamsen (1993, 139) have formulated it: 'Settlements are the remains of the most central places in the life of Bronze-

4 *E.g.* Tiesing 1921; Trefois 1941; Bijhouwer 1943; Everhard 1965; Koning 1966; Albers *et al.* 1990; Van Olst 1991.
5 For general introductions to Dutch agricultural history see for instance: Blink 1902; 1904; Slicher van Bath 1976; De Vries 1974; Bieleman 1992.

Age Man'. They may represent the single place in the cultural landscape where people, livestock, agrarian tools and tasks, and presumably also deities and ancestors interacted on a daily basis. One may perhaps consider the Bronze Age longhouses to have stood as monuments to this special interplay. Not unimportantly, settlement sites furthermore represent the most frequently encountered site type in Dutch archaeology.

Therefore, a systematic study of Bronze Age settlement sites may inform us better on various aspects of Bronze Age everyday life. In this study, the role of the settlement sites will be assessed on different levels. The highest level is formed by the settlement system; why are settlement sites found in certain places? What options were available to Bronze Age local communities, and more importantly, can insight be gained into the reasons why a particular place was (not) chosen? Especially in the Dutch river area, the physical landscape can change dramatically on a small spatial as well as a temporal scale (see Chapter 2). An analysis of site locations may point us towards the decisions that Bronze Age farmers made and help us in compiling a reconstruction of a 'Bronze Age perception' of the landscape. At this level, the information from settlement sites must be complemented by information on other elements in the physical landscape. By incorporating the information available on funerary rituals, depositional practices and agricultural and industrial activities, a more detailed reconstruction of the Bronze Age (cultural) landscape can be made.[6] Furthermore, settlement sites need to be studied in a long-term perspective. The answers to the questions 'what was there before?' and 'what happened thereafter?' are necessary supplements to studies of settlement sites based on a static or 'snapshot' temporal perspective. How have older man-made elements in the landscape affected later Bronze Age occupation? What exactly did happen once a settlement site was abandoned? A long-term approach to house-site usage can possibly indicate different prehistoric perceptions of former domestic sites (see section 7.3.2).

Besides these more technical questions, a more fundamental problem needs to be solved at this scale. Were there ever Bronze Age villages in a social sense? Did Bronze Age local communities (or families?) cluster into villages? Is it even reasonable to expect prehistoric settlement sites to have been physically defined and to be archaeologically visible as such?

Similar questions may be posed on a smaller spatial scale; that of the farmstead. It is assumed that Bronze Age farmers structured the surroundings of the farmhouse in such a way that this is recognizable by archaeologists. From this, Bronze Age decision making in structuring of the house environs can be inferred. Did Bronze Age farmers, for instance, share a mental 'template' of what a house-site should look like? Why do possible farmstead elements like granaries or pits occur where they do? Can the structure of the farmstead be tied to agricultural or social processes? To answer questions like these calls for a detailed analysis of Bronze Age houses and their direct surroundings (Chapter 6).

On the smallest spatial level, that of the farmhouse proper, there are also various interesting questions to be raised. Apart from some more generalized accounts (*e.g.* Harsema 1997a; Theunissen 1999, 192-197; Fokkens 2005b), not much detailed information is available on whether Bronze Age farms functioned differently in various parts of the Netherlands and if so, what this difference entails. Only rarely does conservation allow for the reconstruction of living quarters or byres. For reconstructions of the number of inhabitants and their activities, the situation is even dimmer. In this study, the house proper will be studied, amongst other aspects, as an expression by Bronze Age communities of their attachment to place. From systematic repairs or the rebuilding of a house on the same spot, it may be inferred that it was important to prolong the existing domestic functionality of a given plot.

Summarizing, there is still much to be learned from studying Bronze Age settlement sites. These settlement sites must however be studied integrally as part of a wider (physical and conceptual) cultural landscape. The validity and nature of the 'settlement' – *i.e.* a (social) grouping of houses – and 'farmstead' – *i.e.* the highly structured farmhouse surroundings – concepts for the Bronze Age needs to be evaluated. This calls for a detailed analysis of settlement site data at different spatial scales and within a broad temporal scope.

6 Although the interrelation of the various elements will be discussed to some extent in this study (*cf.* section 8.2), it will not be dealt with in detail as it forms the core of the research done by Fontijn (Arnoldussen & Fontijn 2006, Fontijn 2007, Bourgeois & Fontijn 2007). For a discussion of the cultural landscape concept see section 3.2.6.

1.3 Settlement analysis and Bronze Age studies: the onset

Initially, north-west European Bronze Age studies focussed predominantly on bronze artefacts and barrow contents. This initial attention to bronze artefacts was guided by the relatively high number of bronzes preserved, combined with the fact that these were often of 'familiar' shape, thus facilitating easy recognition. The antiquarian interest in barrows – sometimes sparked by folk-tales – of the 19th century, combined with the fact that mounds were often still visible in the landscape, was presumably crucial to the early start of Bronze Age barrow research. Until that moment, Bronze Age settlement sites – nor ritual sites, for that matter – were scarcely specifically targeted for research.

This general imbalance in the development of north-west European Bronze Age studies holds true for the Netherlands as well. It is consequently no surprise that of the first three Dutch Bronze Age settlement sites where houses were discovered for the first time (Deventer, Elp, Emmerhout), two were discovered by chance during barrow excavations (Modderman 1955a; Waterbolk 1964; 1987; Van der Waals & Butler 1976).

Since these initial discoveries in the fifties and sixties of the 20th century, the balance between the main branches of Bronze Age studies in the Netherlands shifted. This was primarily a consequence of the greater number of excavations undertaken as part of the Dutch reconstruction projects during the post world war II era (Roymans & Fokkens 1991). Settlement archaeology evolved into an established practical as well as an academic field of research. By 1989, a large number of Bronze Age settlement sites were known from various geological landscapes of the Netherlands, but only few were published in full (but see: Louwe Kooijmans 1974; Waterbolk 1964; 1987). A conference was organized, of which the proceedings (Fokkens & Roymans 1991) offer a concise overview of a large number of Dutch Bronze Age settlement sites. Since then, excavated Dutch Bronze Age settlement sites are predominantly published as site reports and only rarely discussed as a – regional – group. An important exception is the dissertation by Theunissen (1999), who in her evaluation of the Bronze Age 'Hilversum-culture', offered an overview of Dutch Bronze Age regional settlement characteristics (Theunissen 1999, 118-131; 192-197). In addition she offered, in cooperation with Hulst, more detailed excavation reports for two Bronze Age settlement sites (Zijderveld and Dodewaard; Chapter 4) in the Dutch river area (Theunissen & Hulst 1999a-b).

More recently, various other Bronze Age settlement sites have been discovered during the last decade. This can in a large measure be attributed to the construction of the 'Betuweroute' freight railway. This cargo railroad starts near Rotterdam's harbour and crosses the Dutch central river area to connect in the east to the German Rhineland near the village of Zevenaar. From 1995 to 2004, archaeological fieldwork, ranging from prospecting, a watching brief, test-trenching to extensive excavations, resulted in the discovery of as many as 40 settlement sites for the Bronze Age alone. Four of these were selected for large-scale excavation and have been published in full.[7] Unfortunately, for some older, large-scale excavations elsewhere in the Netherlands with valuable information on the structure and dynamics of Bronze Age settlements (*e.g.* Andijk, Bovenkarspel, Angelslo) only preliminary reports are available.[8]

1.4 Previous approaches to Dutch Bronze Age settlement sites

At first glance, it may appear that Bronze Age settlement sites occur abundantly in the Netherlands, and especially in the Dutch river area. So why is it that with all the publications currently available we once again need to study Bronze Age settlement sites? To answer this question, a brief digression into the way archaeologists historically have dealt with Bronze Age settlement sites is necessary.

The first settlement sites

Initially, in the fifties and sixties of the former century, much attention was paid to the recognition of Bronze Age settlement sites. Although some European Bronze Age settlements were already known, the specific characteristics of Dutch Bronze Age settlement sites still needed to be established. Modderman's discussion and initial (mis)interpretation of the houses at Deventer - Margijnen Enk (Modderman 1955a, 31; see also Harsema 1997a, 139;

7 Schoneveld & Gehasse 2001; Jongste & Van Wijngaarden 2002; Meijlink & Kranendonk 2002; Schoneveld & Kranendonk 2002.

8 Andijk: IJzereef 1991; Van Mensch & IJzereef 1975; IJzereef & Van Regteren Altena 1991; Van Regteren Altena *et al.* 1975, Bovenkarspel: Buurman 1979; IJzereef 1981; IJzereef & Van Regteren Altena 1991; Van Regteren Altena, Buurman & IJzereef 1980, Angelslo: Van der Waals 1967; Van der Waals & Butler 1976; Kooi 2008.

Theunissen 1999, 116) illustrate this point very well. During the sixties, the number of known Bronze Age settlement sites increased, forming a corpus of house plans that could be studied to reveal their European affinities. This has, for instance, contributed to the – later dismissed as erroneous – 'recognition' of British types of round houses on Dutch 'Hilversum-culture' settlement sites (Butler 1969, 58-69; Theunissen 1999, 180-185).

After more Dutch Bronze Age settlement sites had been uncovered in the seventies and eighties of the 20th century, the focus shifted from mere 'recognition' to determination of to what degree these settlements reflected aspects of social and agricultural properties of the local communities. The differentiation in grave furnishings – equated to articulated 'social status' – visible in a few known Bronze Age burials, appeared not to manifest itself in the settlements.[9] Most settlement sites lacked defensive outer structures and displayed a dispersed and open pattern of farm buildings (Roymans & Fokkens 1991). The uniformity within and between settlements as well as their open, unfortified appearance were taken to indicate an egalitarian, self-supporting local community.[10]

The locations of the sites, with settlements situated on higher points amidst space for pastures and fields, also reinforced the image of agricultural communities practising mixed farming. In accordance with New Archaeology's main goals and methods, the surroundings of settlement sites were quantified into possible caloric output through either crop agriculture or pasture land.[11] Despite known methodological flaws, the amount of land presumably utilized by a Bronze Age settlement site was either established through palaeogeographical maps that indicated the maximally usable area (*cf.* IJzereef 1981) or through the use of Thiessen Polygons.[12]

Besides agricultural motives, from the nineties of the 20th century onward, social causes were also thought to determine, to a certain extent, where Bronze Age settlement sites were situated. The correlation between settlement sites and funerary sites is central to this line of investigation. For the Late Bronze Age, settlement sites were thought of as clustering near urnfields, whereas in the Middle Bronze Age graves were situated next to – some of the – individual farmsteads (Roymans & Fokkens 1991, 12). Some archaeologists have argued that the location of later Middle Bronze Age settlement sites not only seems to acknowledge and incidentally incorporate older burial monuments, but that the location may even have been favoured as a domestic site *because of* the already present funerary site (Harsema 1982, 156; Kolen 2005, 145).

Another social cause, an assumed shift from extended to nuclear families inhabiting the Bronze Age farmhouses, has been forwarded by Fokkens (1997; 2001; 2003) to explain the increase in number of newly established farmsteads during the Late Bronze Age (*cf.* section 8.3.2). Gerritsen's (2003) correlation of the life cycle of the inhabitants to that of the house is another example of a social factor used to explain farmstead mobility.[13] Additionally, Verlinde has recently (2000) published an extensive list of factors presumably relevant to the choice of settlement location of late prehistoric societies on the eastern sandy soils, but this approach is predominantly concerned with establishing the crucial preconditions of, as opposed to explaining the backgrounds to, site patterning.

The social interconnectedness of settlements became more intensely analyzed. Where contemporary settlements were situated at close range or farmsteads were in use for long periods, a close-knit local – sense of – community was constructed, the presence and extent of which was to be confirmed through pottery style analysis (*cf.* Brandt 1988a). For the river area, investigations by Louwe Kooijmans (1974a) had uncovered a high number of contemporaneous and uniform settlement sites, for which contact routes in between were reconstructed along the course of a fossil channel belt. Later, Louwe Kooijmans' (1993, 104) model allowed for more variation in site type, accommodating non-permanent Bronze Age special activity or extraction sites. Roymans and Fokkens (1991, 14) postulated that, especially in the eastern Dutch river area, more intense competition over bronze trade between local leaders (but see Fontijn 2003, 188-191) may have led to more differentiation in settlements, although these could not be reconstructed at that time from the available evidence. Nowadays, especially for the Dutch river area, some variation in sites type, location and duration may be argued for (see section 7.3) and the recent excavations in the river

9 But see the claim by IJzereef & Van Regteren Altena (1991, 78).

10 Roymans & Fokkens 1991, 13; Louwe Kooijmans 1993c, 17; Fontijn 2003, 224-226.

11 *Cf.* Brandt & IJzereef 1980; IJzereef 1981, 175-191; see also Fokkens 1998a, 137-146 and references therein.

12 Although most often funerary sites were used as centre-points for these polygons; *cf.* Kooi 1979, 149-179; Waterbolk 1987, 191-215; but see Fokkens 1998b, 86-89; Hodder & Orton 1976, 60-61.

13 For a discussion see section 3.3.3 and note 44.

area have resulted in approaches that allow for a site interpretation based on the interaction of differentiated types of sites in the same area (sections 3.3.3 and 7.3.6).

The farmstead as settlement component

Traditionally, the farmstead was only rarely seen as an appropriate scale of settlement analysis. Waterbolk, in his initial publication of the Elp excavation results (1964, 115), assumed that Bronze Age farmsteads comprised a longhouse, a smaller house (later dismissed; see Waterbolk 1987), a barn and possibly a number of larger or smaller sheds. Roymans and Fokkens (1991, 10) added the presence of pits and pit circles to this list. The observation by Hessing (1991, 44) that at Wijk bij Duurstede most finds and outbuildings were found within 20 m of the houses, has led to the use of the term 'farmyard' as describing the surface area directly adjacent to the house (*cf.* Schinkel 1998, 26) or as a hypothetical – rectangular, often 50 by 50 m – plot around a farmhouse (*cf.* Fokkens 1997, 365). In Theunissen's (1999, 112-113) definition of a farmstead, only the house and nearby (within 20 m) outbuildings are incorporated. Although she does pay some attention to the distinction and definition of farmsteads (Theunissen 1999, 112-114), the farmstead or house-site generally receives little attention as a specific object of study.

This lack of systematic attention to what actually constitutes a 'farmstead' is remarkable, since the 'farmstead' concept is used frequently in excavation reports as an interpretative label to denote the original context of (a varied range of) excavated settlement site remains. For example, to interpret finds as 'indicating a nearby farmstead' when no house plan has been uncovered, seems unwarranted. Moreover, the 'farmstead' has become the core element to describe settlement dynamics for the Bronze Age, and has given its name to the dominant model, that of the 'wandering farmsteads' (see section 3.3.1). Consequently, the farmstead as a main settlement component is in need of detailed study (see section 3.2.2, Chapter 6 and section 8.2.2).

The role of houses in settlement studies

While traditionally some attention was paid to the study of Bronze Age settlements as a whole, most – and most detailed – studies of Bronze Age settlement sites have put much emphasis on the study of the reconstructed house ground plans. Archaeologists have forwarded and tested various hypotheses of Bronze Age local communities through reconstructions of their houses. The typology of house plans was instrumental in recognizing 'archaeological cultures', as Bronze Age houses in the north-eastern part of the Netherlands seemed to differ from those on the southern sandy soils and those known from the river area and inland coastal districts.[14]

Based on the sometimes high number – and frequently isolated occurrence of – the house plans, relocation of the houses was thought to have taken place regularly (see section 3.3). Wood decay and/or soil depletion were implicitly seen as the prime movers behind this process of domestic mobility (see section 3.4). The assumed close relationship between the life cycle of the house and its inhabitants (Gerritsen 2003), is a more recent approach in explaining the domestic mobility of later prehistoric communities (section 3.3.3).

Individual ground plans of Bronze Age farmhouses have been scrutinized for clues on prehistoric subsistence strategies as well as social dynamics.[15] The recognition of stalls confirmed the assumed importance of cattle as suggested by archaeozoological studies.[16] Furthermore, the size of the house – and its ratio to the byre section – have been used in distinguishing between 'wealthier/high status' and 'poorer/low status' Bronze Age farmers.[17] The small size of some houses was thought to reflect a smaller number of occupants, less cattle and/or – consequently? – a possibly subordinate social position of its occupants.[18]

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14 Waterbolk 1982; Huijts 1992; Harsema 1993b; 1997a, Theunissen 1999, 192-197, but see Fokkens 2001, 252; Lanting & Van der Plicht 2003, 158; see also section 5.2.3.2.

15 Harsema (1997a, 140) even compared house plans to 'bar codes' that archaeologists were learning to read.

16 See IJzereef 1981; Louwe Kooijmans 1993a; Clason 1999; Brinkkemper & Van Wijngaarden-Bakker 2005 and Arnoldussen & Fontijn 2006; Appendices I & II for an overview of Bronze Age livestock composition.

17 *Cf.* Louwe Kooijmans 1993c, 17; Harsema 1997, 91; *cf.* Kristiansen & Larsson 2005, 277-279, but see Fokkens 1999, 33; 2003, 24.

18 *E.g.* Waterbolk 1964, 122, *cf.* on Iron Age farms Brinkkemper 1991, 142 and Harsema 1996, 61.

Apart from initial quantitative approaches (counting stalls, heads of cattle and their caloric in- and output),[19] later on attention also focussed on the social implications of living together with one's livestock.[20]

Despite the considerable attention that house plans have been given in Bronze Age settlement studies traditionally, there are various questions still left open. For example, what criteria may be used to assess the recognition of house ground plans and the validity of their reconstructions (*cf.* section 3.2.3)? In addition, typological approaches have perhaps mainly sought to contrast houses from various geogentic regions, whereas a systematic inventory at supra-regional scale may also have outlined shared properties (*cf.* sections 5.2.3.2-5.2.3.3). Moreover, what factors may explain why houses from the Early Bronze Age (*c.* 2000-1800 cal BC), Middle Bronze Age-A (*c.* 1800-1500 cal BC) and Late Bronze Age (*c.* 1100-800 cal BC) are – compared to those of the Middle Bronze Age – are known in much smaller numbers (*cf.* sections 5.2; 7.2.3 ; 7.4)? As house plans are of key importance to several approaches adopted in this study (*cf.* sections 3.2.2; 6.3-6.5; 8.2.2), considerable attention is paid to their structure, dating and interpretation in the present study (section 5.2).

Evaluation of previous Bronze Age settlement research

To sum it up, only rarely have specific research questions been directed towards Dutch Bronze Age settlement site data. Generally the settlement- or house-sites have been taken at face value, with more descriptive than analytical approaches. Observations about settlement sites often remained limited to their value in discussions on their social structure (*e.g.* 'open layout ≈ egalitarianism').

Furthermore, despite their recognized regional variability, Dutch Bronze Age sites are often treated as representing a homogeneous group. The different geological settings of the various Dutch Bronze Age sites, and the consequences for subsistence strategies, have sometimes been somewhat overlooked. Although a simplification, it is possible to contrast the Bronze Age sites from the Dutch central river area with those in all the other parts of the Netherlands, based on the dynamics of their natural environment. While in the southern and north-eastern coversand landscapes Bronze Age local communities had to interact with a landscape that had lost nearly all of its creational dynamics by the last ice age, large parts of the Dutch central river area were still in constant development during the Bronze Age (Chapter 2). Even the West-Frisian creek ridge landscape – although too of aquatic origin – and much of the coastal dune areas were passive (in the case of West-Friesland even inverted) geological landscapes by the time they were settled. This may lead to biases, as data from one area is extrapolated to the next (*e.g.* subsistence data from the river area and West-Friesland is applied to the Pleistocene areas and models on settlement dynamics based on the Pleistocene areas are projected onto the Holocene districts).

Zooming in from the level of the settlement, I have argued that the level of the farmstead or house-site – in the form of representing the structured outcome of the interplay of farming strategies and prehistoric landscape creation – has only rarely been the subject of systematic critical analysis.[21] Nonetheless, one of the most popular models describing later prehistoric settlement dynamics in the Netherlands has come to be known as the 'wandering farmsteads' model (section 3.3.1).

Central to the 'farmsteads' are the Bronze Age farmhouses, that may have constituted the most monumental element of the cultural landscape in many regions and periods. Despite this, houses have rarely been studied for other purposes than to aid in discussions on subsistence strategy ('stalls ≈ cows ≈ caloric value'). In addition, the dating of Bronze Age houses, often based on unspecified charcoal, is mediocre at best for the majority of sites (see section 5.2.3.1). This clearly hampers discussions on the contemporaneity of houses within a single settlement site and consequently also the interpretation of multiple houses as reflecting a 'settlement' in a social sense.

19 *E.g.* IJzereef 1981, chapter 7; Fokkens 1998a, 137-146; Woltering 2000, 320-362.

20 *Cf.* Butler 1969, 26; 68; Harsema 1993b; Louwe Kooijmans 1998; Fokkens 1999; 2002; 2003.

21 Evidently, the often small size of the excavations within which Bronze Age houses are discovered (mean 3.8 ha; 70 % between 0,4 and 6.4 ha for 53 sites in the Netherlands) hampers the recognition and comparative analysis of Bronze Age house-sites.

1.5 Bronze Age settlement sites: How to answer the questions?

In the above sections it has been argued that despite a large number of known Bronze Age settlement sites, there are still many interesting questions left unanswered. At this point, the key elements necessary to answer these questions are introduced.

First of all, a data set is required that comprises Bronze Age settlement sites that have been subjected to extensive excavation, that have the best possible preservation and that have been published in detail. Second, in order to study the location of the sites within their wider physical landscape, the sites should ideally be situated in a landscape that has been subjected to extensive geological and palaeogeographical studies and that offers possibilities for palaeobotanical reconstructions. Third, a critical analysis of definitions used in settlement studies is necessary. Fourthly, a critical analysis of the models – and underlying premises – current in settlement studies is necessary as well. Availability and critical use of dating methods – *e.g.* radiocarbon dating, dendrochronology, typology and stratigraphy – are also essential. Lastly, the data set should originate from a region that allows a comparison between settlements and other elements of the cultural landscape, as well as one which allows a comparison of various aspects *between* different regions. I will argue below that the (eastern) Dutch central river area is such an ideal region, based on the above-mentioned criteria.

1.6 The selection of a study area: the Dutch central river area

A dynamic physical landscape

The river area is an extensive zone in the central parts of the Netherlands. If one tries to map the size of the parts of the Dutch river area where during the Bronze Age the genesis was dominated by mineroclastic fluvial deposition, one should account for an area in the order of 1290 km^2, mostly situated in the central and eastern part of the Dutch river area (fig. 1.3).[22] The river area in its entirety is well-known for its capabilities of locally excellent preservation. This is not only limited to the conservation of parts of the former surface through later sedimentation, but also concerns the better chances of survival of organic remains such as artefacts, bones and botanical remains due to the availability of anaerobe and calcareous conditions. Within this wider fluvial landscape, the eastern half of the central river area will form the main and spatially largest area under investigation in this study. The reasons to select this area are discussed below.

First, the distribution of all find-spots known for the Bronze Age in the Dutch river area in the Dutch central archaeological database (Archis) shows a concentration in the eastern half of the river area (fig. 1.5). The nature of this unequal patterning can be attributed largely to an unequal chance of discovery caused by the greater thickness of the covering sediments in the western part of the river area. The study area is thus situated in the part of the river area with the highest density of known find spots. In this way, both high-resolution (extensive excavations) and low-resolution (find-spots of varied quality) can be studied in relation to each other (*cf.* Arnoldussen 2000).

Second, the proposed macro-region contains two distinct zones of the river area as distinguished by physical- and historical geographers. During the Bronze Age, the western part the landscape was predominantly shaped by rivers of a different fluvial style compared to those in the east (Chapter 2). This can possibly be related to the indirect influence of sea-level rise. In addition, in the western river area peat formation occurs more frequently and more extensively (Berendsen & Stouthamer 2001; De Mulder *et al.* 2003). In the eastern part the landscape morphology was predominantly influenced by mineroclastic deposition and peat formation was less extensive (*ibid.*; Chapter 2). There, the river deposits proper predominantly determined landscape morphology. The different fluvial styles of rivers in the east as compared to those in the west have important implications for the (study of) Bronze Age settlement sites (section 2.7). These differences in landscape genesis and morphology must be acknowledged in order to make proper comparisons between archaeological data from the various geogenetic regions.

22 Based on the minimum size of the river plain around 3800 BP on the map by De Mulder *et al.* (2003, 228 fig. 143).

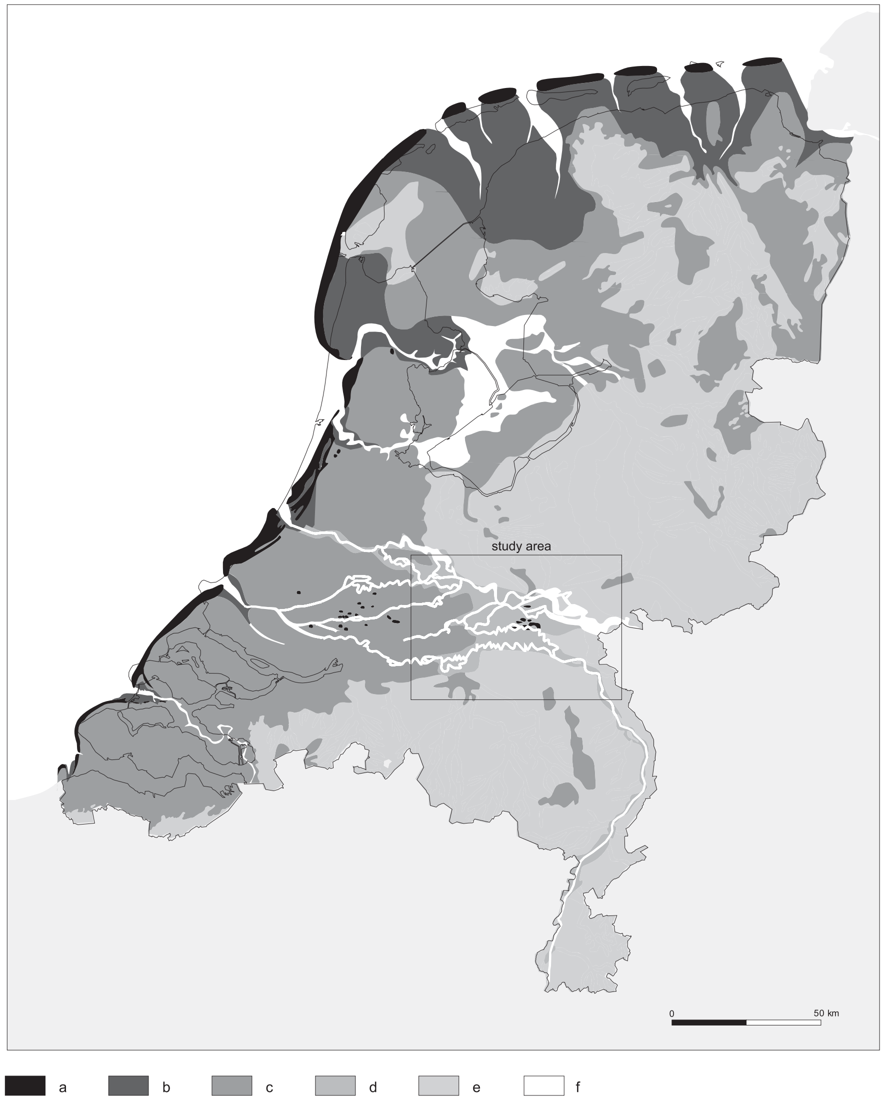

Fig. 1.3 Simplified palaeogeographical map of The Netherlands at 3800 BP (after De Mulder *et al.* 2003, 228 fig. 143). The study area is indicated.

a: coastal and river dunes, b: estuaries and tidal flats, c: peat, d: floodbasin deposits, e: sand, f: water.

The third argument in support of the selected study area is the availability of a relatively large number of high quality studies on the fluvial genesis of the eastern part of the river area. Various recent publications have offered detailed reconstructions of the palaeogeography of the eastern river area.[23] This sets the eastern part of the river area apart from the western part, which is studied less intensively. The specific properties of the fluvial landscape of the (eastern) central Dutch river area will be discussed in Chapter 2.

Fourth, the proposed study area encompasses a large part of the adjacent Pleistocene sandy soils to the south and the ice-pushed hills to the north, of which especially the former have also seen considerable archaeological research.[24] These bordering areas can serve as a framework of reference and comparison. It is, however, evident that in the synthesis of this study comparison to even more distant regions will be required.

Last, but not least, a large number of Bronze Age settlements (see fig. 1.4 and Chapter 4) has been extensively excavated in the study area. Three settlement sites ('De Horden', 'Dodewaard' and 'Zijderveld') have already been published in varying detail.[25] Four large sites ('Eigenblok', 'De Bogen', 'Boog-C Noord' and 'Lienden-Kesteren') as well as a host of smaller or less intensively investigated sites were discovered between 1996 and 2003, prior to the construction of the *Betuweroute* freight railway.[26]

23 *E.g.* Makaske 1998; Stouthamer 2001; Berendsen & Stouthamer 2001; Berendsen *et al.* 2001; Van Dinter 2001; 2002; Van Zijverden 2002a-b; 2003a-b; 2004a-b; 2005; 2006; De Mulder *et al.* 2003.

24 Southern sandy soils: Roymans 1996; Fokkens 1996; Schinkel 1998, Northern ice-pushed hill landscape: Hulst 1969; Lehmann 1969; Van Tent 1988; Jongste 2001; Van Hoof & Meurkens 2007; Meurkens 2006; Bourgeois & Fontijn 2008.

25 See Chapter 4 and Appendices I, IV and VI; chief references for Wijk bij Duurstede: Hessing 1991, for Dodewaard: Theunissen & Hulst 1999a and for Zijderveld: Theunissen & Hulst 1999b; Knippenberg & Jongste 2005.

26 See Chapter 4 and Appendices II, III and V; chief references for Eigenblok: Jongste & Van Wijngaarden 2002, for De Bogen: Meijlink & Kranendonk 2002, for Boog-C Noord: Schoneveld & Gehasse 2001 and for Kesteren-Lienden: Schoneveld & Kranendonk 2002.

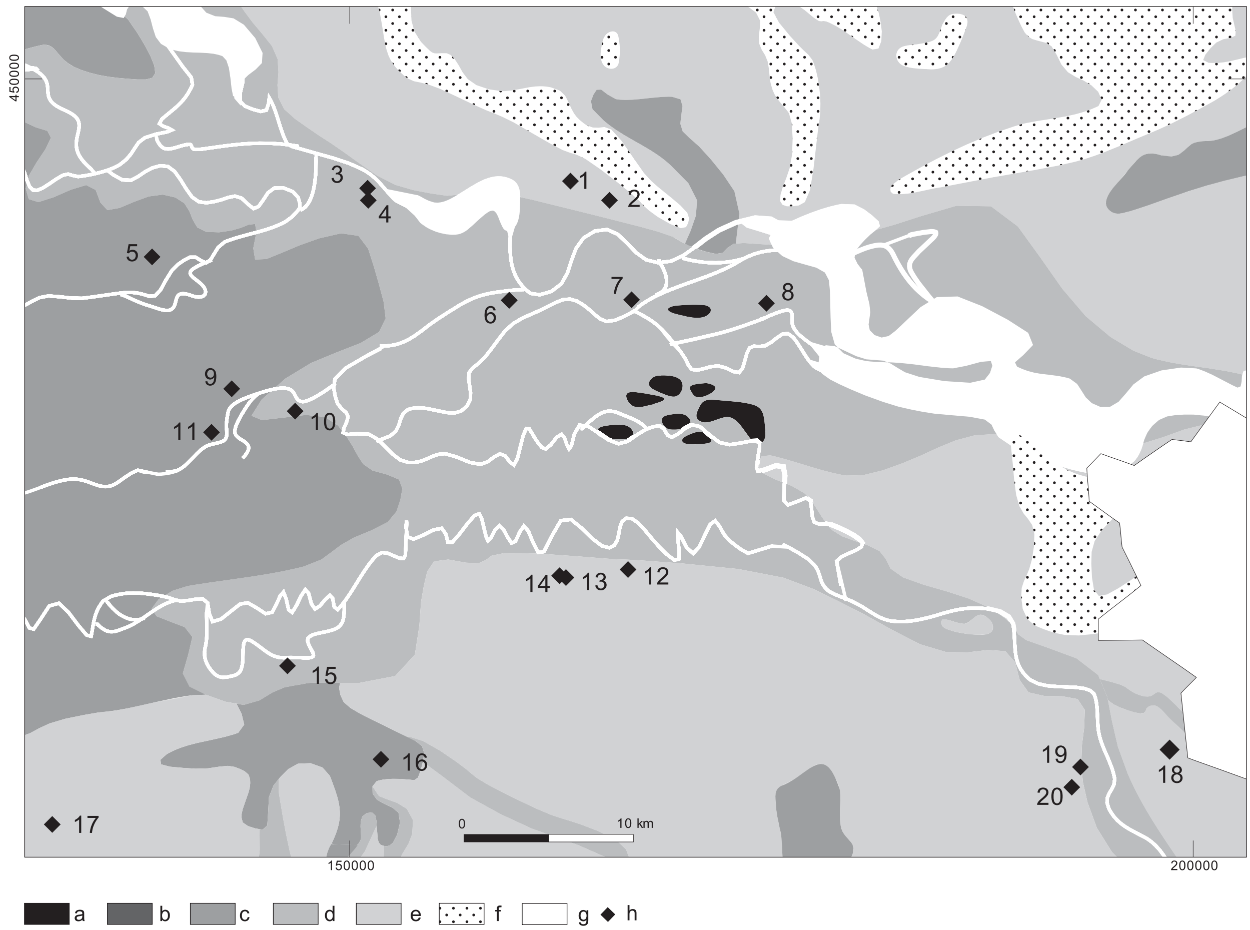

Fig. 1.4 Simplified palaeogeographical map of the eastern central Dutch river area. The main excavated Bronze Age settlement sites are indicated.

a: coastal and river dunes, b: estuaries and tidal flats, c: peat, d: floodbasin deposits, e: sand, f: ice-pushed sediments, g: water, h: settlement site.

1: Elst - 't Woud (Van Tent 1988), 2: Rhenen - Remmerden (Van Hoof & Meurkens 2007), 3: Wijk bij Duurstede - De Geer (Van Es *et al.* 1992), 4: Wijk bij Duurstede - De Horden (Hessing 1991), 5: Zijderveld (Knippenberg & Jongste 2005), 6: Tiel - Medel (Hielkema 2003; Van Hoof & Jongste 2007), 7: Lienden - Kesteren (Schoneveld & Kranendonk 2002), 8: Dodewaard (Theunissen & Hulst 1999a), 9: Enspijk - A2 (Ter Wal 2005b), 10: Meteren - De Bogen (Meijlink & Kranendonk 2002), 11: Rumpt - Eigenblok (Jongste & Van Wijngaarden 2002), 12: Oss - De Geer (Jansen & Van Hoof 2003), 13: Oss - Gewandeweg (Vasbinder & Fokkens 1987), 14: Oss - Mikeldonk (Fokkens 1991), 15: Engelen - Hoogveld (Dautzenberg *et al.* 2002), 16: Den Dungen - Kloosterstraat (Verwers 1991), 17: Loon op Zand - Kraanvensche Heide (Roymans & Hiddink 1991), 18: Heijen - Hommersumseweg (Mooren & Van Nunen *in prep.*), 19: Beugen (Hissel *et al.* 2004), 20: Boxmeer - Maasbroeksche Blokken (Hiddink 2000).

To point out the contrast, there is only one other extensive excavation of a Bronze Age settlement site in the river area outside the selected study area (Molenaarsgraaf; Louwe Kooijmans 1974). Thus, the proposed study area encompasses most of the larger excavations in the Dutch river area relevant to the period under study.[27]

For practical and analytical purposes, the proposed study area is divided into several smaller analytical scales. The smallest of these (*i.e.* the micro-regions) concern the excavated parts of the Bronze Age settlement sites. This is the scale at which detailed archaeological data is presented (Chapter 4). Around these excavated areas zones

27 After the start of the project, yet another extensive Bronze Age settlement site was discovered and partly excavated at Tiel - Medel 8. This site, however, could not be fully integrated into the present study as publications were still pending (Hielkema 2003; 2005; Hielkema & Hamburg 2008; Van Hoof & Jongste 2007).

of 4 km^2 can be outlined (*i.e.* the meso-regions), for which detailed palaeogeographical reconstructions have been compiled (fig. 1.6).[28]

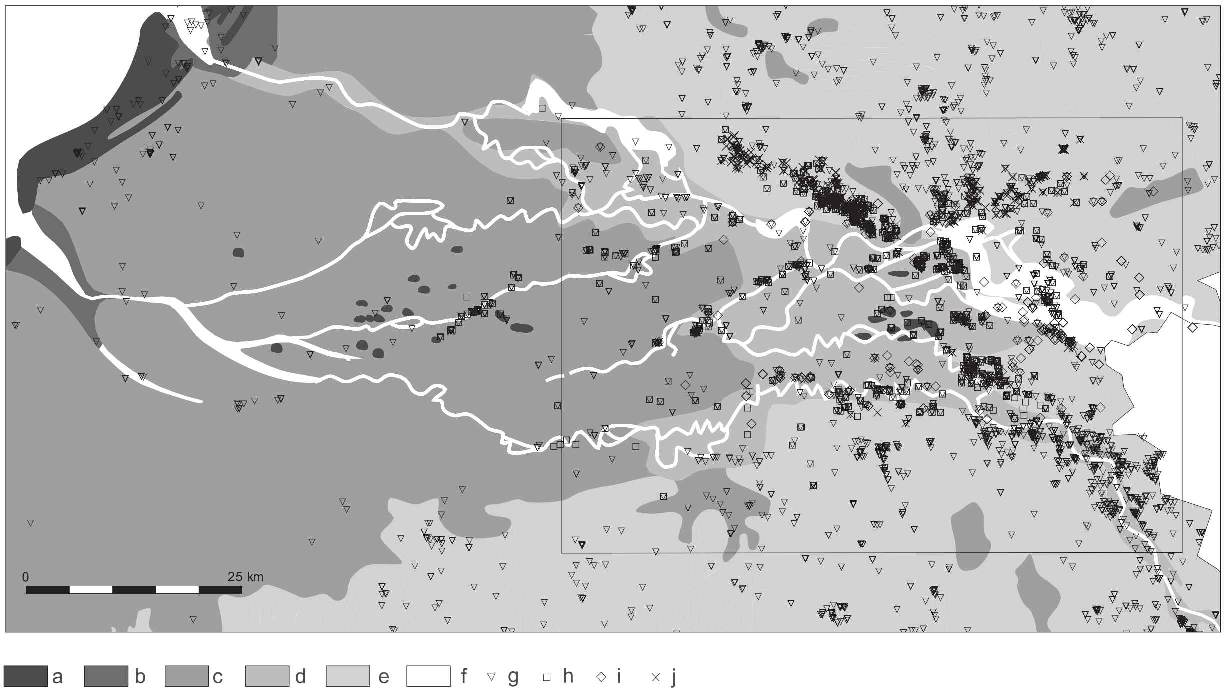

Fig. 1.5 Find-spots listed in the Dutch central archaeological database (ARCHIS) for the Bronze Age in the Dutch river area. The rectangle indicates the location of the study area.

a: coastal and river dunes, b: estuaries and tidal flats, c: peat, d: floodbasin deposits, e: sand, f: water, g: unspecified find-spot, h: possible settlement sites, i: possible deposition, j: possible funerary site.

The size of the meso-regions is thus relatively arbitrary, as it is defined by the geographic scope of the palaeogeographical studies carried out prior to the present study. It does, however, provide a scale of research in which the nature – and changes – of the landscape in the direct vicinity, *i.e.* the everyday surroundings, of Middle Bronze Age settlements can be properly understood. Within these meso-regions, the interrelations between people and their settlement environs can be studied with sufficient certainty.

Around the meso-regions, even larger spatial units – the macro-regions – have been defined for this study. While their exact dimensions are arbitrary and variable (*c.* 30 km^2), these are not random. The size of the macro-regions has been determined by a combination of factors. First, a sufficiently large area around the excavated sites had to be selected to allow the balanced comparison of a sufficient number of additional Bronze Age find-spots (see Appendices I-VI) with the detailed, high-quality, excavation data (Chapter 4). With the often low density of known Bronze Age find-spots (fig. 1.5), this calls for study areas of considerable extent. Second, the size of the macro-region should be sufficient to understand and portrait the basic palaeogeographical development of the meso-regions (*cf.* fig. 2.16 and Appendices I-VI). In fluvial landscapes, rivers at several kilometres distance can still affect local situations (*e.g.* by sedimentation or flooding), so that palaeographical information for a moderately large area should be incorporated. With the selected size of the macro-regions (minimally 4.8 by 7.6 km)[29], both criteria (the availability of additional find-spots and sufficient information on the palaeogeographical development) are met and

28 Research by Van Zijverden (2003a-b; 2004a-b; 2005), incorporated into Chapter 4 and Appendices I-VI.

29 Using much larger macro-region sizes would have created uninformative overlaps between the different macro-regions (see fig. 1.6).

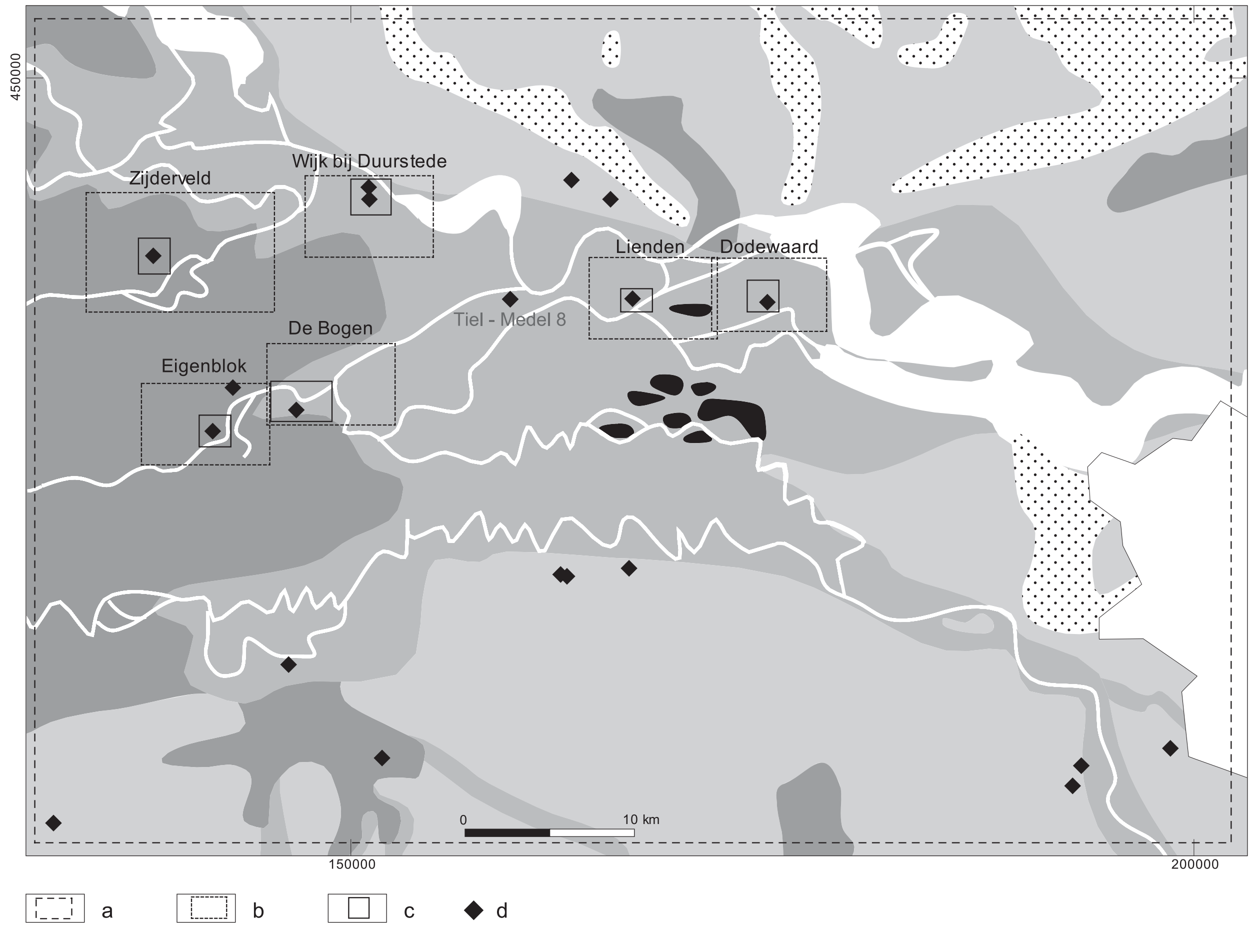

Fig. 1.6 The location, name and extent of the meso- and macro-regions within the study area on a simplified palaeogeographical map (see fig. 1.3).

a: the study area, b: macro-regions, c: meso-regions, d: Bronze Age settlement sites (see fig. 1.4).

can the macro-regions be used as a regional framework to compare the documented Bronze Age occupation with a wider regional occupation history (Appendices I-VI).

A dynamic cultural landscape
Besides forming a transitional zone between the various Dutch geogenetic regions (see fig. 1.3), the river area also appears to form a transitional zone between reconstructed prehistoric cultural landscapes (for problems of definition see section 3.2.6). Regional variation in archaeological manifestations ('cultures' as Childe (1950, 2) would have labelled them) seem to conform to a general north(-east) versus south(-west) division during various periods of Dutch prehistory (*cf.* Fokkens 1997, 361). Although the (definitions of) reconstructed 'regions of variation' are likely to be corrupted by the variation in research intensity, some long-term differentiation between these areas is discernible.

For example, the location of the modern river Rhine more or less divides the reconstructed regions inhabited by the middle Neolithic communities using Vlaardingen (south-west) or Funnel Beaker (north-east) types of pottery (fig. 7.3; Raemaekers 1999, 178-179). During the start of the Late Neolithic, the Protruding Foot Beaker, considered characteristic for the Single Grave Culture period, appears to be virtually absent in the southern Netherlands coversand areas beyond the river valleys (Van der Beek 1997; Fokkens 2005a, 360 fig. 16.2, but see fig. 7.4). For the Bronze Age too, the variation in types of houses, graves and (patterns of deposition of) bronzes tends to conform to a north(-east) – south(-west) division.[30] Regional variation has also been established for the Late Bronze Age urnfields, although in this specific case the reconstructed boundary zone is situated north of the river area proper.[31]

Evidently, these north-south variations are hardly categorical, but represent gradual differences. The fact that intensified archaeological and physical-geographical research has rightly led to the identification of additional regions (*cf.* Theunissen 1999, 192), shows that there is still much to be learned and to be gained by better defining such regional differences in both space and time. Yet, archaeologists cautiously argue that the river area often formed the dividing line, or the area of transition (border zone), for the kinds of regional variability mentioned above (*cf.* Fokkens 1997, 361; 2001; 244). Unfortunately, in too few cases (*e.g.* Willems 1986), has the Dutch river area been studied as a region in its own right. The present study hopes to do just that for the Bronze Age settlement sites situated in it.

1.7 Formulation of research questions

Settlement sites

The central aim of this study is to determine the nature (*i.e.* composition) and dynamics of Bronze Age settlement sites in the Dutch river area, on which a large volume of data has recently been made available. Analyses of the specifics of river area sites, through comparison to Bronze Age settlement sites in other regions, will be the prime focus of this line of enquiry. In addition to terminological and theoretical lack of clarity on 'settlements' as a concept, also the practical problems of determining what physical elements constitute a settlement need to be dealt with. Most of the specific research questions thus apply to settlement sites both within and outside the river area. Such approaches are necessary in order to counterbalance traditional ones in which Bronze Age settlements have been somewhat 'taken for granted' (*cf.* section 1.4) or have been studied from a 'snapshot', rather than 'long-term' perspective (*cf.* section 1.2).

It will be assessed whether different types of sites were current during the Bronze Age and to what extent these are likely to have had a (permanent) domestic nature. This calls for an analysis of the physical nature and the constituent components of a settlement site and their interrelations (Chapters 5 and 6). For instance, how many house-sites formed a 'settlement' from a social perspective? And, if this concept is applicable at all, how were such 'settlements' physically and conceptually defined as 'communal' residential spaces? In addition, a long-term approach to domestic sites may provide important information. Did settlements, for instance, needed to be established on previously unsettled parts of the landscape? And if older traces underlie a given settlement site, can any insight be gained as to how these were dealt with? It will also be interesting to see what happens to the location of a former settlement site after it was abandoned. Does abandonment only concern the residential function and are sites used as fields or pastures after abandonment? And why do some settlement sites show many occupation phases whereas others appear to have existed relatively briefly?

Some of these more general questions can even be tailored to the specific properties of living in a dynamic fluvial landscape. The presence of vertical stratigraphy, for instance, could allow for documentation of societal changes otherwise obscured by the palimpsest nature of the archaeological record. As new landscapes are created in the river area at humanly perceptible timescales (section 2.4), one might wonder whether and for what reasons old or young landscapes were preferred by Bronze Age farming communities. The possibility of studying such man-landscape interactions is an innate property of dynamic Holocene regions and may shed some light on Bronze Age perceptions of the landscape. For instance, what is the response of small scale farming communities to gradually rising ground water levels or regular flooding? Do present-day common sense notions of living where one can maintain 'dry feet' apply to the rationale of Bronze Age communities? What other factors are likely to have motivated the choice for a Bronze Age settlement site location?

30 On houses see: Theunissen 1999, 192-198; Fokkens 2001, 247-256, for graves see Lohof 1991 and Theunissen 1999, 35-108 and for bronze deposition see Fontijn 2003.

31 Verlinde 1987, 292-307; Fokkens 1997, 361; *cf.* Roymans & Kortlang 1999, 50.

House-sites
At a smaller spatial scale, the applicability of the concept of the 'farmstead' for the Bronze Age period will be investigated. In this study, an attempt is made to systematically investigate the nature of Bronze Age house-sites in order to find out whether the use of concepts like 'farmsteads' is unwarranted or not. Information will be gathered about which settlement site elements show a (spatial) relation to Bronze Age farmhouses and on what this relationship may have been based. Moreover, it will be analyzed whether Bronze Age house-sites relied on, or were characterized by, any physical demarcation (see section 3.2.2, Chapter 6 and section 8.2.2).

Through such analyses, it may be possible determine to what extent deliberate human choices are visible in the structuring of the direct vicinity of Bronze Age farmhouses. If there, for example, was a preferred placement of elements like granary-type outbuildings, what could have been the meaning of this? Why should the structuring of the house-site have mattered to agricultural communities in the first place? In addition, what can be learned from the dynamics of farmsteads?

After critically assessing the plausible 'generic' content and structure of Bronze Age house-sites, their dynamics should be analysed. In particular the occupation history – or cultural biography (*cf.* Gerritsen 2003) – of house-sites will be investigated, to see whether these justify an interrelation between the house and the household life cycles (section 7.3). Are short-term (*e.g.* generational) shifts of the house-sites indeed the predominant mode of settlement dynamics as conventional views assume? If so, what could have been the motivation, distance and temporality of such periodical relocations (see section 3.4)? And if variation exists between the content, the structure and the 'biographies' of house-sites, what factors may have caused such differences? Furthermore, if 'farmsteads' prove to be an applicable concept altogether, are farmsteads erected on so far unused plots of land or on locations previously used for agricultural, ritual or funerary purposes?

Houses
During the Bronze Age, the form of houses changes significantly over time. The typical large three-aisled buildings of the Middle Bronze Age-B may even be labelled monumental. But who or what exactly was situated within these buildings remains rather vague. The reliability of inferences considering social structure or subsistence strategies that are based on ground plans of Bronze Age farmhouses needs to be examined (*cf.* section 3.4.1). In addition, it is necessary to investigate the dynamics of Bronze Age houses; their repairs, extensions, rebuilding, overbuilding, abandonment *et cetera* (for definitions see section 3.2.3), for these have so far received insufficient systematic attention (but see section 5.2.3.3).

This calls for a critical approach to traditional Bronze Age farmhouse typologies and detailed attention to structural modifications such as repairs, rebuilding phases and extensions (section 5.2). For instance, what can we conclude from the observation that, despite the often excellent feature preservation, not a single reliable stall partition wall is known from the Dutch river area? What general and specific (functional or cosmological) inferences can be made from the ground plans of Bronze Age houses and what may account for their differences and similarities? If knowledge on house-building traditions was shared on a given spatial scale, can we expect to find archaeologically visible local or regional variations? Formulated in a simpler way: do houses indicate (local) communities? For questions like these, the excellent feature- and organic preservation of the Dutch river area can help to provide some important answers.

1.8 Introducing the data set: Bronze Age settlement sites in the Dutch river area

At this point, the data sets used in the present study are introduced. As outlined above, seven extensively excavated Bronze Age sites form the primary data set (at the micro-scales; see section 1.6) for the analyses in this study. These sites, to begin with, differ in the degree as to which they have been published, which accordingly has consequences for their applicability in this study.

Accessibility of documentation
The publication of the results of the excavations at Zijderveld and Dodewaard formed part of Theunissen's 1999 dissertation. As these two sites were excavated in the nineteen-sixties, their documentation is fully analogue.

Theunissen provided extensive discussions of the materials recovered from these two sites and offered all-feature excavation plans with the structures indicated. These plans, however, have no feature labels in paper or digital form and consequently cannot be used to plot find- or feature-depth distribution maps. This made it impracticable to plot the content of features or the features with specific content without having to go back to the original documentation. Therefore, in this study the interpretations as forwarded by Theunissen & Hulst (1999a-b) formed the base level of detail and no original documentation has been consulted for these two sites. In 2002 and 2004 an additional part of the Zijderveld settlement site was excavated (Arnoldussen 2003; Knippenberg & Jongste 2005). For this campaign, full digital documentation of find-, feature- and geological data was made available by Archol BV for the present study.

The publication of the Bronze Age remains from Wijk bij Duurstede has been even more limited (Hessing 1991; Van Es *et al.* 1992; 1993; 1994). For these sites too, all documentation was only available in analogue form. For the sites Wijk bij Duurstede - De Horden and Wijk bij Duurstede - De Geer, none of the complete feature plans for the Bronze Age phase(s) have ever been published. Consequently, the original field drawings of the Bronze Age house-sites at these sites have been scanned and digitized for the current study.[32] Although this was very informative (see section 4.4, Chapter 6 and Appendix IV), a link between the features and their content or properties such as depth could not be established.

site	when excavated	excavated by	excavation size (ha)	geological context	archaeological periods	vertical stratigraphy	palaeo-geographical studies	published in full	min. nos. of Bronze Age house-sites
Molenaars-graaf	1966-1967	RMO	0.12	Schoonrewoerd channel deposits	LNEO-B, EBA, MBA	-	+	+	1
Zijderveld	1965-1966, 1971, 2003, 2004	RACM Archol	1.2 1.4	Crevasses Schoon-rewoerd and Zijder-veld fluvial system	MBA, (LBA?), EIA	-/+	-/+	+/-	4
Dodewaard	1967	RACM	0.4	Crevasses Distel-kamp-Afferden	LNEO-B, (EBA-MBA-A), MBA-B, (LBA?)	-	+	+/-	2
Wijk bij Duurstede - De Horden	1977-1983	RACM	14	Werkhoven channel deposits?	NEO, EBA, (MBA-A?), MBA-B	-	+	-	12
Wijk bij Duurstede - De Geer	1987-1994	RACM	8.19	Werkhoven channel deposits?	(EBA?), MBA	-	-	-	2
Meteren - Boog C Noord	1998-1999	ARC bv	0.05	Crevasse complex 'De Bogen'	LNEO-B, EBA, (MBA)	-	+/-	+	0
Meteren - De Bogen	1998-1999	ADC	2.8	Crevasse complex 'De Bogen'	LNEO-B, EBA, MBA, LBA, IA	-	+	+	9
Rumpt - Eigenblok	1997-1999	ADC	1.7	Crevasse and channel deposits Eigenblok system	LNEO-B, EBA, MBA (IA)	+/-	+	+	5
Lienden - Kesteren	1999	ARC bv	0.66	Crevasses by Westerveld and older system	(LNEO-B, EBA), MBA, ROM	-/+	+	+	2
Tiel - Medel 1	2003	ARC bv	0.12	Crevasses and/or levee deposits Zoelen system	(LNEO-B, EBA), MBA	-	-/+	+	1
Tiel - Medel 8	2005	Archol	1.9	Crevasses and/or levee deposits Zoelen system	(LNEO), MBA, LBA	-	+	+	5

Table 1.1 Simplified comparison of extensively excavated Bronze Age settlement sites in the Dutch river area.

32 Thanks are due to J. van Doesburg (State Service for Archaeological Investigations (ROB, now RACM)) and W. Hessing (Vestigia) for their help in locating and understanding the original documentation.

The main Betuweroute sites of 'De Bogen' (comprising Boog-C Noord), 'Eigenblok' and 'Lienden' have been published in full in monographs (see above and Chapter 4). The digital data on finds, features and the geological information was archived and kindly made available by the State Service for Archaeological Investigations (ROB, now called RACM).[33] For these sites, it was thus much easier to check interpretations, compile custom distribution maps *et cetera*. Consequently, this allowed for a much more detailed analysis of the excavation results for these sites compared to the sites for which only analogue documentation was available.

Simplified comparison
Besides differences in documentation and degree of publication, the excavated sites differ in various additional aspects (see table 1.1). The scale of excavation ranges from *c.* 0.05 to 14 hectares. All excavated sites are situated either on levee deposits or on crevasse splay deposits. Unfortunately, only rarely could archaeologists profit from the presence of vertical stratigraphy to study changes over time, such as at Eigenblok (table 1.1). Although the other sites do also show vertical stratigraphy – visible as multiple vegetation horizons in the surroundings of the prehistoric settlement sites – these were sometimes not excavated or did not yield many archaeological remains. In addition, the finds recovered at several sites span a long chronological period. Furthermore, the number of recognized Bronze Age house-sites differs strongly between sites.

For the sites under investigation in this study, their Bronze Age occupation phases are discussed as separate sections in Chapter 4. For additional information, such as the history of the archaeological research or the longer-term (Neolithic to Early Iron Age) occupation history in an area of *c.* 30 km^2 around these excavations, the reader is referred to the Appendices I-VI. In these appendices more detailed information and discussion on the interpretations of the Bronze Age occupation phases is provided. In this way, the appendices provide a background to the more concise discussion of the sites in Chapter 4. For brevity, these appendices are not part of this book, but can be obtained separately through the author or can be ordered from the publisher.

1.9 Research context

The present book is not an isolated study, but part of a wider research programme labelled '*Living in a dynamic (cultural) landscape. Bronze Age settlements in the Dutch river area*', funded by the Netherlands Organisation for Scientific Research (NWO) and based at Leiden University. This programme, which ran between 2003 and 2007, was part of 'The Malta Harvest' (Dutch: *De oogst van Malta*) project by NWO that aimed at synthesising the wealth of data generated by developer paid funding due to the (anticipated) Malta legislation.[34]

Within the project 'Living in a dynamic (cultural) landscape. (…)' a multi-disciplinary approach was chosen, with four archaeologists, a physical-geographer and a palaeobotanist working at the same time, and frequently together, on similar or related topics.[35] Several complementary research tracks were followed, that targeted the physical landscape of the Dutch river area,[36] models for vegetation development in the Dutch river area (Van Beurden 2008), the development of the cultural landscape (Jongste & Van Zijverden 2007; Jongste 2008), ritual dimensions of the landscape,[37] processes of cultural change (Fokkens 2003; 2005c-f) and the structure of Bronze Age settlements (this publication; Arnoldussen & Fontijn 2006; Arnoldussen & Fokkens 2008).

The present study has benefited considerably from the close collaboration and frequent discussions with the other project group members. Even more so, the information presented in this study on the palaeogeographical developments of the various sites (see Appendices I-VI) and the (model for) vegetation reconstructions (see section 2.6), is derived mainly from the works by Van Zijverden and Van Beurden respectively (*supra*).

33 Thanks are due to C. Sueur (Vestigia) for providing the digital data of the Betuweroute excavations.
34 Anonymous 2002, *cf.* Willems 2007. The Malta legislation is a result of the 1992 Valletta convention (Council of Europe 1992).
35 Involved in the project 'Living in a dynamic (cultural) landscape. (…)' were the archaeologists prof. dr. H. Fokkens (supervisor), dr. D.R. Fontijn (post-doc), dr. P.F.B. Jongste (post-doc), drs. W.K. van Zijverden (researcher; physical-geography), drs. L. van Beurden (researcher; palaeobotany) and the present author (PhD).
36 Van Zijverden 2002a-b, 2003a-b,2004a-b; 2005; 2006, see also Van Zijverden 2007; Jongste & Van Zijverden 2007; Mol & Van Zijverden 2007.
37 Fontijn 2007; Fontijn, Jansen & Fokkens 2004; Butler & Fontijn 2007; Fontijn & Fokkens 2007; Arnoldussen & Fontijn 2006; Bourgeois & Fontijn 2008.

1.10 A living landscape: research outline

In this chapter the general goals and research aims of this thesis have been outlined. It has been argued that there is still much to be learned about the nature and dynamics of Bronze Age settlements. The Dutch river area has been forwarded as a region with a considerable potential to answer (some of) these questions, and the selection of different scales of research has been explained. In the Dutch river area, the data from various low-quality find-spots can be combined with that of several extensively excavated Bronze Age settlement sites. Moreover, specific properties innate to fluvial landscapes such as vertical stratigraphy, fair to excellent preservation conditions – for features and (organic) finds alike – and the availability of detailed palaeogeographical studies enhance this potential even more.

Consequently, the subsequent chapter will start with an introduction into the particular geological properties and dynamics of (selected parts of) the Dutch river area. This will allow for a better understanding of the (dis)advantages and dynamics posed by the fluvial landscapes in which the Bronze Age habitation took place. This chapter will also provide a general background to the palaeogeographical developments (which are summarized in Chapter 4 and discussed in detail in Appendices I-VI) of the various macro-regions for the periods between the Neolithic and the Iron Age.

Prior to answering the main research questions of this study, clarity must be provided on terminology and approaches. In Chapter 3, I will define and discuss the (backgrounds of) concepts and models used in this study and the underlying premises. There, analytical distinctions between labels such as ‘farmsteads’ and ‘house-sites’ will be clarified, and backgrounds to models current in later prehistoric settlement archaeology, particularly the ‘wandering farmsteads model’, are provided.

Having provided background information to general properties of the landscape setting in Chapter 2 and to methodological issues in Chapter 3, the stage is set for a more detailed presentation of the available data on Bronze Age settlements from the Dutch river area in Chapter 4. For each of the six macro-regions, a brief introduction to the history of research is provided, after which specific information at the scales of the settlement site as a whole, the house-sites, the houses and the interrelation between the settlement and the physical landscape is provided. This chapter thus offers a broad overview of the quality and quantity of the available data from the various excavations (discussed in detail in Appendices I-VI). With such an overview, the relevance, scope and value of more general (such as Chapter 5) or more specific (Chapter 6) analyses can be evaluated.

Chapter 5 aims to provide a critical analysis of Bronze Age settlement site elements. There, the various (constituent) components of Bronze Age settlement sites, such as houses, outbuildings, fences, ditches and pits, are discussed in detail. For each of these, problems of dating, (re)construction and interpretation are dealt with. In order to outline and understand regional patterning, this chapter has a supra-regional scope and is not confined to data from the river area proper. As certain settlement site elements such as houses, outbuildings and fences are of key importance in analyses later on in this study (*e.g.* of house-site structure; Chapter 6), this chapter provides a yardstick for evaluating the selection, interpretation and validity of these.

Whereas the various individual elements of Bronze Age settlement sites are introduced in Chapter 5, their specific interplay forms the topic of Chapter 6. Using high-quality data from the Dutch river area, this chapter seeks to answer questions like ‘What did Bronze Age house-sites look like?’ and ‘Which elements are present and how should this be understood?’. Using a methodology involving ‘Visual Analyses of Spatial Overlays (‘VASO’), a systematic analysis of Bronze Age house-site structuring in the Dutch river area is undertaken.

The more technical approaches of Chapters 5 and 6 are recombined in Chapter 7, where the analysis of Bronze Age settlement sites is undertaken with more attention to chronological (long-term) developments. Starting from the Neolithic period and ending with the Early Iron Age, the settlement site data will be analyzed from a perspective that is more focussed on the settlement dynamics of Bronze Age settlement sites and on mapping and understanding the changes over time for house-sites and settlement sites as a whole.

In the final chapter (Chapter 8), the various strands of research are recombined into a narrative that tries to characterise the essence of the Bronze Age cultural landscape in the Dutch river area. At that point, the interplay of settlements, funerary locations and depositional sites as elements of a single (dynamic) cultural landscape is addressed. There, it will be argued that the Bronze Age river area was indeed ‘a living landscape’.

2 The Dutch central river area: fluvial dynamics and palaeogeography

2.1 Introduction

The Dutch central river area forms a core region for the various (palaeo)rivers that drain the lower Rhine basin. It forms, and has formed, a node where many different rivers – of different fluvial styles – no longer incised themselves into Pleistocene subsoil, but actively contributed to the Holocene aggradation of the Rhine-Meuse delta.[1] As such, the central river area formed a pivotal and consequently highly dynamic (palaeo)environment, only to be largely subdued with the widespread construction of dikes around the early 13th century AD.[2]

The dynamics of such fluvial landscapes are played out at different spatial and temporal scales. Some processes, such as river meandering, flooding and gradual shrinking of inhabitable areas by 'drowning' (section 2.4.3), were perceptible at human time-scales and affected the potential uses of Bronze Age landscapes. Other processes, such as major restructuring of the basin drainage structure through avulsion (*e.g.* crevasse propagation), excess peak discharge (causing major floods or restructuring), or the vegetation development from pioneer vegetation into softwood river forests, affected areas much wider than that of individual settlements. Moreover, such processes are either relatively rare (*e.g.* peak discharge) or can take several hundreds of years to complete (*e.g.* avulsion or succession to climax vegetation), so that it may be questioned to what extent such processes were evident – or relevant – to Bronze Age farming communities in the Dutch river area.

In order to understand the risks and benefits of living in an active fluvial landscape, the scale, periodicity, causes and (locally variable) effects of the various fluvial processes need to be clarified. Therefore, this chapter provides a brief introduction to the main fluvial regimes (once) current in the Dutch river area and the changes in their distribution (section 2.3). In addition, the periodicity of these processes in relation to human time-scales, or in other words; 'How would these have appeared to Bronze Age occupants?', is assessed (section 2.4).

The types of vegetation in the direct vicinity of Bronze Age settlements provide – albeit indirect – clues for potential usage of palaeo-landscapes, through their correlations with subsoil lithology and groundwater tables. Using palaeogeographical maps made by Van Zijverden (2003a-b; 2004a-b; 2005) and a model for vegetation development in fluvial landscapes put forward by Van Beurden (2008), the complexities of vegetation development are discussed in a general sense and applied to the Middle Bronze Age-B settlement sites of Eigenblok and Zijderveld in particular (section 2.5).

Palaeogeographical analyses in this study take place at several spatial scales, and these are published in different locations. To start, the nature of – and changes in – the micro-topographic landscape of a settlement site (*i.e.* the micro scale) are described for the six main Bronze Age settlement sites in Chapter 4. In the appendices to the different settlement sites (Appendices I-VI), palaeogeographical reconstructions are offered for an intermediate (*i.e.* meso scale, *c.* 0-4 km^2) and macro (*i.e.* 4-30 km^2) spatial scale. In order to provide linkage between the information available at the different spatial scales, a simplified palaeogeography for the entire delta (*i.e.* a supra-regional scale) is presented as well (section 2.6).

At the close of this chapter, some specific implications of the different fluvial processes and dynamics for archaeological studies are discussed. There, questions such as 'What specific benefits or problems did active fluvial landscapes pose to Bronze Age occupants and how do these types of landscapes affect later archaeological research?' are addressed and some methodological suggestions are provided (section 2.7).

2.2 Palaeogeographic research history

The first systematic scientific studies into the palaeogeography of the Dutch Rhine-Meuse delta date from the start of the 20th century and especially the research by Vink should be noted in this context for its methodology and scope (*e.g.* Vink 1926, 6-9; 376-385; 1954). During the fifties and sixties of the previous century, detailed soil mapping of

1 For a discussion of the concept of a 'delta' see Miall 1984; Chorley, Schumm & Sugden 1984, 359-369; Kruit 1963.
2 Berendsen 1982, 215; Gottschalk 1971; Middelkoop 1997, 61; Berendsen & Stouthamer 2001, 17.

various parts of the Rhine-Meuse delta was undertaken.[3] Only in a few studies, like the early examples by Modderman (1949a-b; 1955a), was the mapping of – or at least studying the interrelation with – (pre)historic habitation explicitly part of the research questions.[4] The corings executed in order to compile the geological maps for the river area have also contributed significantly to the understanding of the area's palaeogeography.[5] In addition, studies emerged that focussed on the general background of the Holocene development of the delta, often in relation to sea-level movement.[6] Palaeo-environmental studies were also more frequently undertaken, sometimes in direct relation to archaeological sites.[7] More and more, the increasing data set allowed for increasingly detailed palaeogeographical reconstructions at ever larger scales (Berendsen & Stouthamer 2001, 6).[8] These reconstructions allow for the results from archaeological investigations to be placed in palaeogeographical perspectives at different spatial (*e.g.* excavation trench to macro-region) and temporal scales (*e.g.* snapshot perspectives to long-term palaeogeographies). Every kind of archaeology undertaken in the Holocene river area needs to come to grips with the different processes and dynamics that have created, affected and partly destroyed the landscapes on which human activities took place. Therefore, in the following sections attention will be paid to the particular processes and dynamics of the Holocene river area, with special attention for the effects these have had (and still have) on – the study of – past human activities.

2.3 The Dutch river area: processes and dynamics

Various parts of the Holocene Dutch river area have been formed in different geological settings, varying with their topographical location within the Netherlands. The most important factors behind these differentiated developments are listed by Berendsen & Stouthamer (2001, 13) and comprise the morphology and gradient of the Pleistocene subsoil, sea-level rise and subsidence, the influence of coastal dunes, tidal differences and fluvial inundations. All these factors – amongst others – influence the fluvial style of the rivers draining the central river area, thus influencing the nature and distribution of the various Holocene deposits in the river area.

2.3.1 Types of depositional environments in the study area

In general, the Dutch central river area is home to two main palaeo-environments: in the west so-called 'peri-marine' (Hageman 1969; Berendsen 1982, 83) or 'fluvio-lagoonal' (see Van der Woude 1981; 1983) conditions prevailed (Berendsen & Stouthamer 2001, 13-14). The term 'peri-marine' designates the areas where sedimentation is influenced by sea-level rise, but where marine deposits are absent (Hageman 1969; Berendsen 2005a, 244). Here, smaller river channels crosscut extensive areas where, behind the coastal dunes, peat had formed and continued to form. The term fluvio-lagoonal presents a more ecologically descriptive view and denotes extensive areas of permanent open water intersected by wooded natural levees of many small rivers in a fresh water deltaic plane (Van der Woude 1981; 1984, 399). Because of the relatively large distance from the sea, the lagoons represented extensive open water areas with fresh water vegetation and peat deposits (Hageman 1969, 377; Berendsen & Stouthamer 2001, 13). To the east, such extensive peat deposits are absent. There the morphology of the floodplain is determined by larger rivers leaving overbank deposits in floodbasins of varying size.

Whereas in both areas the Pleistocene deposits, which form the base of geological build-up, were formed mainly by rivers of the braiding type (see below), during the Holocene rivers of different morphological types had a different distribution in both space and time (*cf.* fig. 2.12). These differences in morphology are related to differences

3 See the overview in Berendsen & Stouthamer 2001, 5 and Edelman 1943a; Hoeksema 1947; 1948; Van Diepen 1950; Pons 1954; Bennema & Pons 1952; Poelman 1966.

4 *Cf.* Edelman *et al.* 1950; Pons & Modderman 1951; Van der Linde 1955; Van der Sluys 1956; Bakker 1958; Poelman 1966; Van Wallenburg 1966; Havinga 1969; Havinga & Op 't Hof 1975; 1983.

5 Verbraeck 1970; 1984; Van der Meene 1977; Bosch & Kok 1994.

6 Bakker 1954; Bennema 1954a-b; De Jong 1960; Pons *et al.* 1963; Jelgersma 1966; 1979; Hageman 1969; Van de Plassche 1980; 1982; Kasse, Vandenberghe & Bohncke 1995; Huisink 1997; Beets & Van der Spek 2000.

7 De Jong 1970-1971; Van der Woude 1979; 1981; 1983; Van der Wiel 1982; Teunissen 1986; 1990; Steenbeek 1990.

8 *Cf.* Kruit 1963; Pons *et al.* 1963; Louwe Kooijmans 1974; 1980; Zagwijn 1974; 1986; Van Dijk, Berendsen & Roeleveld 1991; Törnqvist 1993; Berendsen, Faessens & Kempen 1994; De Groot & De Gans 1996; Weerts 1996; Berendsen 1998; Makaske 1998; Berendsen *et al.* 2001; Berendsen & Stouthamer 2001; De Mulder *et al.* 2003, Gouw 2007.

Fig. 2.1 Simplified geological map showing the distribution of several deposits in the Netherlands (after De Mulder *et al.* 2003, Geological Map of the Netherlands (Appendix)).

a: coastal dunes and barrier deposits (inland: river dunes), b: peat (hatched: on marine deposits), c: estuarine intertidal and lagoonal deposits, d: fluvial deposits (hatched: on marine deposits), e: Pleistocene deposits (hatched: glacial origin), f: fluvial deposits (channel belt deposits), g: study area.

in the bed load and gradient of the palaeo-rivers, but are also influenced by the type and depth of the subsoil and encasing deposits. Much simplified; meandering, anastomosing and straight rivers are dominant in the west and meandering types of rivers in the east. As the river type, or fluvial style, affects both the potential for past human activities as well as the archaeological study thereof (see section 2.7), the defining characteristics of these different fluvial styles will be discussed below.

2.3.2 Morphological river types

It should be stressed that the morphological classifications of rivers types vary with the criteria used,[9] but four main types can be used to reasonably accurately describe the various fluvial deposits current in the Dutch central river area. These are braided rivers, comprising multiple active channels within a single channel-bed (fig. 2.2, no 1), straight rivers with a single low-sinuosity channel in a single channel-bed (fig. 2.2, no 2), meandering rivers characterized by a single high-sinuosity channel in a single channel-bed (fig. 2.2, no 3) and lastly anastomosing rivers which consist of multiple interconnected channels that enclose floodbasins (fig. 2.2, no 4).

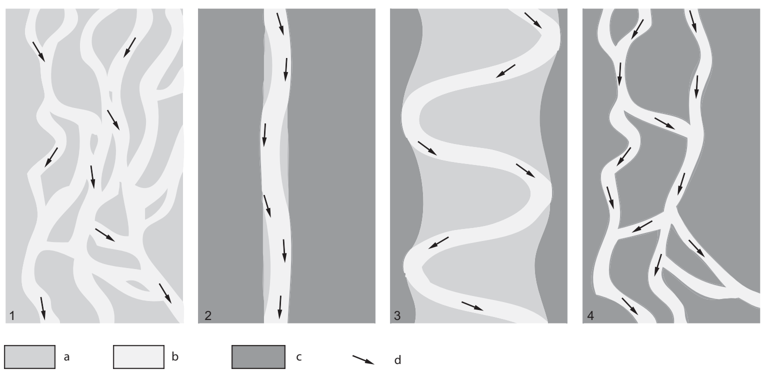

Fig. 2.2 Basis classification of river types (after Berendsen & Stouthamer 2001, 21 fig. 3.1, based on Leopold & Wolman 1957; Schumm 1985).

a: channel bed deposits (sand), b: active watercourse (thread), c: floodbasin deposits (clay), d: flow direction.

Often, however, classification is difficult, as it is influenced by the scale of the study, and thus quantifiable criteria are much needed. 'Straight' river courses, for instance, can at a small scale appear remarkably meandrous in shape. To complicate matters further, anastomosing fluvial systems often comprise 'straight' channels (Makaske 1998,

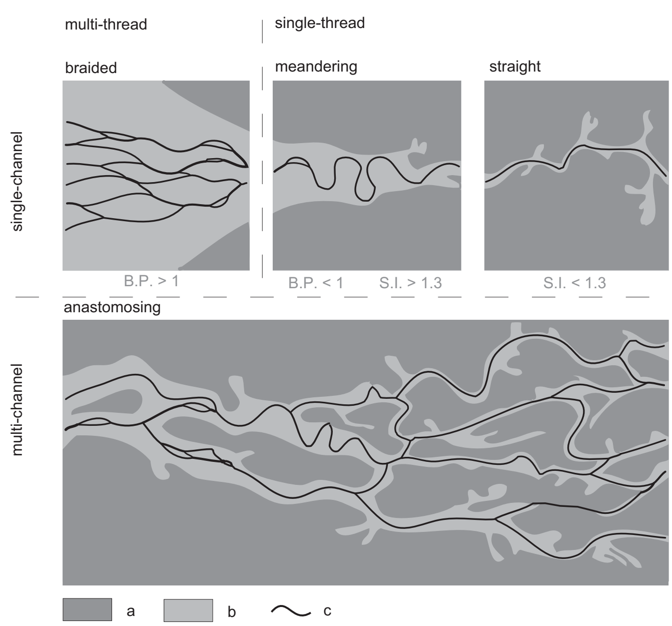

Fig. 2.3 Classification of river types by number of channels, threads and sinuosity (after Makaske 1998, 28 fig. 2.2; Rust 1978).

a: floodbasin, b: alluvial ridge, c: active channel (thread).

9 *Cf.* Weerts 1996, 25; Makaske 1998, 17; 27-29; Berendsen & Stouthamer 2001, 21-22.

241). The distinction between straight and anastomosing is thus reliant on scale. Accordingly, these can be labelled '(straight) anastomosing' fluvial systems in the text below. Otherwise, the main classification according to number of coeval channels and threads (and thread sinuosity) as proposed by Makaske (1998, 28 fig. 2.2, based on Rust 1978) is used (fig. 2.3).[10] The morphological distinction between the main fluvial types is supported by their generally distinct width/thickness ratio of the sand-bodies in cross-section (see fig. 2.10; Törnqvist 1993, 99; 111-112 and references therein; *cf.* Makaske 1998, 231 fig. 5.24).

The properties of the fluvial deposits of the four main morphological fluvial types will be described in somewhat more detail below (if not specified otherwise, all descriptions of river types below are based on Berendsen & Stouthamer 2001, 22-25).

Braided rivers

This type of river is characterized by the presence of multiple active watercourses (threads), which are confined to a single channel-bed often consisting of sand and gravel. The channel-bed is both wide and shallow, and encloses sandy to gravelly bars. Braided river systems occur frequently when peak discharges of rivers are high and vegetation is limited, as for instance under the periglacial conditions during the Pleistocene-Holocene transition in the Dutch central river area.

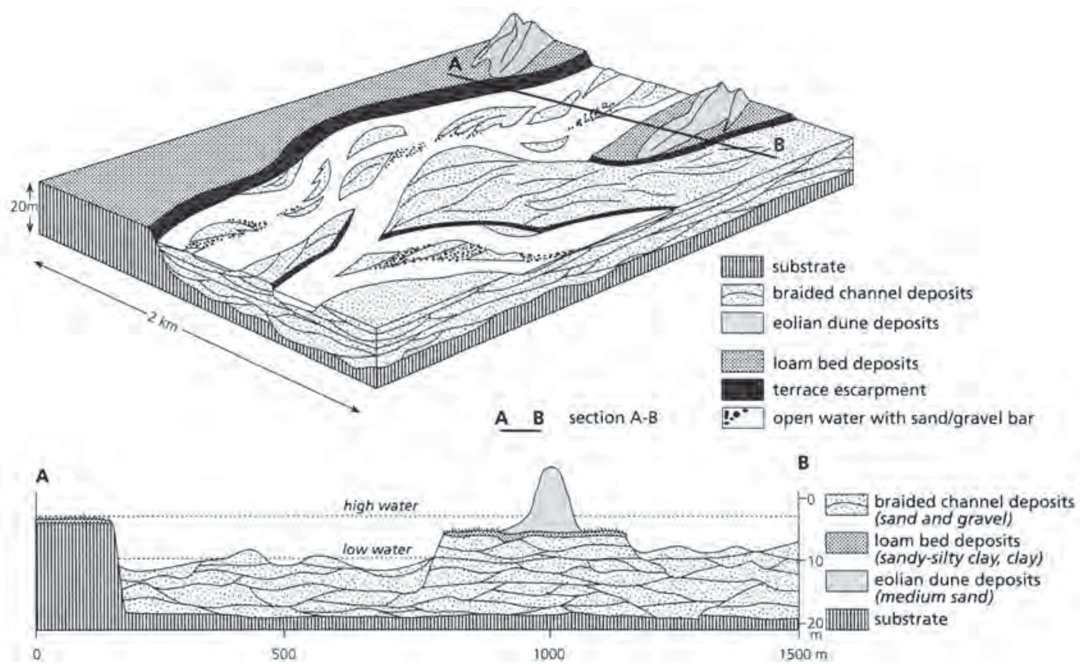

Fig. 2.4 Block diagram of a braided river (after Berendsen & Stouthamer 2001, 22 fig. 3.3).

As such conditions are absent during the later parts of the Holocene, braided rivers are of limited relevance to the study of later prehistoric occupation of the river area. Nonetheless, sometimes rivers locally do display some characteristics of braided fluvial systems, such as the presence of multiple simultaneously active watercourses. For instance, the Werkhoven fluvial system in the Wijk bij Duurstede macro-region (see Appendix IV) was situated partly in a location with a limited peat cover (*c.* < 50 cm) and with easily erodible Pleistocene sandy deposits as

10 This classification is based on metric parameters for the degree of braidedness (BP: braiding parameter, *i.e.* the number of braids per mean meander wavelength; Rust 1978) and the sinuosity index (SI, *i.e.* the channel versus meander belt axis length; Brice 1964). Berendsen (2005b, 271) defines the braiding parameter as the sum of the inter-channel island length divided by the channel length.

underlying deposits (Van Zijverden 2004a). This has resulted in a broad meander belt, which in parts had multiple active watercourses (*ibid.*, ref. to Berendsen 1982, 159; Berendsen & Stouthamer 2001, 78). These courses did build up laterally shifting levee deposits for the individual channels.[11] A similar condition affected its successor, the Houten fluvial system, which also locally displays a similar multi-thread morphology, as is documented by the presence of multiple residual gullies within the Houten channel-bed deposits (Berendsen & Stouthamer 2001, 209).

Straight rivers

Although almost never literally straight, these single-thread and single channel rivers are characterized by the near absence of lateral accretion and not necessarily by a very low sinuosity. The primary distinction to meandering rivers is the fact that, while 'straight' rivers can appear meandrous in shape, this appearance is – unlike with true meandering rivers – not a consequence of constant processes of lateral accretion and erosion. Straight rivers occur predominantly in areas where the encasing floodbasin deposits consist of clay or peat and thus confine lateral mobility. Consequently, point bars are rare, but crevasse splays (see below) form regularly. The width of the channel deposits is small, but they often incise deeply into the subsoil. Frequently, the individual channels of anastomosing rivers (see below) behave like straight rivers (Makaske 1998, chapter 5).

For instance, the morphology of the Zijderveld and Schoonrewoerd fluvial systems within the Zijderveld macro-region can be classified as being of a straight fluvial style (Appendix I). The same can be argued for the Enspijk, Gellicum and Eigenblok fluvial systems in the Eigenblok macro-region (Appendix II) and the Zoelen system just north-east of the De Bogen macro-region (Appendix III). Nonetheless, at the larger scale of the Rhine-Meuse delta as a whole, these fluvial systems should be classified as being part of an anastomosing system (see below; Makaske 1998; pers. comm., April 2007).

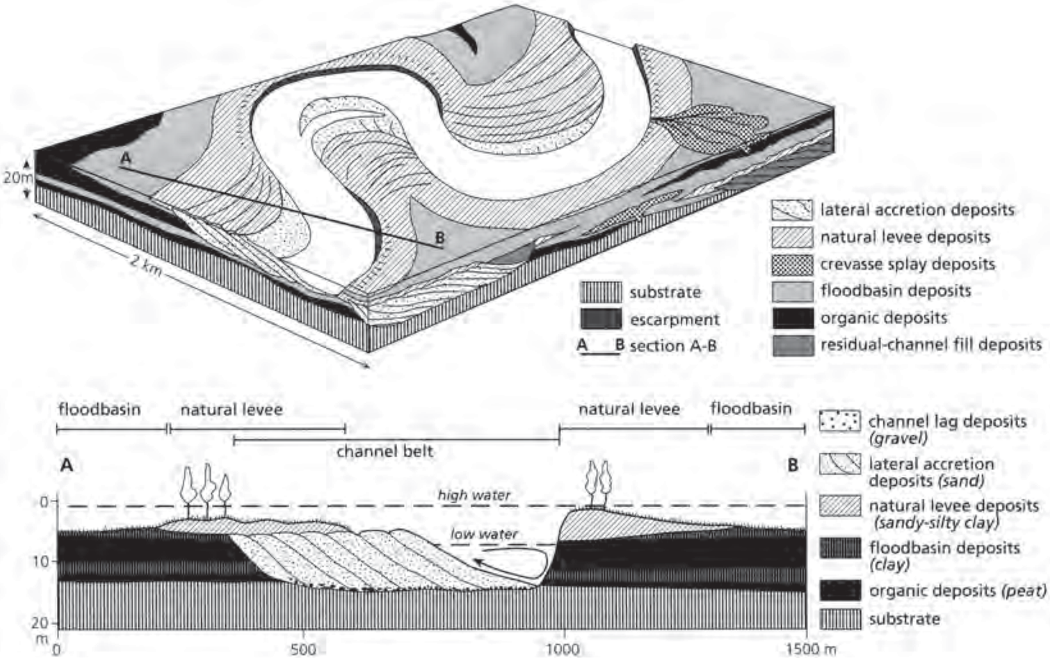

Fig. 2.5 Block diagram of a meandering river (after Berendsen & Stouthamer 2001, 24 fig. 3.4).

Meandering rivers

A meandering river has only one active thread, which is sinuous in shape and which is characterized by active lateral movement within a relatively wide channel-bed. Through constant erosion and accretion, the meanders widen until

11 This pattern possibly also applies to parts of the Herveld and Ressen fluvial systems (W. van Zijverden, pers. comm., Oct. 2006, *cf.* Chorey, Schumm & Sugden 1984, 295).

they are (often) cut-off. On the inside of the active meanders, convex scroll bars form. These scroll bars form in the channel-bed because of the presence of an upward helical flow. Sometimes, the lower parts between the scroll bars (the swales) contain water, but these are not real threads. Meandering rivers engage in overbank deposition: seasonally, high water levels cause the river to leave the channel-bed and sandy to silty sediments – which form the levees – are deposited close by, whereas finer sediments such as clay and silt are deposited in the more distant floodbasin. Occasionally, breaches in the (outer) levee occur and channel-bed-, levee- and suspended sediments are deposited outside the levees; these deposits are called crevasse splay deposits (see below).

The Herveld and Distelkamp-Afferden fluvial systems in the Dodewaard macro-region (fig. 2.16, A; Appendix VI) are good examples of rivers displaying a meandering fluvial style. On the crevasse deposits formed by these systems, archaeological remains from the Middle Neolithic to the Late Bronze Age have been uncovered (Chapter 4; Appendix VI). The sediments of the Werkhoven fluvial system that underlie many Middle Bronze Age-B occupation traces in the Wijk bij Duurstede macro-region are also a typical example of deposits originating from a meandering fluvial system (Chapter 4; Appendix IV).

Anastomosing rivers
These rivers consist of several, interconnected channels which enclose low-lying floodbasins. The channels are usually straight and relatively stable. The identification of anastomosing fluvial systems is dependent on the spatial scale involved. Individual branches within an anastomosing fluvial system can be either (confined) meandering or straight. Sinuosity of the (sometimes multiple) threads within the various channels varies, but is normally moderate. As these rivers occur in areas with clayey and peaty subsoils, lateral accretion is nearly absent, with only vertical aggradation taking place. The combined width of the channel- and levee- deposits is limited, whereas their depth is considerable. Crevasse splays of fine sand and sandy to silty clay form frequently.

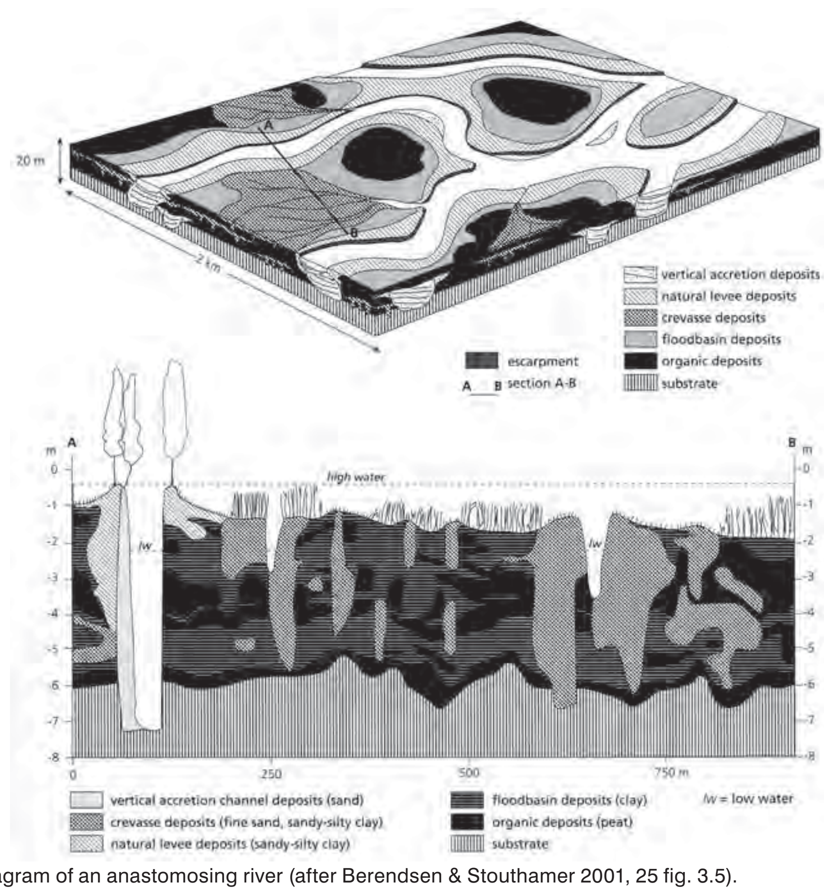

Fig. 2.6 Block diagram of an anastomosing river (after Berendsen & Stouthamer 2001, 25 fig. 3.5).

2.3.3 Crevasse splay deposits

Crevasse or crevasse splay deposits are discussed here separately in somewhat more detail. These deserve special attention as they, in several cases, supported dense Bronze Age occupation (see Chapter 4). Crevasse splay deposits are characterized by a very erratic fluvial genesis and unpredictable morphology. In these aspects they differ in spatial predictability from the other fluvial deposits associated with the main morphological fluvial types already discussed above. Therefore, although representing a facies rather than a separate fluvial style, the characteristics of crevasse splay deposits are discussed at this point.

In short, crevasse splay deposits occur when a watercourse breaks through its levees and discharges some of its stream power into the adjacent floodbasin (fig. 2.7).[12] Levee material and suspended matter is thus transported into the floodbasin area. Consequently, crevasse splay deposits can consist lithologically of coarser material tapped from the watercourse's lowest part as well as more fine grained sandy to sandy-silty clayey material from the original levee through which it breached. These materials are reworked upon depositing and after the initial breach no predictable sedimentological structures (*e.g.* lamination, fining-upward sequences) are present.

Fig. 2.7 Crevasse formation by the Columbia river (Canada; photos courtesy of H.J.A. Berendsen, Utrecht University).

Note the extent of the sandy deposits into the floodbasin, the narrow wooded levees and the possibility to acces the main river channel from the hinterland offered by the crevasse inlet.

The morphology of these deposits is very variable because it is influenced by the fluvial type, the bed load material as well as the levee- and floodbasin lithology (*cf.* fig. 2.8). Crevasse splay deposits have two main geometric shapes, which usually are concurrent. The first are sheet-like deposits. These are up to two metres thick (usually with a non-erosive base) lobate, dendritic or elongated deposits which can be hundreds of metres wide and long. The second type concerns crevasse channels, which are often deeply incisive (and consequently up to several metres thick), between 10 and 100 m in width and which extend several hundreds of metres into the floodbasin.[13] Accurate mapping of such deposits calls for coring densities below the 20 m grid interval (Weerts 1996, 69).[14]

Crevasse formation occurs with rivers of the meandering, anastomosing and straight type. With the latter (two) type(s), crevasse formation seems to be more frequent (Weerts 1996, 54; Makaske 1998, 57; Stouthamer 2001, 144).[15] Possibly, this is related to the more limited width of the levee deposits and the relatively bigger difference in height between the top of the levee deposits and the floodbasin for these types. Crevasse formation may, however,

12 Description based on Berendsen 1982, 106-108; Weerts 1996, 43-45; Makaske 1998, 46; Berendsen & Stouthamer 2001; Van Dinter & Van Zijverden 2002.

13 Sometimes even up to several kilometres; Berendsen 1982, 193; Stouthamer 2001, 134.

14 The percentage of crevasse deposits detected for the Schaik system by Weerts (1996, 69 table 3.3) decreases from 57 % at a 20 m interval to 45 % at 100 m coring grid density. Formulated otherwise, with coring grids of 20 m, 43 % (!) of the crevasse deposits have not even been detected. A minimally required sampling distance of 25-30 m perpendicular to the main palaeo-flow direction is proposed (*ibid.*). See also Makaske (1998, 183), who used 10-20 m coring intervals for his cross-sections across the Schoonrewoerd channel belt, and Stouthamer (2001, 40).

15 According to Stouthamer (2001, 144), crevasses are completely absent with meandering rivers in the (western) Rhine-Meuse delta that postdate the Lopik crevasse splay (*c.* 3800-3660 BP; *op. cit.*, 142). The crevasse formation by the Herveld fluvial system (Appendix VI) shows that this need not apply to all parts of the Rhine-Meuse delta (also B. Makaske, pers. comm., April 2007).

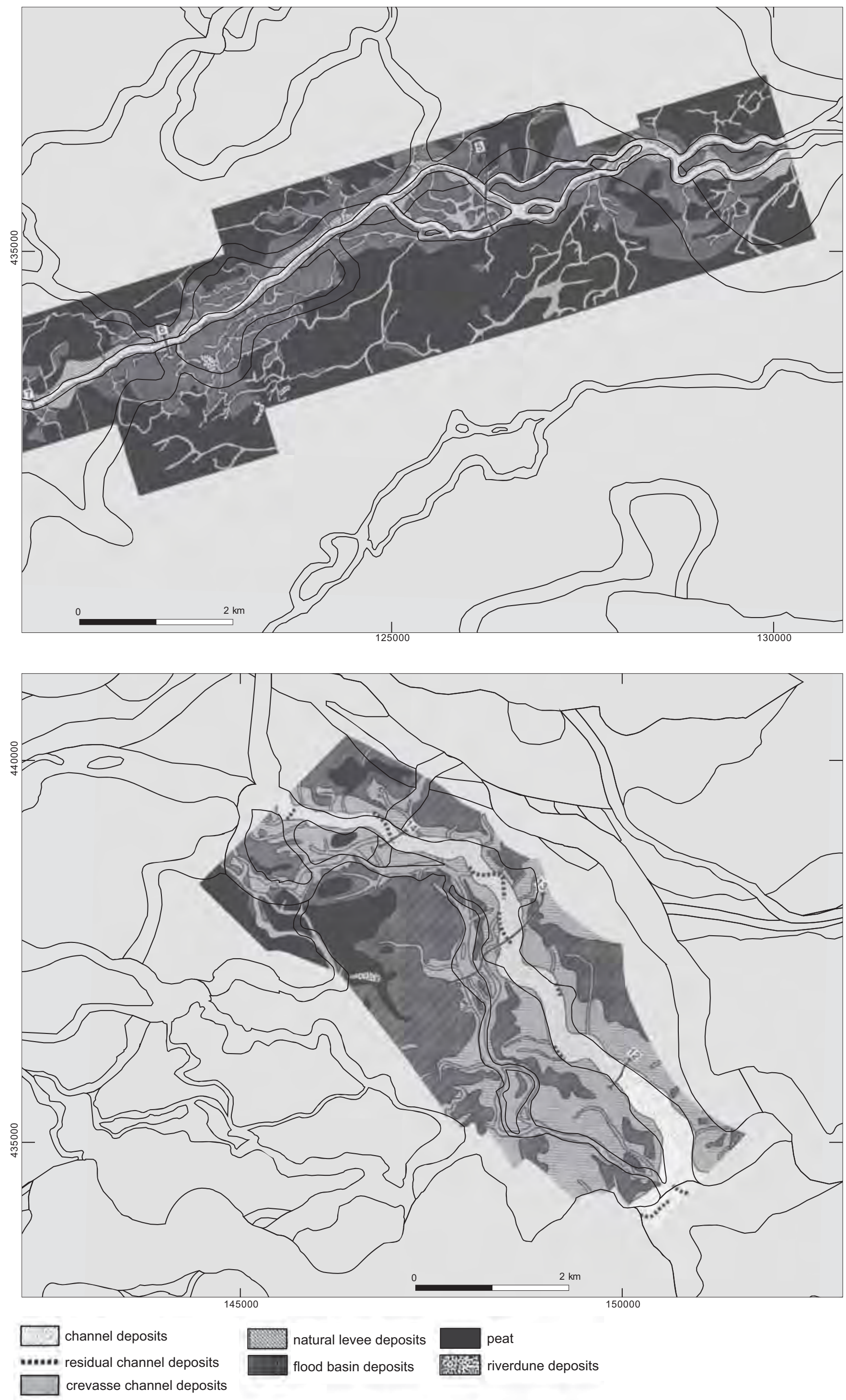

Fig. 2.8 Detailed geological maps showing the extent and density of crevasse splay deposits for a (straight) anastomosing fluvial system (top; Schoonrewoerd fluvial system, after Makaske 1998, 186, fig. 5.7) and a (confined) meandering fluvial system (bottom; Hennisdijk fluvial system, after Makaske 1998, 187 fig. 5.8). The overlying thick black lines indicate the extent of the deposits as mapped by Berendsen and Stouthamer (2001).

be a predominantly stochastic process and beaver trails through the levees, log-jams and ice- or beaver dams in the active river course are thought to have been important triggers (Makaske 1998, 34 and references therein). In addition, crevasse formation is thought to occur more frequent at locations where an active river course crosses an older sand body (older channel-bed-, levee- or crevasse deposits), which results in a decrease of levee stability.

Crevasse splays can be both short- or longer-lived depositional environments. If the entry point from the main watercourse is not blocked relatively fast, the crevasse channels remain water-logged as well and they can build up small levees next to their channel during floods. Alternatively, during times of low water level, the crevasse channels can – but not necessarily always do – drain the floodbasin. Crevasse channels sometimes formed the starting point of an avulsion, which is the abandonment of a part or a whole channel belt in favour of a new course on the floodplain (Berendsen 1982, 106; Stouthamer 2001, 13-31; 149 fig. 5.6).

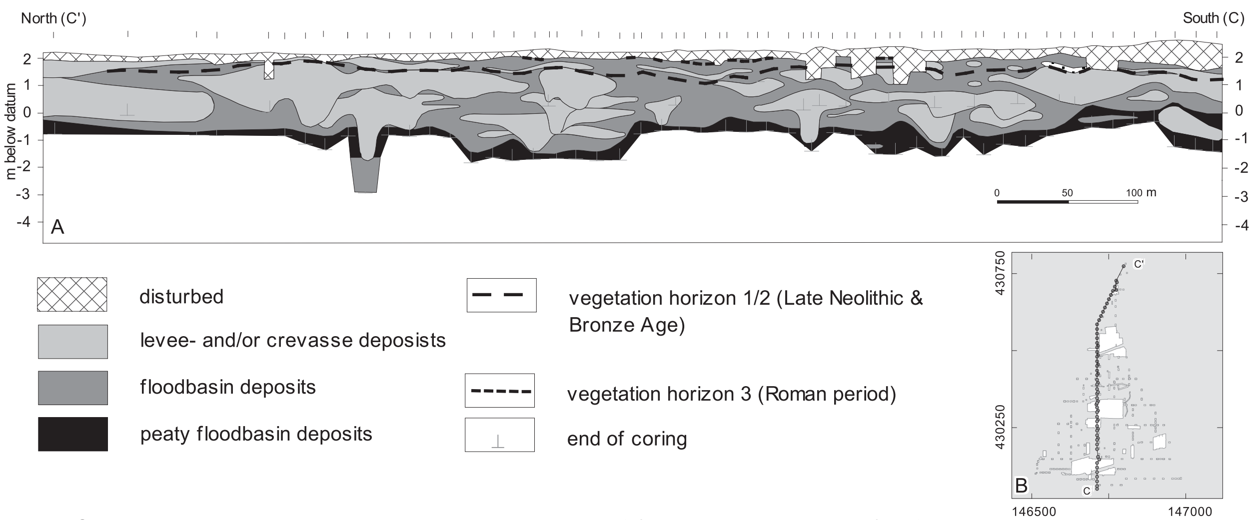

Fig. 2.9 Stacked crevasse splay deposits near Meteren - De Bogen (after Van Zijverden 2004b, fig. 6).

2.3.4 Lithogenetic descriptions of fluvial deposits

For the rivers of the different fluvial styles described above, three main lithological-genetical (lithogenetic) entities can be distinguished: channel belt deposits, crevasse splay deposits and floodbasin deposits (Weerts 1996, 32; Berendsen 2005a, 268).[16] The channel belt deposits can be subdivided further into lateral accretion deposits such as point bar deposits, vertical accretion deposits such as channel-lag deposits, residual-channel deposits and levee deposits. The main lithological properties of these lithogenetic units are summarized below in table 2.1. In this study, following Makaske (1998, 229), a palaeochannel and its genetically associated deposits will be called a fluvial system.

Non-fluvial deposits

Within the study area, deposits of fluvial genesis are found interspersed with (more rare) non-fluvial deposits. These comprise for instance aeolian river dune deposits and organic deposits (peat formation) in the (former) floodbasins. Although the Pleistocene ice-pushed hills and the coversand landscapes that confine the Rhine-Meuse delta respectively to the north and south are also of non-fluvial genesis and are sometimes present within the macro-regions, a description of their genesis and lithology lies beyond the purpose of the current study.[17]

River dunes are Late Weichselian (Younger Dryas; *c.* 11-10 kA BP) aeolian deposits that can reach up to 15 m in thickness. They consist of channel-bed deposits blown from the Rhine-Meuse braidplain.[18] During the Holocene they are gradually covered by aggrading sedimentation, but some still breached the Holocene base level

16 Dike-breach deposits are considered to be a fourth type of fluvial lithogenetic unit, but they are not relevant for the time period of this study and will consequently not be dealt with here.
17 But see Berendsen 1982, 36-57; Weerts 1996, 50; De Mulder *et al.* 2003, 197-202; 346-350.
18 Berendsen 1982, 57; Weerts 1996, 49-50; Berendsen & Stouthamer 2001, 35; 66; De Mulder *et al.* 2003, 210.

Deposit	Architectural element	Lithology
Channel belt deposit	Lateral accretion deposits (point bar deposits, channel lag deposits) (= channel deposits)	Very fine to coarse sand, occasionally gravel and sandy-silty clay. Fine sand and sandy-silty clay layers on accretion surfaces. Fining-upward sequences are common
	Vertical accretion deposits (channel lag deposits, coarse channel fill deposits) (= channel deposits)	Very fine to coarse sand, occasionally sandy-silty clay. Fining-upward sequences and lateral accretion surfaces are rare
	Residual channel deposits	Minerothrophic peat, humic clay, sandy-silty clay, sometimes clayey sand and fine sand
	Natural levee deposits	Horizontally laminated sandy-silty clay, occasionally with layers of fine sand
Crevasse splay deposits	Crevasse splay deposits	Sandy to silty clay, in crevasse channels also sand. In crevasse splays usually horizontally laminated. In crevasse channels usually interbedded. Sometimes fining upward sequences (often on top of a coarsening-upward sequence) from coarse sand to sandy-silty clay. Many local variations in lithology, high organic content (up to 80 %) possible.
Floodbasin deposits	Floodbasin deposits	Very thin laminated to massive clay and humic clay

Table 2.1 Lithogenetic units and their lithological characteristics (based on Weerts 1996, 32 table 2.1; Stouthamer 2001, 132-133; Berendsen 2005a, 268-286).

during the Bronze Age. River dunes are present in the Wijk bij Duurstede and Zijderveld macro-regions and there is some evidence for human activities on top of them during the Bronze Age in the latter case.[19]

Although sometimes related to fluvial deposits, organic deposits in the Rhine-Meuse delta are not fluvial in origin. Organic deposits can form, however, in residual gullies of fossil rivers and active rivers can influence (*e.g.* through flooding) vegetation successions and floodbasin peat development (see section 2.5). In areas that were either too distant or had – for instance by processes of avulsion – become cut off from regular fluvial activity, groundwater level rise and precipitation jointly contributed to the formation of alder (*Alnus*) and reed (*Phragmites*) peat deposits (Weerts 1996, 49).

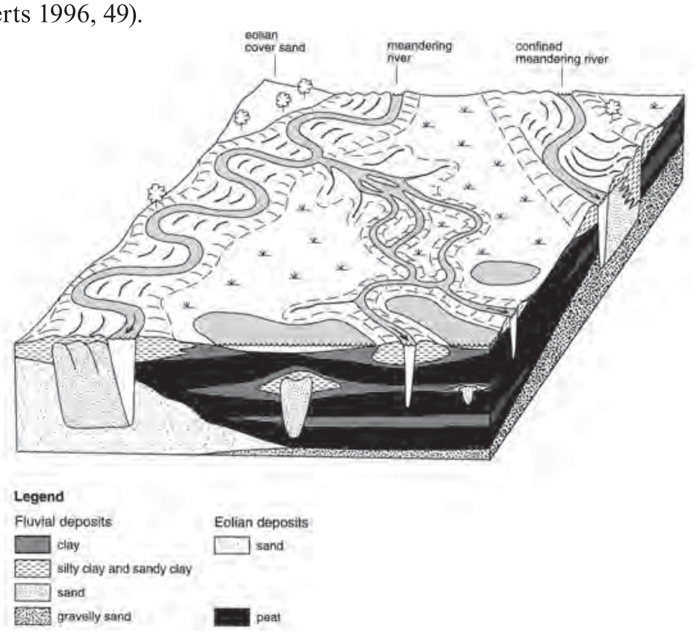

Fig. 2.10 Block diagram showing schematic (sub)surface morphology for three fictional concurrent fluvial systems in the Middle to Late Holocene Rhine-Meuse delta. The block represents an area of 25 by 25 km and 10 m in thickness (Makaske 1998, 238 fig. 6.3). Note the relation between the fluvial style and subsoil lithology and the relation between fluvial style and width/thickness ratio of the channel bed deposits.

19 Appendices IV and I. See also fig. 7.10 and Louwe Kooijmans (1974, 89; 368 no 60; 63; 371-372 no 92).

2.3.5 Post-depositional processes

Although on the time-scale of millennia the entire Dutch central river area was subjected to continuous fluvial deposition, at smaller time frames and spatial scales, periods of reduced or halted sedimentation can be identified. At such places and times, the morphology of the fluvial deposits is affected by processes such as shrinkage (*i.e.* the loss of moisture from sediments by evaporation), oxidation (*i.e.* the removal of organic content by bacterial transformation into carbon dioxide) and auto-compaction, which is compaction of a sediment under its own weight (Locher & De Bakker 1992). Where channel-bed deposits have incised into the Pleistocene subsoil or where stacked crevasse splay deposits form a continuous sequence down into the Pleistocene subsoil, compaction is less an issue (see fig. 2.11).

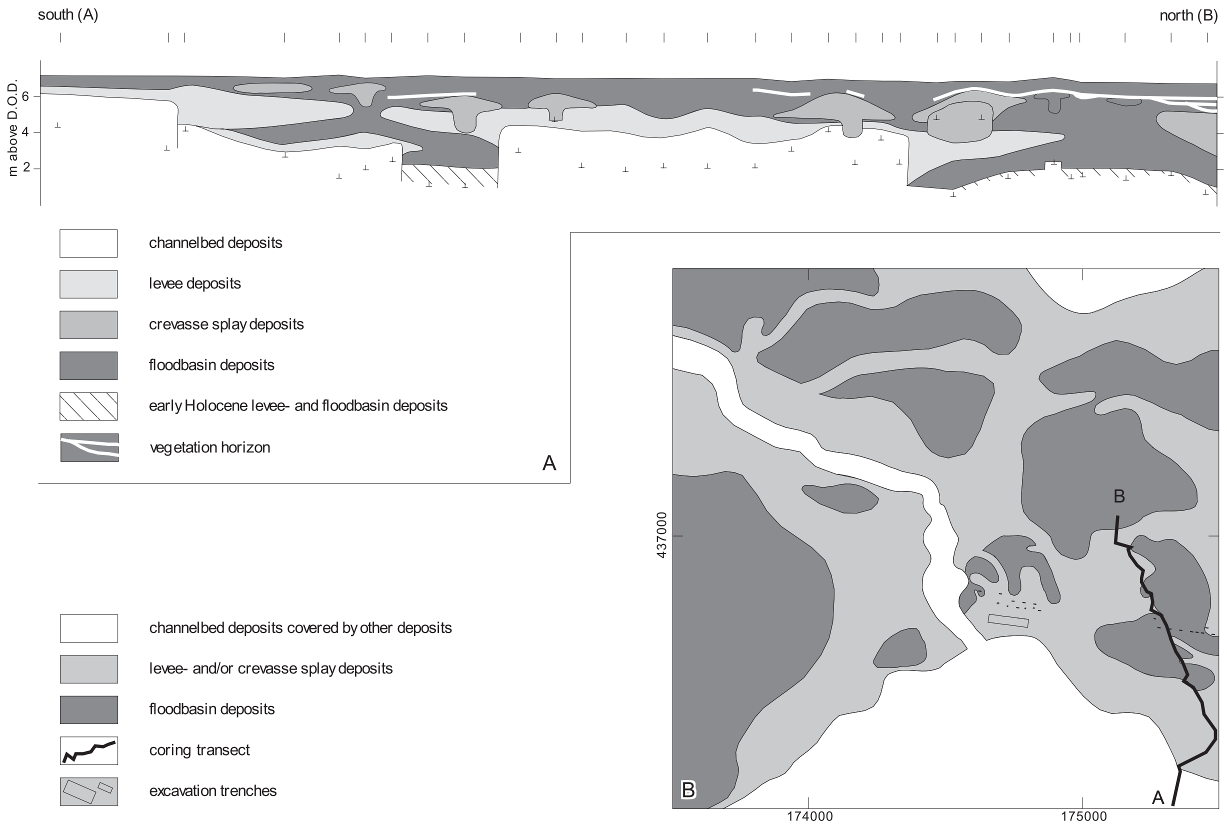

Fig. 2.11 Stacked crevasse splay deposits near Dodewaard (after Van Zijverden 2003b, fig. 4) The thickness of the crevasse splay deposits proper and the thickness and lithology of underlying sediments influence landscape morphology over time. Unfounded (*i.e.* deposits without a compaction-free (sandy) underlying sequence into the Pleistocene subsoil) parts of crevasse splays will 'drown' – as a result of combined compaction and continued sedimentation – quicker than other parts.

In addition, chemical processes such as vertical transport of minerals and decalcification due to rainfall and groundwater level movements, but also chemical and mechanical alteration induced by plant and animal life, affect fluvial sediments after deposition. Faunal activities effect soil properties such as lamination, aeration and chemical composition, but these are of limited relevance to the palaeogeographical analyses of prehistoric habitation.[20] Vegetation development, however, is of higher archaeological relevance as certain types of vegetation can indicate environments that are or are not suitable for various human activities (in the past). The typical vegetation types that

20 Notwithstanding the fact that many archaeological research questions can be investigated with techniques which are based on such alterations, as soil micro-morphology. See for examples from the study area Steenbeek 1990 and Exaltus 2002a-b.

occur in fluvial landscapes are described in section 2.5. Here we will only briefly address one distinct consequence of the vegetation cover for palaeogeographical studies and that is the occurrence of vegetation horizons.

Vegetation horizons

The moment vegetation takes foothold on newly deposited fluvial sediments, processes of decay and organic decomposition will begin to take place as well. Over time, minute particles of black organic matter and humic components are transported vertically downward into the sediment supporting the vegetation. This results in organically enriched layers which, depending on the conditions of their formation, are dark-grey to black (aquatic) or greyish (terrestrial) in colour.[21] The formation and visibility of these so-called 'vegetation horizons' rely on the presence of a prolonged phase of diminished (or absent) fluvial influence (Steenbeek 1990, 201). At such points in time, vegetation horizons form the surface level and do accordingly correspond to palaeo-surface levels.

If not eroded later on, vegetation horizons can be recognized in archaeological coring campaigns. Therefore, vegetation horizons – especially if containing archaeological relicts – are important indicators of landscapes which may have seen a human presence. These vegetation horizons serve as indicators for periods of reduced sedimentation and can – with caution – be correlated to palaeo-surfaces. As hiatuses may be present within seemingly single vegetation horizons and laterally interconnected vegetation horizons may not necessarily have been formed at the same time, vegetation horizons should not be considered unproblematic time markers. They may represent more than a single palaeo-surface.

If human activities took place on such palaeo-surfaces that resulted in anthropogenic waste, this can become embedded (through the combined processes of trampling, bioturbation and accumulation) into the vegetation horizon. In that case the topmost soil trajectory is both former surface area, vegetation horizon, and finds-layer (*i.e.* any (continuous) trajectory of sediment wherein archaeological traces can be attested). This intertwinement, however, is not a rule. If, for example, the top layer of a sediment with a vegetation horizon and embedded artefacts is eroded, a decapitated vegetation horizon and finds-layer remain. However, the former surface area, and most of the archaeological materials, are missing.

Erosion

Processes of erosion also complicate palaeogeographical reconstructions in the Dutch river area. First of all, continuous alteration of the large-scale drainage structure of the entire delta occurred through avulsion (Stouthamer 2001, 149 fig. 5.6). The relatively small size of the delta basin, the long duration of the Holocene genesis and the often deeply incisive nature of the fluvial systems have resulted in a delta where much of the palaeo-channels have been partly or completely reworked by younger fluvial systems.

On a smaller scale, temporally synchronous erosion by processes such as meandering, avulsion and crevasse formation have disturbed (near-)contemporary and older deposits. This means, for instance, that archaeological remains may be discovered in secondary contexts and that these are consequently hard to interpret.[22] Conversely, it means that where once prehistoric habitation took place, few remains may be detectable with the techniques of coring (or test-pitting), frequently used in compiling palaeogeographical reconstructions.[23] Whereas crevasse formation or avulsion can be responsible for the wholesale destruction of archaeologically interesting locations, erosion may also take more subtle forms. Especially the process of sheet erosion should be noted (also called overland flow or sheet flow; Chorley, Schumm & Sudgen 1984, 260; Collison 1996, 38-39). Sheet erosion entails the unchannelled dislocation of the top layer of the soil in a liquefied state. If induced by rainfall, the effect is limited to transportation of the topmost few millimetres. In the river area, however, it is likely that the surface area, liquefied by precipitation and high groundwater levels, could have been washed away by (the high-power floods associated with) crevasse

21 Edelman *et al.* 1950, 87; Berendsen 1982, 109; Schoute 1984; Schoute & Steenbeek 1986; Steenbeek 1990, 16-18 (and references therein); Berendsen 2005a, 272.

22 See for instance Hessing & Steenbeek 1990, 15-16; Bulten 1998b, 10-13; Arnoldussen & Van Zijverden 2004, 68; Appendix III.

23 For example compare Haarhuis 1998, 27 versus Knippenberg & Jongste 2005 or Hessing & Steenbeek 1990, 10; Hessing 1994, 230 versus Apppendix IV or Asmussen 1996, 59-67 versus Hielkema, Brokke & Meijlink 2002, 236-288; *cf.* Appendix II and Van Hoof & Jongste 2007, 33.

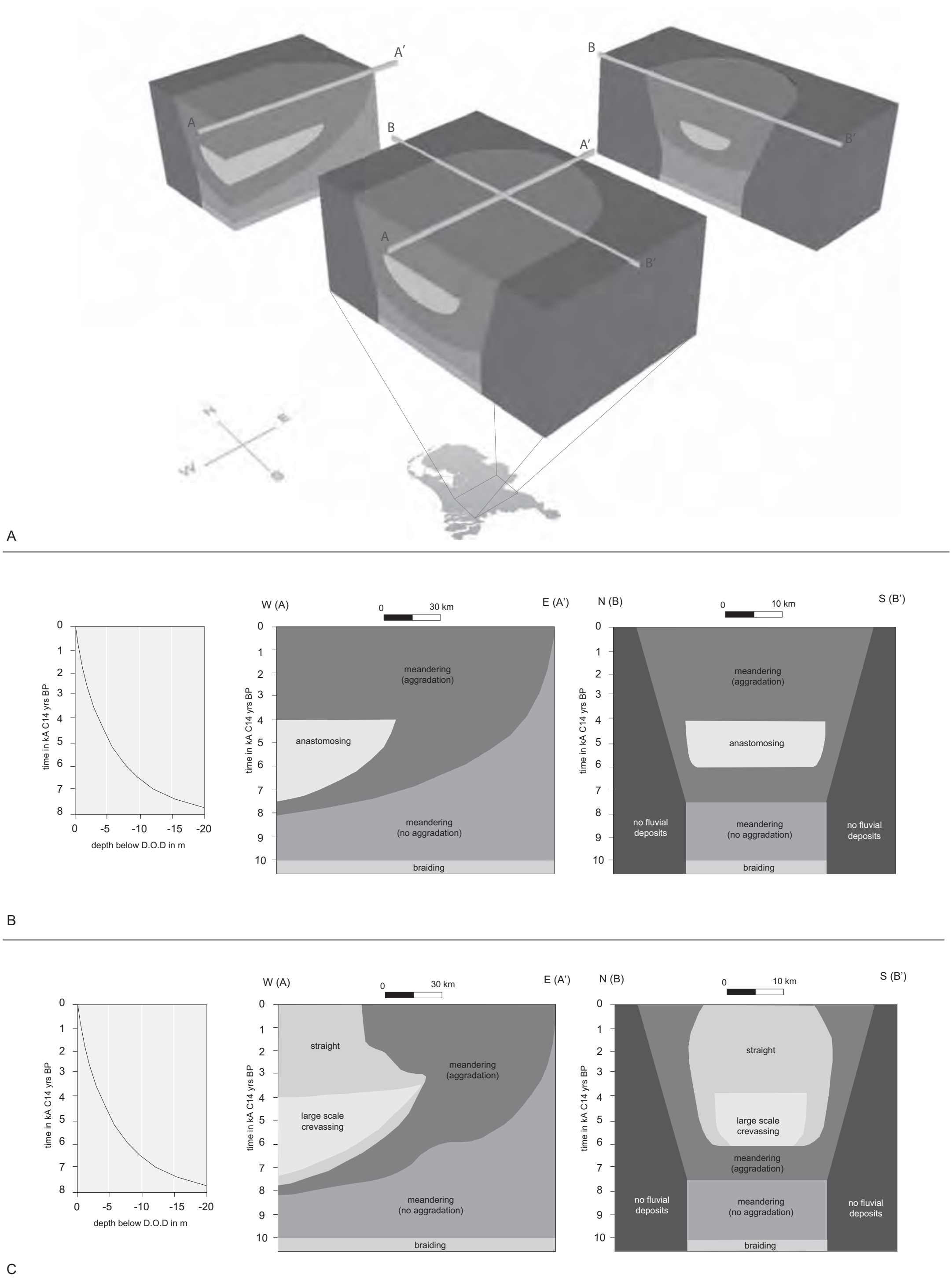

Fig. 2.12 3D time-space model for the distribution of the various fluvial types in the Rhine-Meuse delta (see also Gouw 2007, 122 fig. 5.12). A: schematic 3D representation of the Rhine-Meuse delta. The location of sections A-A' and B-B' is indicated. The X-Y (compass) plane describes the spatial axis, whereas time-depth is plotted on the vertical axis. B: distribution of fluvial styles in space and time in relation to sea-level rise (curve from Berendsen 2005a, 234 fig. 9.9) according to Törnqvist (1993, 105 fig. 11). C: distribution of fluvial styles in space and time in relation to sea-level rise according to Berendsen and Stouthamer (2001, 15 fig. 2.9).

formation up to a depth of several centimetres. In this manner, the top of a given finds-layer (possibly correlated to a vegetation horizon) may be washed from its original location over several metres.[24] This complicates (or even renders impossible) the possibility to detect locations of former human activities by only executing corings at such locations. Conversely, the areas to where the various (washed out) finds are transported, are easily misinterpreted as *in situ* archaeological remains.[25]

2.3.6 Changes in river type distribution

The distribution of the various types of rivers within the Dutch central river area is determined by sea-level rise, the amount of discharge, sediment load of a river and river gradient, but also by the depth and nature of the subsoil deposits (Berendsen & Stouthamer 2001, 14-15; 92-96; Törnqvist 1993). The interplay between these factors is complex and a discussion thereof lies well beyond the scope of the current study.[26] In short, where rivers have the possibility to erode easily into a sandy subsoil, rivers displaying a (confined) meandering (or more rarely braided) style can develop. Where rivers are encased by thick layers of clayey or peaty sediments – reducing lateral movement – straight and anastomosing river types can develop (*cf.* Berendsen & Stouthamer 2001, 77-79).

The Dutch central river area can be visualized schematically as an elongated, more or less conical valley that gradually broadens and deepens towards the west (fig. 2.12, A). Over time, the types of fluvial systems and their spatial extent have varied considerably. The distribution of the various river types in both space and time can be visualized as a 3D time-space model. In this model, a spatial generalization of the Rhine-Meuse delta is mapped on the X-Y (compass) plane. The vertical dimension represents time-depth, starting from *c.* 11 kA BP to the present day. The 3D representation (fig. 2.12, A) aids in understanding the 2D cross-sections of this model depicted in figure 2.12, B and C. The sections present different interpretations of the distribution of the fluvial styles according to Törnqvist (1993; fig. 2.12, B) and Berendsen & Stouthamer (2001; fig. 2.12, C), in relation to sea-level rise.[27]

The observable changes on the horizontal level are predominantly related to variations in the subsoil (erodibility). However, during the Holocene – especially in the western part of the delta – an extensive (up to 18 m) thick accumulation of both lagoonal and fluvial deposits occurred. Because of the slope of the underlying Pleistocene subsoil and the gradual sea-level rise, the intersection between the Pleistocene subsoil and the first Holocence aggradation shifted upwards (eastwards). This is a process known as onlap (Berendsen & Stouthamer 2001, 15). This eastward shift of the terrace intersection meant that subsoil conditions for fluvial systems also changed over time. Thus, for instance, the shift from aggrading meandering fluvial systems to anastomosing ones, is thought to have occurred earlier in the west (where thicker layers of floodbasin deposits had already accumulated) than in the east. Therefore fluvial style is determined by more supra-local factors such as sea-level rise and the Pleistocene terrace gradient, as well as by more local parameters such as the lithological properties of the encasing deposits. It is this intertwinement of temporal and spatial scales that necessitates the three-dimensional approach reflected in the models of fig. 2.12.

2.4 Periodicity of fluvial dynamics in relation to human time-scales

At a geological time-scale, the Rhine-Meuse delta can be characterized by constant sedimentation (see above). In this section, the periodicity of the various geogenetic processes outlined above will be indicated. This serves to distinguish between processes that were perceptible to prehistoric occupants and those that extend beyond humanly perceptible time-scales. Progressively larger time-scales will form the structure of the sections below.

24 *Cf.* Bulten 1997, 13-15; Van Zijverden in Bulten 1997, 20-22; Koorevaar 1998, 7; Van Zijverden 2002a, 66; 70; Van Zijverden 2002b, 87; Bulten 1997, 13-15; Van Zijverden in Bulten 1997, 20-22. For a Roman period example see Vos 2003, esp. 10-14.

25 See for instance the discussion in Ten Anscher & Van der Roest 1997, 17-18.

26 But see Chorley, Schumm & Sugden 1984, 290-306; Schumm 1985; Brown 1997, 24; Makaske 1998, 42-43; Berendsen & Stouthamer 2001, 22-27; 71-96 for modelled approaches.

27 According to Makaske (1998, 173; 228), the influence of sea-level rise on the distributions is overrated. For more recent interpretations, see Cohen (2003, 96 fig. 4.10, who also incorporates the tidally influenced area) and Gouw (2007, esp. 92-96; 118-131).

2.4.1 Instant (catastrophic) events

In natural river systems, unlike in the modern day Dutch river area, the difference between the mean water level in the river channel and the surface level of the floodbasin was limited to 0,5-2 m.[28] This means that levee collapse was not accompanied by the forceful erosion of present-day dike-breaches. Rather, if water levels did rise above bankfull capacity, usually low energy bank overflow (flooding) occurred. Despite this observation, levee collapse is likely to have occurred with palaeo-rivers of all fluvial styles and will nonetheless have been catastrophic for occupants in the direct vicinity (< 100 m) of the breaching point. Levee breaches can occur instantly (*i.e.* within the hour) and levee and suspended bed load material are deposited as crevasse splay deposits in the floodbasin near the breaching point (see fig. 2.7). It has been outlined above that natural causes such as beaver dams, log- or ice dams, extreme floods (see below) or tectonic events could have triggered such levee breaches (Makaske 1998, 34).

2.4.2 Seasonal to yearly events

As indicated above, with unembanked rivers, low-energy flooding over the levees is a normal process. Presumably, several of the factors influencing contemporary river (peak) discharge also affected palaeo-rivers. Discharge of the current Rhine-Meuse delta is predominantly affected by the balance of precipitation, soil saturation and evaporation (and – to a lesser extent – freezing) of water in the upstream catchment area.[29] Especially between November and May, peak discharge occurs frequently. During these months, vegetation covers are limited (decreasing intake and evaporation), prolonged precipitation occurs (resulting in soil moisture saturation and thus increased subsoil water transport) and – if present – snow covers melt (Van de Langemheen *et al.* 2002, esp. 12-14; *cf.* Van Dinter 2000, 35). This increased discharge could have resulted in seasonal flooding, which could have lasted several weeks (Berendsen 1982, 89). Recent analogies in unembanked systems (*e.g.* the Columbia river; mean flooding 45 days/yr: Makaske 1998, 95) and palaeobotanical studies (*e.g.* Willow (*Salix*) vegetation thrives at 100-200 days/yr flooding; Van Beurden 2008) can support these assumptions.

Flooding also implies sedimentation. Near the active watercourse the flow velocities are the highest and more coarse grained sediments are deposited, leading to levee build-up. At more distant locations, mostly clay is deposited. Establishing the exact rate of sedimentation is difficult and it is necessary to take into account the local variability in basin morphology.[30] Some general indication of sedimentation rates may be deduced from radiocarbon dated sediments. Berendsen (2005a, 285) estimated a mean sedimentation rate of *c.* 2 mm/yr in the Rhine-Meuse delta between 8000 and 3700 BP. Other estimates range between 0.4 to 6 mm/yr.[31]

2.4.3 Generational events

At the scale of a human generational cycle, several processes take place. One such process is the closure of crevasse channel inlets. Although the (stochastic) initial formation of crevasses may take place at a larger time interval, the entrances of crevasse channels could be (but need not be; *cf.* Van Dinter & Van Zijverden 2002, 12) blocked relatively soon. Suspended material is deposited near the former crevasse channel entrances and sometimes natural blockage is added (vegetation, branches or beaver dams) which decreases flow velocity (*cf.* fig. 2.7, for an example of channel blockage in progress). This process (if not countered by a floodbasin draining current during periods of low water levels) can quickly completely block crevasse channels.

An indication of the speed of this natural silting up of the crevasse entry point can perhaps be deduced from meander mobility. Although the lateral displacement of meandering channel fragments will have varied locally in speed, a maximum lateral displacement of 16-24 m/yr is not unrealistic.[32]

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28 *Cf.* Steenbeek 1990, 204; Weerts 1996, 42; Berendsen 2005c, 95.

29 C*f.* Van Winden, Overmars & Braakhekke 2003, esp. 15-25.

30 See for instance the effect of floodbasin size on sedimentation and the development of vegetation horizons to the north and south of Zijderveld (Van Zijverden 2003a).

31 *E.g.* Makaske (1998, 234); 0,4-1 mm/yr (ref. to Van Dijk, Berendsen & Roeleveld 1991), Törnqvist (1993, 105); 1.5-6 mm/yr, De Klerk *et al.* (1997, 136); 0.3-0.5 mm/yr, Exaltus (2002a, 86); 'several mm/yr', Maas *et al.* (2003, 10; 54-77); 0-5 mm, Gouw (2007, 125); 0.3-3 mm/yr. Cattle hoof- and human foot imprints vividly testify that Bronze Age farmers were well acquainted with muddy farmhouse environments (*cf.* Appendices I-III).

32 See \07 Animations\Meandering river and dune migration\Meander Allier.avi on CD-ROM with Berendsen & Stouthamer 2001.

For an anastomosing fluvial system – for which crevasse formation is thought to be more abundant – lateral accretion is limited (see above), but it still seems likely that a several meters wide crevasse channel could silt up within one or two decades.

Another process that could be witnessed on a generational scale is the 'drowning' of the landscape. This drowning entails the decrease of accessible, agriculturally useable or inhabitable space due to the combined processes of sedimentation and subsidence. For instance, a crevasse splay deposit which initially formed a relatively higher sandy sheet, would gradually appear to shrink to the eyes of prehistoric occupants. The floodbasin deposits, on which the sand sheet is situated, are compacted by the crevasse splay deposit's weight and are furthermore reduced in volume by oxidation and shrinkage (see above). These processes are thought to have sorted maximum effect after a *c.* 30 year period (Locher & De Bakker 1992, 308). In addition, continued sedimentation rapidly decreases surface areas in low-grade morphologies. The data from Zijderveld, Meteren - De Bogen and Rumpt - Eigenblok suggest that 'drowning' of inhabitable space was a Bronze Age reality in those parts of the river area (Appendix I-III).

Whereas the process of flooding has already been discussed as a yearly event, at this time-scale extreme peak discharges can occur. Recent data suggest that peak discharges of 150 or 200% of the mean discharge can occur at a 15-20 and a 45-98 year interval respectively.[33] Consequently, it seems not unwarranted to assume that excessive flooding could take place once every generation. Such extremely high water levels could lead to the propagation of crevasse channels or the re-opening of previously (partly) silted-up crevasse channels or, in rarer cases, it could act as the trigger for new crevasse formation.

Lastly, some comments on vegetation development are relevant. Although not essentially a fluvial process in origin, vegetation development and succession on newly deposited sediments (such as point bars or crevasse splay deposits) takes place well within the generational time frame. After the flooding period, willow (*Salix*), black poplar (*Populus nigra*) and members of the *Bidentatea tripartitae* communities take foothold swiftly (section 2.5; Van Beurden 2008). If circumstances favour vegetation succession, the development into alluvial softwood (*Salicion albae*) forest can take place, but this is thought to take *c.* 30-75 years (Pelsma, Platteeuw & Vulink 2003, 16).

2.4.4 Events at the centuries time-scale

Vegetation succession on the various parts of fluvial deposits continues at larger time-scales. The shift from willow softwood communities (*Salicion albae*) to poplar softwood communities (*Populetum albae*) can take between five decades to five centuries (section 2.5; Van Beurden 2008). Estimates for the development of hardwood (*Alno-Padion*) climax vegetation on the highest parts of the (no longer regularly flooded) fluvial landscape is suspected to require several centuries (*ibid.*).

Concurrent with vegetation development, palaeosols (vegetation horizons) can form. It has been outlined above that the development of this soil type is reliant on reduced, and not necessarily on fully halted, sedimentation. Consequently, it is not unlikely that hiatuses are present in what appear to be continuous sequences of soil formation. As some sedimentation does not prevent the soil transformation towards a vegetation horizon, a thicker vegetation horizon may have been formed intermittently. Consequently, the thickness of vegetation horizons is not a good indicator of formation duration.[34] Based on critical analysis by Steenbeek (1990, 20) of the many radiocarbon dates for vegetation horizons available, it can be argued that formation can take place within 170 ± 30 (radiocarbon) years. This does, however, not exclude the possibility of much faster or much more prolonged formation.

Whereas it has been outlined above that active crevasse channels can (but need not necessarily) become blocked relatively quickly, a time period of several centuries seems a reasonable estimate for the maximum formation and activity period of an individual crevasse splay (Smith *et al.* 1989). Even extensive crevasse splay complexes such as those at Lopik and Zuid-Stuivenberg may have been formed within 300 (radiocarbon) year periods (Berendsen 1982, 195; Stouthamer 2001, 140). Likewise, sediment accumulation (peat and sometimes sand) in chute cut-offs or (crevasse) residual gullies will have been completed within a few centuries (*cf.* Berendsen 1982, 101; 142). Radiocarbon

33 Based on the recurrence interval of peak discharges of the Meuse and Rhine rivers during 88 and 97 years respectively. Data from http://www.knmi.nl/kenniscentrum/de_toestand_van_het_klimaat_in_Nederland_1999/fig13.txt.

34 Vegetation horizons can range in thickness from centimetres to several decimetres; *cf.* Steenbeek 1990, 201; references in appendices I-VI).

dates for residual gullies indicate that vertical sedimentation rate can reach rates of 1.5 cm/yr, *i.e.* filling a 3 m deep gully in two centuries (Van Dinter 2000, 35-37; Van Zijverden 2006).[35]

Avulsion frequency analyses have shown that the intensity of avulsions in the Holocene Rhine-Meuse delta varied in both time and space (Stouthamer 2001, esp. fig. 3.7). For the period between *c.* 5350 and 1250 cal BC, avulsions occurred at the rate of 0.85 avulsions per century, whereas for the period 1250 cal BC to 450 AD, a total of 1.89 avulsions per century is calculated (Stouthamer 2001, 114-115). Once started, avulsion can be completed within a few centuries, although the process can also span millennia (Törnqvist 1993, 160). According to Berendsen and Stouthamer (2001, 105) avulsion can be called 'instant' if full avulsion occurs within two centuries. Longer period mean values for the Holocene avulsion history of the Rhine-Meuse delta point towards a 335 year mean duration for avulsions to complete (Stouthamer 2001, 116; 188).[36]

It is doubtful whether any of the processes measured at the centuries time-scale were perceptible to Bronze Age occupants of the river area. Soil formation is hardly visible and the avulsion rate concerns the entire delta, reducing the chance for occupants of actually observing it. Nonetheless, it seems unlikely that agricultural communities would not have noted the slightest of changes in vegetation types on crevasses splays and in residual gullies. Yet at the scale of centuries, oral histories on the (former) appearance of landscapes are destined to become patchy, distorted or mysticized.[37]

2.4.5 Time-scales of centuries to a millennium

Some peaks in avulsion frequency are discernable on the time-scale of the Holocene, predominantly around 5000-4000 BP, around 3000 BP and around 1800 BP (Weerts 1996, 86).[38] A distribution pattern with a 500 radiocarbon year cyclicity is suggested, but cannot be proven (Stouthamer 2001, 99).

At time-scales approaching a millennium, the life of entire fluvial systems can be mapped. In fig. 2.13 the available start and end dates for the period of sedimentation of Holocene fluvial systems are plotted. Based on these data, a mean lifespan of *c.* 1000-1100 radiocarbon years for a generic fluvial system can be established (Berendsen & Stouthamer 2001, 104). At this time-scale, stochastic avulsion (*e.g.* by tectonics) also resulted in some fluvial systems with a much smaller lifespan. Conversely, especially near the northern and southern margins of the Rhine-Meuse delta, some significantly longer-lived fluvial systems were present. The standard deviation for the mean lifespan is accordingly high: 700 radiocarbon years (*ibid.*).

The rate of crevasse formation is thought to have been more intense at two points during a fluvial system's life cycle. Initially, rivers do not have levees that are elevated significantly above the floodplain. In case of peak discharge, low-energy bank overflow occurs. Only after prolonged cycles of flooding does significant vertical aggradation of the levees take place. This process is known as superelevation and it increases the frequency and nature (lithology and morphology) of crevasse formation (Stouthamer 2001, 21-22). At the end of a fluvial system's life, the channel-bed morphologically adapts after a prolonged period of decreasing discharge. This often entails a decrease of bankfull capacity, which facilitates crevasse formation at times of peak discharge (Berendsen 1982, 195; Van Dinter & Van Zijverden 2002, 8). To formulate it in a simpler way, crevasse formation seems to occur most abundantly around puberty and at old age of a fluvial system (Stouthamer 2001, 21-22; 27-30). In line with the mean age for a fluvial

35 Based on typological dates for Mediaeval pottery, a sedimentation rate between 0.5 to 1.5 cm is assumed for the filling in of a 1.5 m deep crevasse residual channel at Kerk-Avezaath (Van Dinter 2000, 37). The filling in of the residual gully of the Avezaath fluvial system proper is known by two radiocarbon dates and took *c.* 202 ± 31 radiocarbon years to complete (*op. cit.*, 32). For the Schaik fluvial system's residual gully, a sedimentation rate of 10-16 cm per century has been established (De Klerk *et al.* 1997, 136).

36 Based on the data from Stouthamer 2001, 116 fig. 4.4, a mean of 380 year with a large standard deviation of almost 300 years seems probable.

37 *Cf.* Fentress & Wickham 1992, esp. 73-86, 98-101; Tonkin 1992, chapter 7; Bradley 2002a, 8; Bintliff 2004, 181; Heckenberger 2005, 103-104. See also Henige (1974; esp. 2, note 4; 4) who states: 'In cultures where descent groups rather than centralized institutions are the cement of unity, genealogies are usually the most common expression of social relationships and control. These will tend to reflect relevant social truths rather than abstract historic ones. As a result these genealogies are usually quite shallow (…)' (Henige 1974, 4, *cf.* Waterson 2003, 46). See Vasina (1985, 18; 117) or Waterson (2000, 182-183) for examples of longer-lived oral accounts.

38 According to Stouthamer (2001, 97), a decrease in the avulsion frequency of the Rhine-Meuse delta characterizes the period between 3500 and 3000 BP (*i.e.*, roughly the Early Bronze and Middle Bronze Age-A).

system as suggested above, these variations in crevasse formation frequency take place at a multi-century time-scale.

Sea-level rise was also an important factor for the Holocene development of the Rhine-Meuse delta at this time-scale.[39] As a consequence of sea-level rise, the terrace intersection shifted inland and the level of delta sedimentation was correlated relatively to the mean sea level. The changes in fluvial style (see fig. 2.12) are also interpreted as being related to sea-level rise. The complex interplay of sea-level rise and delta sedimentation are, however, well beyond the scope of the present study.[40]

A final factor being of influence at the millennia scale is that of human societal complexity and landscape interference. Although some possible Neolithic wooden linings of gullies are known (*e.g.* Appendix IV; *cf.* Hessing 1992, 352), waterways were generally not interfered with. This apparently changes during the last millennium BC, as Iron Age and Roman period waterworks such as canals, drainpipes and dams are known historically or archaeologically from this period.[41] In addition, non-intentional human influence should be considered. It is for instance possible that the increasing deforestation induced by human occupation at the end of the second millennium BC in the upstream catchment areas of the Rhine and Meuse rivers influenced – through increased peak discharge and sediment load – the fluvial dynamics and morphology of the Dutch river delta (Jongste & Van Zijverden 2007, 350-351).

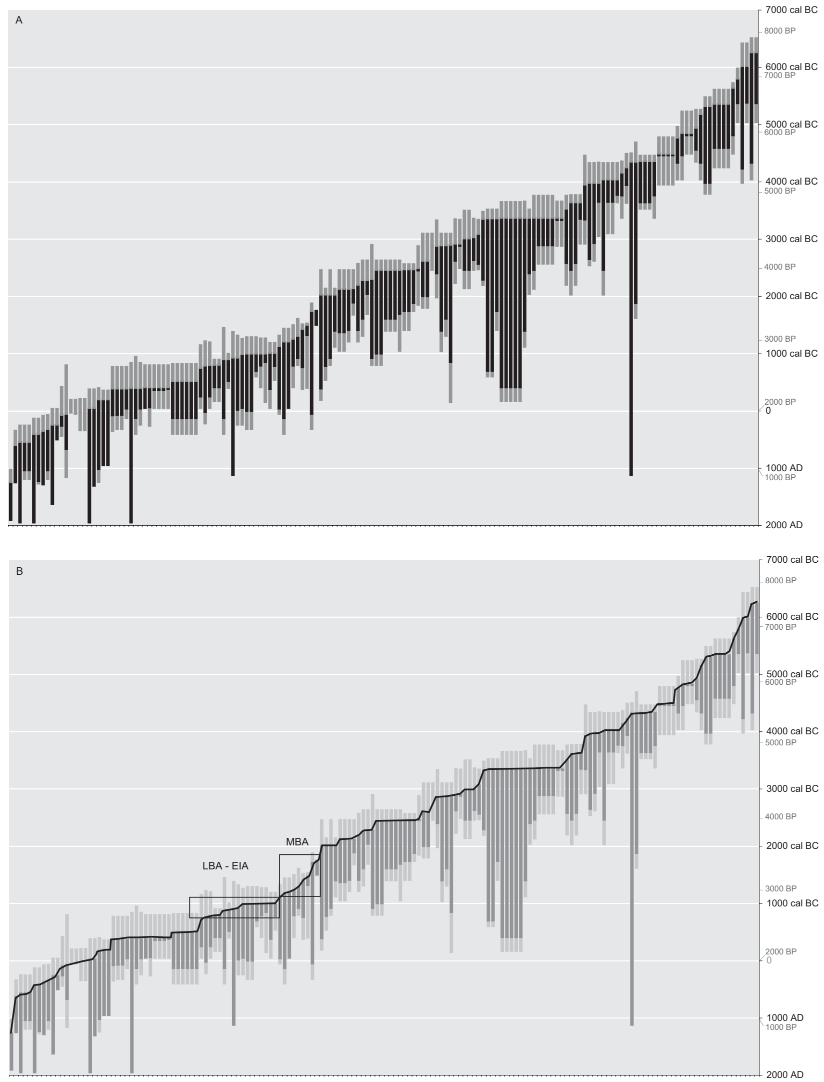

Fig. 2.13 Channel belts, sorted by the start of sedimentation (after Berendsen & Stouthamer 2001, 105 fig. 10.5) A: period of activity (start of grey bar at top indicates possible earliest start, start of black bar indicates definite start, end of black bar indicates possible cease of sedimentation, end of grey bar indicates certain cease of sedimentation), B: schematic trend line: a less steep trajectory of the trendline indicates the emergence of more fluvial systems at within a shorter time frame (*i.e.* high fluvial dynamics at the macro-scale). Steeper parts indicate a period of compratively low fluvial dynamics. Note the steep trajectory during the MBA and the less steep trajectory during the Late Bronze Age and Early Iron Age (*cf.* fig. 2.17, esp. C versus E).

39 See note 22, Berendsen & Stouthamer 2001, esp. chapter 9 and fig. 2.10.

40 But see Törnvist 1993; Stouthamer 2001; Berendsen & Stouthamer 2001; Cohen 2003 for references.

41 *Cf.* Tacitus *The History,* book V-14. Late Iron Age dams and drainpipes are known from Vlaardingen (De Ridder 1999). A well known archaeological example is the canal dug by Gnaeus Domitius Corbulo around 47 AD in order to connect Rhine and Meuse rivers (Tacitus *The Annals,* book XI-20; De Kort & Henk *in prep.*).

2.5 Vegetation development of (past) fluvial landscapes

2.5.1 Introduction

In the introduction to this chapter attention was drawn to the physical properties of fluvial landscapes in relation to their potential for human usage. The distributions and characteristics of different fluvial deposits discussed in section 2.3, only presented an abiotic perspective. However, the different types of vegetation present on the various deposits and in the areas of different fluvial dynamics will have been noticed by, and have mattered to, prehistoric communities. For example, areas with oak and alder trees were sources of construction wood, thatch was gathered in the lower-lying parts of the floodbasin and open grassland patches were grazed by cattle. Insight into the distribution of different vegetation zones may offer insight into the different possibilities for landscape use around settlement sites. In order to map such potential landscape usage, a model for the vegetation reconstruction of fluvial landscapes is needed. Such a model has been compiled and is published in detail elsewhere (Van Beurden 2008), so that only some key aspects will be summarized here. Unless stated otherwise, the observations below are all based on this study by Van Beurden (2008).

2.5.2 Factors affecting vegetation reconstruction of fluvial landscapes

First, it should be stressed that reconstructing the composition, distribution and succession of vegetation types in the Dutch central river area during the Bronze Age is complicated by the fact that no directly comparable vegetations exist presently. The embankment of rivers has reduced the areas under fluvial influence, but also anthropogenic factors such as grazing by livestock in modern agricultural modes influence the distribution and development of present-day vegetation types. Therefore, vegetation reconstruction must be modelled based on the biological characteristics (*e.g.* resistance to flooding or incidental grazing) of plant communities presently observable in more or less comparable fluvial settings in the Dutch river area, aided by the direct evidence available from palaeobotanical studies of excavated Bronze Age settlement sites. Second, attempts at vegetation reconstruction are complicated by the fact that the distribution of vegetation types is determined by a complex interplay of a number of factors. The main elements among these are the lithology, hydrological properties and mineral composition of the subsoil, the frequency and duration of inundation (related to relative height of the micro-topographic landscape), impact of humans and/or livestock and time. In the following sections, the different geogenetic deposits introduced earlier are used as entry points for the discussion of the influence of the remaining factors.

2.5.3 Vegetation development of alluvial geogenetic facies

River beaches

River beaches are mostly sandy lateral accretion deposits found at the concave bends of meandering rivers (fig. 2.5). They are less well represented with (straight) anastomosing rivers where channel belt deposits are smaller and lateral accretion is minimal. These areas are characterized by a high fluvial dynamic, regular and prolonged inundation and continued accretion. From the perspective of vegetation reconstruction, the lowermost parts of active crevasse splay deposits may have been comparable zones.

In such locations, pioneer vegetation that favours bare, moist, mineral-rich soils such as one- and two year herbs (*Bidentetea* or *Artemisietea*) and softwood shrubs with black poplar and willow (*Artemisio-Salicetum albae*), can take foothold in active fluvial systems within a single growing season. Because of the high fluvial dynamics, sedimentation and erosion often put back the succession, and pioneer vegetation forms the climax stage. If the fluvial activity decreases (*e.g.* by avulsion, lateral displacement, or the silting-up of crevasse inlets), pioneer vegetation can be succeeded by softwood forest.

Levees

On river levees, initially similar successions of pioneer and shrub vegetation take place like on the river beaches. With active fluvial systems, annual inundation of the lowermost parts of the levees may have lasted somewhat longer, but also the highest parts were flooded occasionally. On sufficiently moist (*i.e.* clayey) subsoil, alluvial softwood forest with willow can develop in the lower parts. In situations of continued sedimentation (replenishing nutrients and countering acidification), this softwood forest can be succeeded by hardwood alluvial forest (*Fraxino-Ulmetum*) dominated by ash and elm. If the vegetation is influenced directly by groundwater, ash will be dominant, while also elm, alder and sometimes willow will be present (*Fraxino-Ulmetum alnetosum*). With increasing fluvial activity, hardwood forest reverts to softwood alluvial forests or even open vegetation types. The development of hardwood alluvial forest from pioneer vegetation can take several centuries.

On higher sandy parts, pioneer vegetation will turn into ruderal vegetation and, if grazed, also grassland, but only if inundated very infrequently (*e.g.* several days a year to once every 15-20 years). In this open vegetation, hardwood shrubs develop and are succeeded by hardwood alluvial forests (*Violo odoratae-Ulmetum*) with elm, ash, sycamore and common oak trees. Thorny shrubs such as sloe, hawthorn and dog rose are also common. An increase in fluvial activity (increasing nutrient and moisture content by sedimentation) leads to the conversion of *Violo odoratae-Ulmetum* into *Fraxino-Ulmetum* hardwood alluvial forest, with ash replacing elm trees. On river levees, inundation contributed to the removal of organic waste and replenishment with more clayey and calcareous sediments, preventing acidification and depletion of the soil, allowing alluvial forest to persist.

After complete avulsion, no sedimentation takes place from the main channel. In the residual gully reed swamps (*Phragmitea*) will convert to alder carrs (*Alnetea glutinosea*) that actively contribute to the complete silting-up of the residual channel. Without channel borne sedimentation, fluctuations in local groundwater levels are the dominant factor affecting vegetation development. In most cases, however, inactive fluvial systems were still under the influence of sedimentation by their nearby successors. The lower parts of the levees and crevasse splays may be flooded. By superelevation (vertical aggradation) of the younger system, floodbasin sedimentation by younger systems may cover all parts of the former channel belt. The flooding and deposition of floodbasin deposits on former levees washes off the organic top-layer (reducing acidity) and replenishes mineral content, which allows the alluvial forest (mostly *Fraxino-Ulmetum alnetosum* which favour somewhat eutrophic and wet habitats) to develop or persist.

Crevasse splays

On crevasse splay deposits, vegetation types and developments are particularly difficult to model. Their erratic spatial distribution and the variable thicknesses and lithology of crevasse deposits render specific predictions impossible, while – due to embankments in The Netherlands – no reference vegetations are available for study. Based on the lithological composition and relation to water tables, the vegetation development on the higher parts of the crevasses (near the crevasse inlets), is best comparable to that of the higher parts of the levees. For the lower parts of crevasse splays, where these deposits blend into the floodbasin, the vegetation developments on the lowest parts of levees seem most applicable for comparison.

During their formative period, the sandy parts see developments comparable to the river beaches described above. On relatively wet and more clayey parts, pioneer (*Bidentetea*) communities and willow shrubs can take swift (*e.g.* within a year) foothold. They can also develop into pioneer softwood shrubs within a single year. Once stabilized, the development is comparable to that of the levees. If grazing occurs after initial vegetation build-up, grasslands can develop.

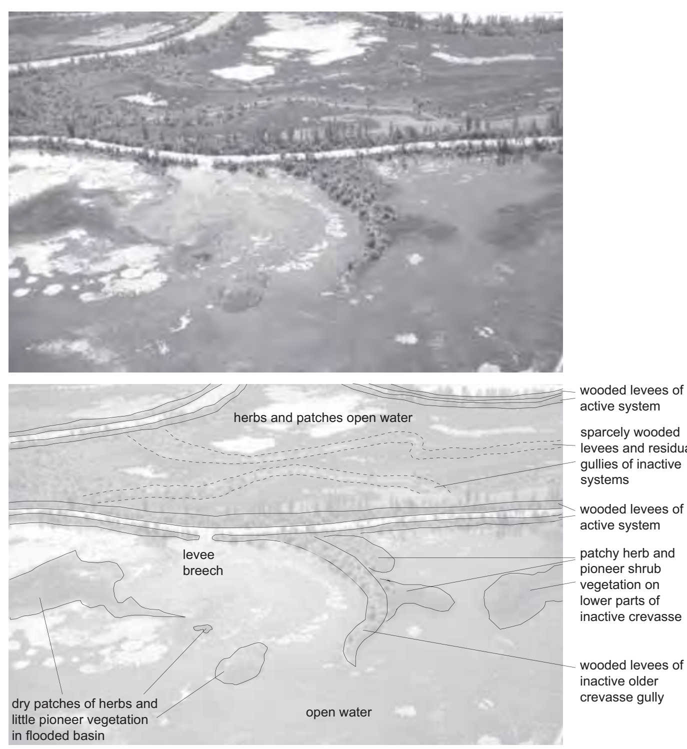

Fig. 2.14 Example of the different types and stages of vegetation development with the anastomosing Columbia River (Canada, photo courtesy of B. Makaske).

An example of the diversity in vegetation development on crevasse splays with anastomosing systems is shown in figure 2.14, where the vegetation on older and new levees and crevasses of the Columbia River (Canada) is shown. From this image, the extreme local variability (compartmentalization) in vegetation and possibilities of land use are evident. Both flooded and dry floodbasins, as well as new and old crevasse splays are found within hundreds of meters. Note also how the proximity of two active courses (top left in fig. 2.14) has created a somewhat higher area of intercalated levee and/or crevasse deposits which is more densely wooded.

Floodbasins

Because of annual flooding, large parts of floodbasins next to active rivers may have been submerged for long periods. In modern floodplain flats softwood forests are common, but in floodbasins in the Bronze Age landscape – where water movement was less dynamic – one would expect alder wood to develop instead of softwood forest dominated by willow. Because of the limited presence of peat in Bronze Age sediments, the presence of alder carr in bronze age floodbasins need not have been dominant but alders carrs may be present in some numbers.

In open, deep waters no vegetation develops, while in shallow, stagnant waters with no flooding for prolonged periods, reed-swamp vegetation (*Phragmitetea*) will develop that is succeeded by alder carr (*Alnetea glutinosea* forest) under the right conditions (*i.e.* high groundwater table and no prolonged periods of flooding or dehydration). Such areas will have been interspersed with areas of herbs of the *Bidentetea tripartitae* class and open, deep waters. These former can be extensive, relatively open and suitable for cattle grazing. Such grazing can lead to the development of wet grasslands

2.5.4 Two examples of vegetation reconstructions for MBA-B settlement sites

Based on the models for vegetation reconstruction discussed above, detailed palaeogeographical maps classed by the soil-types can be used for vegetation reconstruction around settlement sites (for methodology see Van Beurden 2008). For the meso-regions around the Bronze Age sites of Zijderveld (Chapter 4, section 4.2) and Eigenblok (Chapter 4, section 4.3.4), such detailed palaeogeographical information was available. Since the long-term evolution of these landscapes and their vegetation is discussed elsewhere (Van Beurden 2008), here only two examples of the vegetation types at the time of human occupation during the Middle Bronze Age-B are given (fig. 2.15).

Zijderveld

At Zijderveld, habitation has been documented at the location of the levees of the inactive eponymous fluvial system (fig. 2.15, A; middle part). Possibly, some crevasse splays from the Schoonrewoerd system (fig. 2.15, A; lower right corner) did overlie crevasses or levee deposits of the Zijderveld system. Combined, these deposits formed a relatively higher area. The Zijderveld fluvial system's residual gully was at that time a marshy depression, with some willows and wet grasslands. The highest parts were settled, used for agriculture and were presumably already relatively open by the Neolithic. In small patches on the highest parts and lining the transitions to the floodbasin, areas of relatively open alluvial hardwood forest (comprising oak, lime and common hazel) may be expected. There are good indications for the presence of both dry and wet grasslands that will have been present on the lower parts of the levees and crevasse splay deposits. In the lowermost parts of the floodbasins, some alder carr may have been present. Through grazing, a patchwork landscape of grassy areas, shrubs and willow bushes will have emerged.

Eigenblok

The settled parts of the Eigenblok landscape included both crevasse splay deposits as well as the levee deposits of the (long fossil) eponymous fluvial system (fig. 2.16, B; d-e). Because of the erratic crevasse splay morphology, the landscape is much more compartmentalized. On the highest parts of the landscape, oak and hazel are the dominant species. Pollen of pine probably represents non-local pollen. No extensive woodlands were present and bushes will have occurred interspersed with more open areas. Here too, a significant part of the landscape may have been grazed or used for agriculture, which also resulted in a relatively open view of the landscape from the highest parts. On the lower zones near the transition to the floodbasins, more wet types of alluvial hardwood forests (comprising ash, alder, willow and guelder-rose) are present. A large part of the landscape consists of floodbasin, of which the higher parts were presumably grazed. In the lower parts, both relatively open areas and areas of dense alder carr are present.

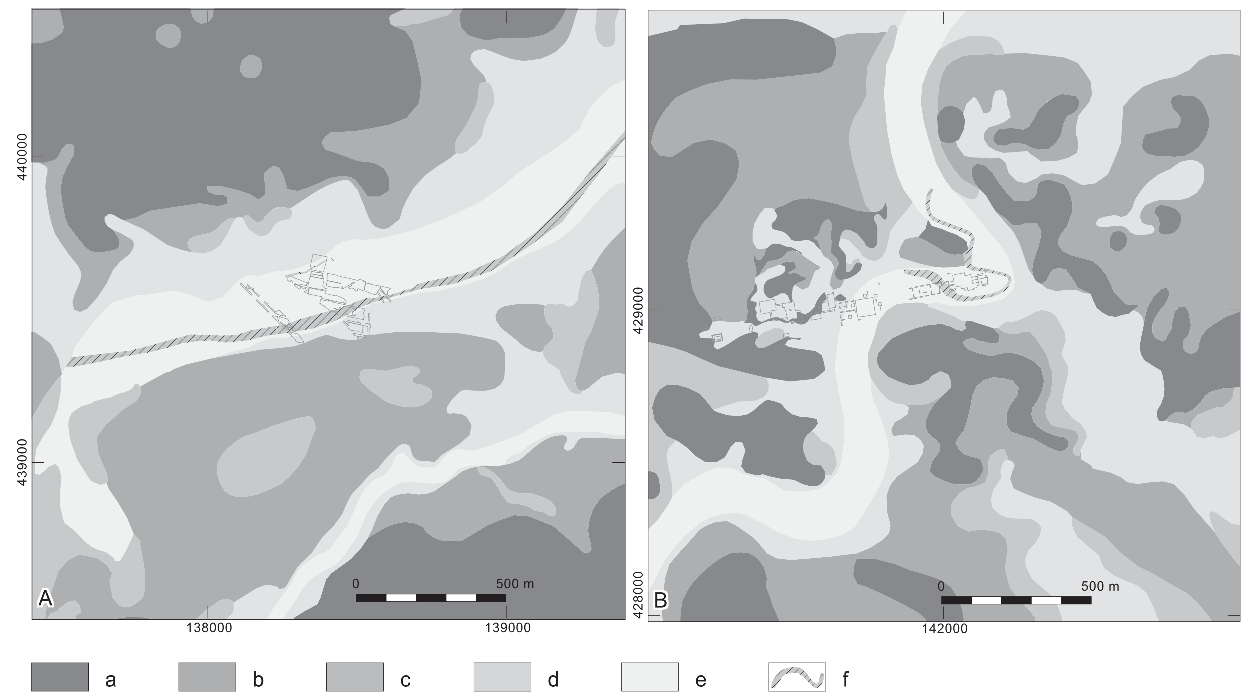

Fig. 2.15 Maps showing a reconstruction of the distribution of different vegetation types during the Middle Bronze Age-B at Zijderveld (A) and Eigenblok (B; both based on Van Beurden 2008). The excavated areas at both sites are indicated. For details see Chapter 4.

a: floodbasin (heavy clay on humic clay; mainly alder carrs), b: floodbasin (heavy clay on heavy clay; wet grasslands and bushes, pioneer vegetation and some willow shrubs, temporary areas of open water), c: transitions from floodbasin to crevasse splays and levees (alluvial hardwood forest, relatively open and with some shrubs), d: crevasse and levee deposits (moist to relatively dry; grasses and herbs if grazed, some alluvial hardwood shrubs), e: highest parts of levee and crevasse deposits (drier; herbs and grasses, suitable for agriculture and habitation), f: residual gully (marshy depressions).

Human impact?

At both sites, palaeobotanical research has indicated considerable human impact on the landscape (see Van Beurden 2008 for details and references). At both sites, an extensive climax vegetation of alluvial hardwood forest could have developed on the highest parts, had it not been for human intervention. Prior to the Middle Bronze Age, these landscapes were already settled and the forest was opened up. At the time of occupation, agriculture and livestock herding were practiced (*cf.* Chapter 7, fig. 7.11). Both ensured that large parts (in addition to those used for habitation) were kept open through agricultural use. Only in the lower parts of the floodbasin, was the vegetation development relatively unrelated to human actions. There, alder carrs formed, and parts were presumably inundated annually. The relatively higher areas will however also have been used as pastures. This will have led to a patchy landscape of willow shrubs and wetter grasslands mixed with alder carrs and marshy areas with temporary open water. Combined, the graded morphology and compartmentalized spatial nature offered a varied range of vegetation types to the Bronze Age occupants. Alder trees for houses were cut from the carrs. In the border zones to wetter areas, thatch may have been obtained. The intermediate zones were excellent pastures and the higher parts of more sandy deposits may have sustained crop-cultivation in dry periods. On the highest parts, excellent drainage and nutrient composition will have been beneficial to crop-cultivation and habitation. Presumably, because of human needs for construction wood and space for fields and house-sites, only patchy areas of alluvial hardwood forest will have remained.

2.6 Simplified palaeogeography for the Dutch river area *c.* 2450-450 cal BC

At this point, a very brief and consequently much simplified palaeogeography for the Rhine-Meuse delta between *c.* 2450 and 450 cal BC is offered. It is focussed on a spatial level that comprises all the defined macro-regions. It thus serves predominantly to illustrate the numbers, extent and degree of interconnectedness of some of the fluvial systems active during the period in question. For more detailed palaeogeographical analyses within the macro-regions, the reader is referred to the Appendices I-VI. For palaeogeographical accounts that span the entire Holocene sequence and a wider part of the Rhine-Meuse delta – on which the information below is based – the reader is referred to Berendsen & Stouthamer (2001) and De Mulder *et al.* (2003, 211-239). The sections below do, however, provide a framework by which the more detailed palaeographical analyses of Chapter 4 and the Appendices can be understood in interrelation and as parts of the wider drainage structure of the delta as a whole. As such, it contains no information on the possibilities for human occupation on more detailed scales. Nonetheless, it does provide insights into the presence or absence, the numbers, and the degrees of interconnectedness of major river courses in or near the macro-regions during the different periods. These are factors that affect the possibilities for human occupation at smaller scales and should therefore be discussed.

c. 2450 - 2050 cal BC; fig. 2.16, A

As a result of continuous onlap, the terrace intersection was at this time situated in the extreme east of the Rhine-Meuse delta, and river systems of aggrading nature occupy most of the delta. In the Zijderveld and Eigenblok macro-regions, the eponymous fluvial systems had already ceased their phase of sedimentation for a few centuries. In the Wijk bij Duurstede macro-region, the avulsion from the Werkhoven to the Houten fluvial system was taking place.

Main Rhine discharge followed two courses. The northernmost one comprised the Ressen, Herveld and presumably upstream the Werkhoven or Houten fluvial systems. From this northern branch, four main bifurcations (incomplete avulsions) are known. The first one concerns the Vuylkop and Lopik fluvial systems and their downstream connections. The second is formed by the Dwarsdijk and Schoonrewoerd fluvial systems. Both are thought to cease their phase of sedimentation during this period. The third branch is formed by the Ommeren, Zoelen and Erichem fluvial systems. Within the De Bogen macro-region the Erichem system is well-mapped, but its downstream connection is unclear. The fourth branch comprises the Westerveld and Ochten fluvial systems. This branch crosscut the Lienden macro-region and probably recombined south of the De Bogen macro-region with a downstream connection of the Meuse.

The second main branch was formed by the Distelkamp-Afferden channel, but here again no downstream connection can be identified. The downstream connection possibly connects to the Ochten fluvial system or lies within the course of the present-day Meuse and is consequently obscured. This second branch could have recombined with the Westerveld-Ochten branch or with a Meuse tributary.

Meuse discharge was carried by two main branches; along the Wijchen's Maasje and Nieuweschans fluvial systems and along the Haren and Lith fluvial systems. These presumably recombined into the Hoorzik, Hedel-Wordragen, Biesheuvel-Hamer and Zwijndrecht branch.

c. 2050 - 1650 cal BC; fig. 2.16, B

The main northern Rhine branch (comprising the Ressen, Herveld and Houten fluvial systems) was still active, but the Houten system followed an (additional) southern course which rejoined through the Linschoten fluvial system. Moreover, near the German border a new branch (the Nederrijn fluvial system) had formed. Of the previous four incomplete avulsions only the Ommeren-Zoelen-Erichem and Westerveld-Ochten branches were still active. With the former, a new branch formed just north of the De Bogen macro-region. There, the Hennisdijk and Honswijk fluvial systems branched to the northwest from the Erichem system, but no direct downstream connection is known yet. Presumably, by connecting through the Stuivenberg and Linschoten fluvial systems, this branch rejoined the main Rhine tributary downstream. The Distelkamp-Afferden fluvial system was also still active but no clarity exists yet for its downstream connection.

The drainage pattern for the southern branch of the Meuse discharge is not thought to have changed radically. The northern branch shifted slightly northwards in the east, replacing the Nieuweschans fluvial system with the Dreumel fluvial system. In the west, the northern branch was now inactive.

c. 1650 - 1250 cal BC; fig. 2.16, C

In this period few major changes occurred with the northern Rhine branch. Only in the east, near the Herveld fluvial systems some new connections between the Nederrijn, Herveld and Distelkamp-Afferden fluvial systems replaced former connections. At the very end of this period, sedimentation by the Westerveld fluvial system is thought to have ended.

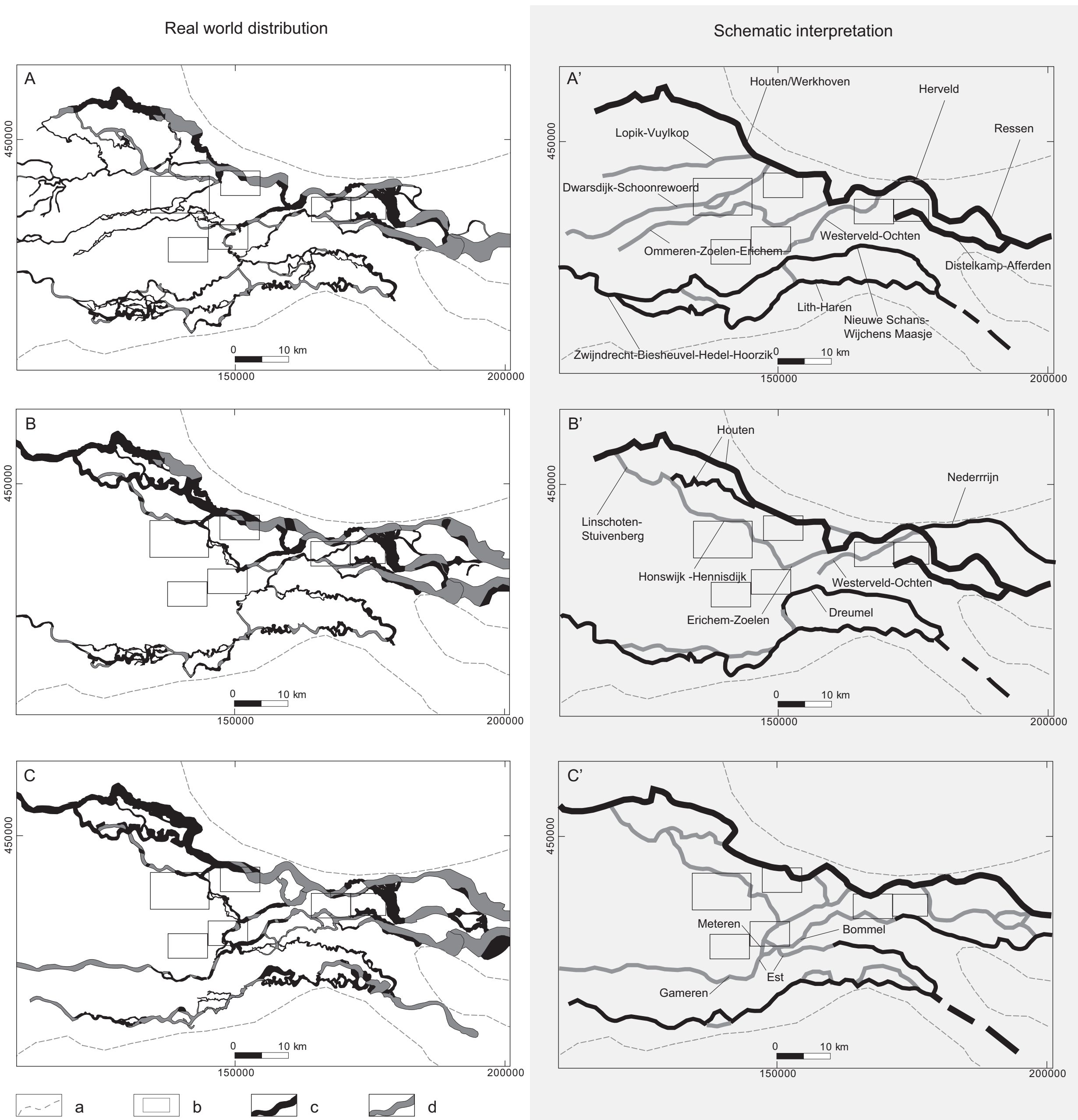

Fig. 2.16 Simplified palaeogeographical map for part of the Rhine-Meuse delta. To the left are simplified palaeogeographical maps displaying the real number and dimensions of active fluvial systems. To the right are schematic interpretations of these maps with some of the relevant fluvial systems named (legend units do not apply to the right frames). (A = *c.* 245-2050 cal BC, B = *c.* 2050-1650 cal BC, C = *c.* 1650-1250 cal BC, D = *c.* 1250-850 cal BC, E = *c.* 850-540 cal BC; after Stouthamer 2001; Berendsen & Stouthamer 2001; Van Zijverden 2003a-b; 2004a-b; 2005 and the maps published on http://www.geo.uu.nl/fg/palaeogeography/).

a: extent of the Rhine-Meuse fluvial delta, b: macro-regions used in this study, c: attested fluvial system, d: reconstructed fluvial system (eroded or unmapped).

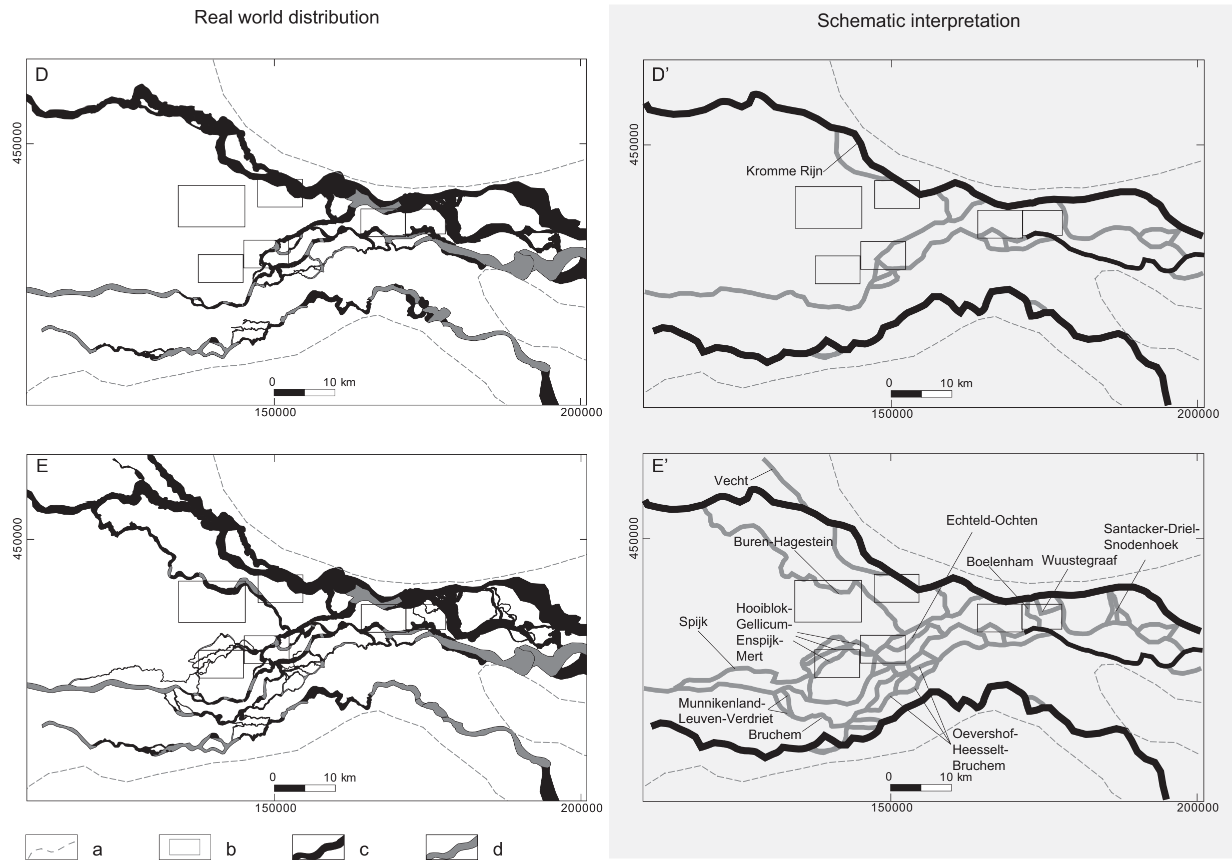

Fig. 2.16 (Continued) Simplified palaeogeographical map for part of the Rhine-Meuse delta. To the left are simplified palaeogeographical maps displaying the real number and dimensions of active fluvial systems. To the right are schematic interpretations of these maps with some of the relevant fluvial systems named (legend units do not apply to the right frames).

(A = *c*. 245-2050 cal BC, B = *c*. 2050-1650 cal BC, C = *c*. 1650-1250 cal BC, D = *c*. 1250-850 cal BC, E = *c*. 850-540 cal BC; after Stouthamer 2001; Berendsen & Stouthamer 2001; Van Zijverden 2003a-b; 2004a-b; 2005 and the maps published on http://www.geo.uu.nl/fg/palaeogeography/).

a: extent of the Rhine-Meuse fluvial delta. b: macro-regions used in this study, c: attested fluvial system, d: reconstructed fluvial system (eroded or unmapped).

A major reorganisation of the drainage structure seems to have taken place at that time in the De Bogen macro-region. Presumably, the downstream connections of the Erichem (through the Meteren fluvial system?), the Distelkamp-Afferden (through the Bommel fluvial system?) and the Dreumel fluvial systems recombined into a knot formed by the Est, Meteren and Bommel fluvial systems. From this node, a new fluvial system (the Gameren fluvial system) is reconstructed to have drained towards the west, possibly following the path of the current river Waal.

c. 1250 - 850 cal BC; fig. 2.16, D

The Houten fluvial system gradually decreases in importance as its function is taken over by the Kromme Rijn fluvial system. The Honswijk-Hennisdijk discharge into the Stuivenberg-Linschoten systems ceased. Consequently, only a single major Rhine branch is present in the north(west). With the Meuse, the number of branches also decreases. Most important is the loss of the Wijchens Maasje-Dreumel branch, which previously connected to the Est fluvial system.

c. 850 - 450 cal BC; fig. 2.16, E

In the two centuries around the Late Bronze Age to Early Iron Age transition, the number of coeval channels increases significantly (*cf.* Berendsen 2005a, 249 fig. 9.17). The northern main Rhine branch shows two incomplete avulsions into the Vecht river valley. New connections (the Santacker-Driel and Snodenhoek fluvial systems) from the Ressen to the main Rhine branch emerge as well. Further downstream, the Wuustegraaf and Boelenham channels came into being. The latter provided a connection between the Distelkamp-Afferden and the northern main Rhine-branch.

The connection between the Erichem-Zoelen and northern main Rhine branch which was lost in the previous period, was re-established. This time, the Buren, Hagestein and presumably a Hollandse IJssel precursor linked the Erichem fluvial system, through the reactivated Linschoten fluvial system, to the northern Rhine branch.

In the central part of the delta, the Ochten-Echteld fluvial systems connected the Distelkamp-Afferden downstream to the Zoelen-Erichem branch. Downstream of where these two were linked, several smaller fluvial systems branched westward from the Meteren system. These comprise the Hooiblok, Gellicum, Enspijk and Mert fluvial systems. Through the Spijk fluvial system, they presumably drained towards the west at the location of the contemporary Waal river.

To the southeast of the Est system, the Oevershof, Heesselt and Bruchem systems followed a south-western course and were possibly interconnected with the main Maas branch. In any case, some of its discharge was diverted as the Munnikenland and Leuven-Verdriet fluvial systems that used the Waal precursor for their drainage.

2.7 Implications for archaeology

At this point, the relevance for archaeological research of the data offered in this chapter will be stressed. Why is it necessary for archaeologists to be aware of the geogentic particularities of the Rhine-Meuse delta and how can it help to better understand patterns of prehistoric occupation? A primary important distinction, is that between active and passive fluvial landscapes. Although it has been outlined above that the transition between passive and active fluvial landscapes can take place at various time-scales and in locally very different trajectories, some more general observations can be made.

2.7.1 Properties of active fluvial landscapes

In active fluvial landscapes (*i.e.* on the floodbasin-, crevasse-, levee- and channel-bed deposits of an active fluvial system) few areas are suitable for long-term occupation. Flooding occurs regularly (annually) and can create an unhealthy environment – lasting weeks – for people and animals alike.[42] The direct vicinity of an active fluvial system would thus not pose an ideal settlement site location. In the Bronze Age we are dealing with societies which presumably relied on an interdependent system of animal husbandry and crop cultivation (Louwe Kooijmans 1993, esp. 103-104; Arnoldussen & Fokkens 2008, 25-26). The levee- and crevasse deposits of the fluvial systems of the Rhine-Meuse delta are, due to their high sand content, well draining soils, which are rich in carbonates and minerals upon deposition. Such sandy soils are rich in nutrients, warm up easily in spring and the underlying clayey deposits retain groundwater, which consequently typify these deposits as ideal for crop cultivation.[43] Crop cultivation on the levee- or crevasse deposits of active fluvial systems seems unlikely, as due to the flooding, crop failure risk is high.[44]

Animal husbandry may, nonetheless, have been practiced and pigs may have been herded in the strips of softwood forest that could form on the levees of active rivers. If crevasse inlets became blocked, here too softwood forests could develop where pigs could be herded and where some hunting may have taken place as well (Arnoldussen & Fokkens 2008, 25-26).

Yet, it should be stressed that the levees and/or crevasse deposits of active fluvial systems were suitable for some kinds of agricultural use and their rich natural biodiversity would additionally have been fully exploited. Fishing with hook and line, nets, weirs and traps could take place in the active channels (Arnoldussen & Fokkens

42 *Cf.* Few *et al.* 2004; Ahern *et al.* 2005; Daugschies 2000.
43 *E.g.* Kooistra 1996, 58-62; Berendsen 2005a, 266; 2005c, 107, *cf.* Bouman 1945, 15.
44 But see below, esp. note 46, *cf.* Gehasse 1995, 146.

2008, *loc. cit.*). Additionally, hunting of furbearing wetland fauna such as otter and beaver could have taken place at these locations.

Moreover, the benefits of an active river channel in transport and communication is often overlooked (but see Louwe Kooijmans 1974, 30). In absence of remains of Bronze Age boats or dug-outs from the Netherlands, the presence of river transport can only be assumed at this stage, but in particular the locations where the wooded levees were interrupted by crevasse inlets will have formed natural harbors for those navigating the watercourse (Van Dinter & Van Zijverden 2002, 12; Berendsen & Hoek 2005, 16).

The lower-lying parts beyond where crevasse- or levee deposits merge into the floodbasin deposits are less suitable for crop cultivation. They consist of predominantly pure clay, which hampers drainage and are generally of low calcareous content (Kooistra 1996, 61; Berendsen 2005c, 99). They do, however, provide excellent pasture areas (*cf.* Blink 1904, 57). Here, if grazed, lush grass vegetation occurs interspersed with drinking locations for cattle. Neither periodic flooding, nor the presence of (extensive) areas of open water, prohibited the grazing of livestock, although parasitic diseases current in wetlands like liver fluke tend to affect sheep more easily than cattle (Mitchell 2002). Furthermore, strands of shrubs and trees like willow and alder on the landscape gradients towards the wetter floodbasins could be used as sources of (construction) wood, fodder and wattle.

In conclusion, the vicinity of an active fluvial system provided ample natural, vegetal and faunal resources. The river course could provide drinking water, fish, an axis for communication and exchange, as well as an incidental hunting or herding ground. During the dry periods, the lower-lying floodbasin could be used to graze livestock. Of the various human of prehistoric fully mixed farmers only two criteria appear to have been met not that well.

The first is the scarcity of suitable house-site locations. Annual flooding could have decreased the willingness to permanently settle the levees and crevasse deposits adjacent to an active system and in many parts of the floodbasin high (above surface) water levels will have inhibited house-site construction (but see section 4.6.3 and Appendix V).[45] It is however plausible that extensive and relatively thick crevasse deposits (stacked or founded into the Pleistocene subsoil) were suitable for occupation even if close to (< 500 m) an active fluvial channel. This is especially the case with crevasse splay deposits whose inlet channel was blocked relatively soon and permanently. The Middle Bronze Age occupation on the crevasse splays near Dodewaard may be an example of this kind of situation (Chapter 4, Section 4.7; Appendix VI).

The second criterion may be the lack of suitable locations for arable fields. Especially with rivers of the straight (anastomosing) fluvial style, the width of the levees is rather limited (< 50 m; Weerts 1996, 54). Crop cultivation may necessitate the almost complete deforestation of a trajectory of the levee. One might furthermore wonder whether the entire width could be used, as its height decreased both towards the active channel as well as towards the floodbasin. The presence of smaller gardens on top of the levees of active systems is in any case not proven, but is also not fundamentally improbable. If these were ever present on levees of active systems, they would rely on summer cereals and require more energy in attending to them (weeding, warding off animals) than plots on fossil systems, which could be situated closer to the house-sites.[46]

2.7.2 Properties of passive fluvial landscapes

Fluvial landscapes that became passive, will initially have offered the same broad ecological spectrum for people to utilize as active fluvial systems. In due time, however, several important changes take place. The nature of the vegetation as well as the types and dominances of fish and waterfowl species will change in response to the gradual silting up of the residual gully. Furthermore, the reduced frequency of flooding allowed pioneer vegetation and/or vegetation succession of levee- and crevasse deposits. At the same time, soil formation such as the creation

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45 To the west of the present study area, the levees of (near-coastal) creek-systems may have been used for Neolithic and Early Bronze Age habitation, while later sedimentation took place (*e.g.* at Hekelingen (Louwe Kooijmans & Verhart 1980, 8-12) or Barendrecht (Moree *et al.* 2002, 90-91). While this suggests continued sedimentation by the underlying creek system, the exact intensity and chronology of the fluvial activity is ill-known. Possibly, such habitation took place during periods of greater fluvial stability and should later sedimentation be attributed to reactivation after a period of ceased or reduced fluvial activity. Moreover the landscape usage may have differed significantly between these periods and the later Bronze Age.

46 Excavations near the village of De Meern have shown that at least in Roman times crevasse splay deposits of an active system were ploughed, as well as the newly deposited splay deposits on top of those (Vos & Blom 2003, 92).

of vegetation horizons and decalcification takes place. If no human interference occurs, eventually the softwood communities on the sandy levee- and crevasse deposits will be replaced by alluvial hardwood forest comprising ash, elm and oak trees (see section 2.5). These hardwood forests could provide construction wood and in the case of the oak trees, also acorns for human or animal consumption (see Chapter 5, note 298). The fact that avulsions may have taken centuries to complete (section 2.4.4; Stouthamer 2001), implies that former channels may have gradually decreased in (drainage) importance and that, for instance, flooding occurred less frequently. As the cease of sedimentation is generally established based on residual gully dates, the conditions in the final centuries prior to the established end-date may have already been favourable to a wider range of human uses, such as habitation or agriculture (B. Jansen, pers. comm., May 2007).

The crevasse splay deposits in particular, would have formed attractive settlement site locations.[47] This attractiveness has several reasons. Crevasse splays were relatively high parts of the floodbasin area, and their former residual gullies are relatively small and may be blocked relatively quickly (see above). If the crevasse systems remained active or were of relatively young age, the removal of (mostly shrub) vegetation prior to crop cultivation is easier than at the more wooded levees (Van Dinter & Van Zijverden 2002, 12). As it is thought that crevasse formation occurred more frequently at the end of the sedimentation period of a given fluvial system (section 2.4.5), these newly formed areas could be settled and worked with minimal clearance efforts. Furthermore, by their nature, the crevasse splays are situated in the middle of the two main utilitarian agrarian landscapes of Bronze Age farmers. Fields for crop cultivation were positioned on the highest part of the crevasse splay deposits and on the levee deposits proper, whereas the lower-lying floodbasin areas provided grasslands and drinking pools for the livestock. By settling the crevasse deposits, the fields, pastures and different natural resources were all as close by as possible.

The excavations at Zijderveld and Wijk bij Duurstede have shown that in the Bronze Age, in addition to crevasse splays, the levee deposits of fossil fluvial systems were inhabited as well.[48] At Wijk bij Duurstede, an extensive fossil landscape of swales and scroll bars was available for Bronze Age agricultural exploitation (Hessing & Steenbeek 1990; Appendix IV). At Zijderveld, occupation of the levee deposits of a river of the straight (anastomosing) type took place (Knippenberg & Jongste 2005; Appendix I). In the case of Zijderveld, it is difficult to determine whether all occupation took place on the Zijderveld fluvial system's levee deposits proper or (also) on the crevasses formed by the Schoonrewoerd fluvial system which overlie the Zijderveld levee deposits (Van Zijverden 2003b; Appendix I).

To summarize, fossil fluvial landscapes – and especially crevasse splay deposits – were ideal settlement site locations. The varied nature of the soil and vegetation meets the requirements of a system of mixed-farming almost perfectly. However, two additional conditions still needed to be met. The first is drinking water. The upper aquifer in still-water situations is prone to pollution by excrement and the water quality of residual gullies presumably was not always adequate. Therefore, Bronze Age farmers relied on wells situated near or in the floodbasin for their freshwater supply in fossil fluvial landscapes.[49] The second condition is that for river based communication and transport, an active (crevasse) channel at some distance from the settlement sites had to be used. The case studies show that for all six studied Bronze Age settlement sites active fluvial systems could be accessed at distances from 500 m (Wijk bij Duurstede) to seven km maximum (Eigenblok) from the settlement sites (Chapter 4; Appendices I-VI; *cf.* Van Zijverden 2006).

2.7.3 Factors influencing the distribution and discovery of Bronze Age settlement sites in the Dutch central river area

Several factors influence the degree to which Bronze Age settlement sites in the Dutch river area can be mapped and, to a certain extent, predicted. These comprise – but are not limited to – the genesis of the underlying sediments (fluvial style), the nature of archaeological phenomena, soil formation processes, post-depositional processes, such as erosion and sedimentation, and the methodology applied in archaeological prospective campaigns.

47 Louwe Kooijmans 1985, 148; Van Dinter & Van Zijverden 2002; Appendices I-III; V-VI.
48 *Cf.* Louwe Kooijmans 1974, 169-339.
49 Appendices I-III.

Braided rivers?
The different types of fluvial styles introduced above are a relevant factor. Braided fluvial systems lack stable and well defined (vertically aggrading) levee deposits. The high channel mobility and (consequent) absence of vegetation renders an agricultural (fields, meadows) or domestic (settlement site) use of the channel-bed deposits unlikely. Whereas some fluvial systems with multiple active courses in a single channel-bed have been documented (see above), true braided fluvial systems did not occur in the Rhine-Meuse delta during the period under study (*cf.* fig 2.12).

Meandering rivers
For meandering fluvial systems, other considerations are important. It has been argued above (sections 2.3.2 and 2.4.3) that meandering fluvial systems are characterized by significant lateral displacement. The pace of these displacements is perceptible on a human time-scale. It may consequently be assumed that Bronze Age farmers would be acquainted with these processes to such an extent as not to construct a house-site too close to, or on, an active meandering levee. Yet by the same rationale, the concave banks, scroll bars and chute cut-offs will have been known as relatively stable fluvial entities. On these parts of a meandering fluvial system – as well as on the crevasse splay deposits – some human activities are to be expected, but full-scale exploitation for long-term habitation and agriculture is not assumed.

Beside these remarks on the genesis of physical landscapes, the lateral instability of the channel also affects the preservation and the discovery chances of former archaeological sites. Human activities taking place at the convex bank of meandering systems are likely to be reworked until chute cut-off or cease of activity by the fluvial system occurs (*cf.* fig. 2.17, A). Moreover, vegetation development varies with the degree of lateral stability and flooding for different parts of a meandering fluvial system. This means that pioneer vegetation can take foothold and/or show a more evolved succession in chute cut-offs and on point bars, while at the concave bank, vegetation development is more limited or halted in succession. This can also be reflected in the presence of vegetation horizons, which can be of a different nature, age and time-depth in the various parts of a meandering fluvial system. The more active parts of meandering fluvial systems are more likely to rework and displace archaeological material, while the possibly not so well defined or absent vegetation horizons furthermore decrease archaeological visibility in coring campaigns.

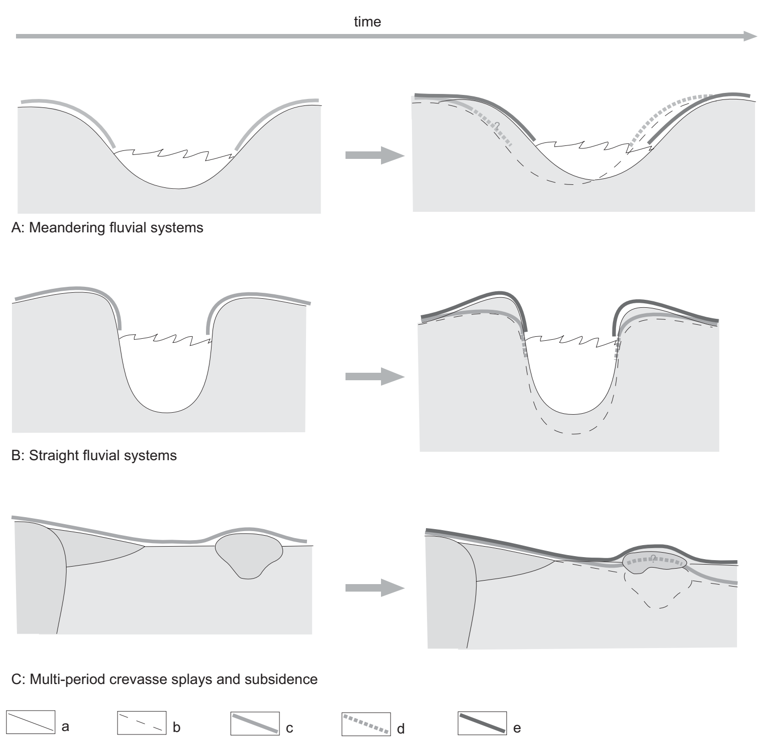

Fig. 2.17 Schematic diagram showing the factors affecting the distribution of archaeological remains for a number of fluvial geogenetic entities over time. A: meandering fluvial system; resulting in palimpsest (if preserved diagonal stratigraphy) on the concave bank and erosion on the convex bank. B: straight fluvial system; vertical stratigraphy (palimpsest possible in floodbasin). C: crevasse formation; erosion of previous distribution, vertical stratigraphy due to subsidence and sedimentation; palimpsest situation on levee and floodbasin.

a: extent fluvial system, first phase, b: former extent fluvial system, c: find distribution first phase, d: find distribution first phase eroded, e: find distribution second phase.

Consequently, archaeological prospecting of such parts calls for test-pits of moderate size (*e.g.* > 16 m^2), which are dug down as deep as possible into (or through) the levee (point bar) deposits.

In less active parts of meandering fluvial systems (concave banks, chute cut-offs) vegetation horizons have a better chance of development and preservation. If these contain archaeological materials, they stand a better chance of being noted during archaeological coring campaigns. Nonetheless, here too test-pits penetrating deep into the levee deposits are necessary in order to reliably establish the absence or presence of preserved archaeological remains.[50] A final remark must be made on residual gullies of meandering systems. Supposing that prehistoric habitation and/or activities did take place near an active gully and materials (*e.g.* refuse, fish traps, dugouts?) became incorporated into the active channel, these are likely to be displaced, reworked or destroyed in the active channel of a meandering system. This does, of course, not apply to the swales or chute cut-off gullies. Yet still, it remains important to realize that archaeological materials from the main residual gully of any fluvial system are most likely to only, or predominantly, reflect human activities taking place during the end of the fluvial system's active life. Formulated otherwise, should one wish to discover a Bronze Age boat, the research focus should be on the swales and chute cut-offs which became inactive during or directly before and after the Bronze Age, and at the residual gullies of fluvial systems whose overall phase of sedimentation ended at that time.

In general, it can be stated that at the level of the complete fluvial system, a good correlation between the presence of channel-bed deposits and the potential discovery of archaeological sites can be assumed for meandering fluvial systems. The age of the sites in relation to the age of the underlying deposits can however vary, as has been argued above. In addition, crevasse splay formation does occur with meandering fluvial systems (see above and Appendix VI) and they could also have supported human activities in the past. This means that an archaeological prospective strategy for a meandering fluvial system should be tailored towards the resolution necessary to uncover the smallest relevant geogentic unit, the crevasse splay (for methodology see above).

Anastomosing rivers

Anastomosing fluvial system are characterized by their small, laterally stable levees (see above; Weerts 1996, 39). This has several implications for archaeological studies. To start, the fact that levees are often smaller than 50 m in width (Weerts 1996, 54) means that if an archaeological coring campaign is undertaken in an area where rivers of this fluvial system are to be expected, the coring grid interval should be even smaller. As crevasse formation occurs frequently with rivers of the (straight) anastomosing style, a methodology suitable for detecting such small-scale fluvial deposits is necessary.[51] The lateral stability of the narrow levees of anastomosing rivers means that the preservation conditions for archaeological remains are roughly equal for both banks, unlike with meandering systems (*supra*). However, this also leads to a greater likeliness of palimpsest situations on both banks (*cf.* fig. 2.17, B). Although some vertical stratigraphy can develop in the levees, usually archaeological remains spanning several centuries in date are found at the same excavation level.[52] This can improve the detectability of archaeological remains in coring campaigns, as the density of archaeological materials per unit of soil volume can be higher.

In situations where activities took place on the levees or crevasse splay deposits of active systems, frequent flooding may prevent or halt the development of vegetation horizons. This leads to a reduced visibility of archaeological sites in coring campaigns, as detectability is confined to chance finds from coring samples and certain sedimentological characteristics (*e.g.* unnatural grain size distributions, chemical soil properties). Consequently, here too substantial test-pits penetrating as deeply as possible into or through the levee deposits are essential to ascertain the presence or absence of archaeological remains.

While the levees and crevasse splay deposits of active anastomosing fluvial systems may have supported various human activities during the Bronze Age, long-term occupation or agricultural usage seems less likely and is

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50 While in these locations vegetation horizons and/or finds-layers may be preserved to a degree that allows for archaeological prospective by means of coring, especially in the cases where no archaeologically traces are found in coring campaigns (while these might be expected), should test-trenches be used to positively confirm the complete absence of such traces.

51 Test-trenching as described at the meandering rivers or coring with grid densities below 20 m interval (see note 14).

52 For instance, the recovery of Neolithic remains in the levee deposits of the Zijderveld fluvial system without any indications for a vegetation horizon or anthropogenic features, could be the result of such vertical aggradation (Knippenberg & Jongste 2005, 84; Appendix I).

yet unproven for the Dutch river area (but see Appendix V).[53] The evidence for Middle Bronze Age(-B) occupation of inactive (straight) anastomosing system's levee and crevasse deposits is, however, considerable. At Zijderveld and Enspijk, Middle Bronze Age(-B) house-sites have been uncovered which are situated on top of (crevasse splay deposits overlying) the channel-bed deposits of straight anastomosing fluvial systems (Chapter 4; Appendices I-II). The Middle Bronze Age(-B) house-sites of Rumpt (Eigenblok), Meteren (De Bogen) and presumably Lienden are all situated on crevasse splay deposits of fossil (straight) anastomosing fluvial systems (Chapter 4; fig. 7.10; Appendices II, III & V).[54]

Crevasse splay deposits
A number of comments on the possibilities for the prehistoric occupation of crevasse splay deposits have already been made in the sections on rivers of the meandering and (straight) anastomosing fluvial style directly above. At this point, some additional aspects of crevasse splay deposits in relation to archaeological studies are discussed.

First of all, the high density of Bronze Age house-sites on crevasse splay deposits should be stressed. Especially at Rumpt and Meteren, it has become clear that crevasse splay deposits were used to the fullest, with indications of domestic architecture on layers of crevasse deposits of modest extent (< 50 by 50 m) and thickness (0.1-0.5 m).[55] The latter observation is particularly important, as often crevasse deposits with thicknesses of less than 50 cm are not mapped (*cf.* Berendsen 1982, 107). This leads to the conclusion that a large part, if not the majority (*cf.* fig. 2.8) of potential Bronze Age settlement site areas, is generally not mapped.

Second, the sometimes relatively limited thickness of crevasse splay deposits is important in another aspect. Crevasse splay deposits can form, when first deposited, up to several meters thick sandy deposits. Through the combined processes of continued sedimentation and compaction (due to the weight and 'normal' shrinkage) of the underlying sediments, crevasse deposits are prone to relatively quick 'drowning'. Such drowning is perhaps reflected in the (re)placement of fences along the crevasse gradients around house-site one at Eigenblok (Van Zijverden 2002a, 75; Appendix II, esp. fig. II.10). Although it may have been a nuisance to prehistoric occupants, this gradual drowning can be beneficial to archaeology. The lowest parts of where the crevasse splay deposits merge into the floodbasin can be sealed by floodbasin sedimentation relatively rapidly. This can enhance the state of preservation at the artefact level (decrease of organic composition in anaerobe conditions), as well as at the level of distribution patterns (preservation of activities or activity areas). Formulated otherwise; should one, for example, wish to investigate a reasonably intact Bell Beaker period site, the best strategy would be to target unfounded crevasse splay deposits of a fluvial system which became inactive shortly before the period in question.

Lastly, crevasse splay formation can also enhance site preservation in another way. Apart from the crevasse channels near the inlet (Van Dinter & Van Zijverden 2002, 13, *cf.* fig. 2.7), the base of crevasse splay deposits is usually non-erosive. Consequently, if crevasse formation takes place on top of an older archaeological site, the underlying archaeological features can be protected from subsequent (human) disturbances (*cf.* fig. 2.17, C). Sometimes, however, crevasse formation is accompanied by sheet erosion (*supra*), implying that the preservative nature only applies to features and not, or less so, to artefacts and their distribution. A minor additional benefit of crevasse splay covering of archaeological sites is the fact that crevasse splay deposits are generally highly calcareous, which enhances bone preservation (*loc. cit.*).

The necessary methodology for mapping crevasse splay deposits in coring campaigns has already been discussed above. However, the geogenesis of crevasse splay deposits (especially the breaching of the formerly stable levees) leaves open the option that archaeological material previously situated *in situ* on the fluvial system's levee, is reworked and incorporated into the crevasse splay. This means that such material can only provide a *terminus post quem* date for crevasse formation. In order to detect these reworked artefacts, it is – again – necessary to penetrate

53 Special activity sites (see section 7.2) are however sometimes reconstructed on crevasse deposits of active fluvial systems; Ten Anscher & Van der Roest 1997, 18-19; Jongste & Ten Anscher 1998, 17; Appendix VI).
54 It cannot be excluded that the Westerveld fluvial systems, on whose crevasse splay deposits Middle Bronze Age occupation took place, still showed (minor?) activity during the Middle Bronze Age-B (Van Zijverden 2005; Appendix V).
55 *Cf.* Chapter 4, fig. 4.17; fig. 4.18 and Bulten & Smits 1998b, 12; Jongste & Smits 1998, 21-22.

the entire sequence in test trenches. This is also necessary to exclude the option that older (sheet erosion affected) levels are present within stacked or multi-phased crevasse splays (*cf.* Vos & Blom 2003).

Nature of the archaeological phenomena and archaeological visibility

The physical properties of the different geogenetic entities, combined with delta-scale parameters such as gradient, base-level rise and basin capacities, set limits to the possibilities for human activities. Of these, the constraints on crop cultivation will have been most severe for Bronze Age occupants of the Rhine-Meuse delta. Crop cultivation relies on the right subsoil (mineral properties), on adequate drainage, on fluid retention capacities *et cetera*. It is argued above that the levees and crevasse deposits in particular, could have provided the right conditions for crop agriculture. Ard marks, such as those discovered at Rump and Meteren and possibly also the (Iron Age?) spade marks at Zijderveld, testify to the prehistoric agricultural use of these deposits (Chapter 4; Appendices I-III). The archaeological visibility of agricultural plots is low. In coring campaigns, these can sometimes be detected as locations with disturbed natural profiles, by their low numbers or absence of anthropogenic indicators (charcoal, sherds *et cetera*) or by a bi-partite grain-size distribution (*cf.* Schoneveld 2002b, 227; Van Zijverden 2002a, 65). The problem is that these characteristics can apply to all palaeo-surfaces subjected to human activities in the study area, so that without detailed local studies, such locations are best mapped in coring campaigns as 'site peripheries' (*cf.* Van Zijverden 2002b, 72, but see Van Zijverden 2002a, 65).

The settled parts of the landscape can sometimes be mapped more easily. Setting aside erosional processes (see above), Bronze Age house-sites in particular are characterized by high densities of archaeological remains (*cf.* fig. 6.36). Usually, for the Middle Bronze Age-B, a single or several house plans underlie the core areas of such archaeological indicator distribution plots.[56] If coring grids are of sufficiently small grid density, coring campaigns can thus sometimes predict the location of Bronze Age house-sites. The excavations at Zijderveld, however, must serve as a cautionary tale that the absence of a finds-layer need not imply poor feature- or organic preservation (Chapter 4; Appendix I). Unfortunately, the majority of prehistoric usage of a landscape is hardly detectable by coring campaigns alone. Small-scale phenomena such as hoof imprints or fences (possibly indicating meadows or fields), funerary sites (barrows or flat graves) and sites of object depositions and craft production rely on test-trenches and large-scale excavation for their discovery (*cf.* Chapter 4 & 5).

2.7.4 A methodology for discovering (Bronze Age) settlement sites on or near former fluvial systems in the Dutch river area

A first step in archaeological prospection in the Dutch river area would be to consult the available analogue and digital data. Of the latter, the Dutch central archaeological database ARCHIS, laser-altimetry maps and the available palaeogeographical, geological and geomorphogenetical maps are the most important.[57] These serve to provide a first idea on the likeliness of encountering archaeological remains and the fluvial systems in the area to be investigated. Thereafter, third party corings (some of which are also digitally available) which crosscut the investigated area should be consulted.[58]

If a prospective coring campaign is planned and the (digital) data sets referred to above indicate the presence and position of a fluvial system, the strategy should be adjusted accordingly. Here, a minimum detection size of 20 m is proposed.[59] This figure is based on the minimal dimensions of the smallest geogenetic unit which needs to be mapped; the crevasse splay deposits.[60]

56 *Cf.* Theunissen & Hulst 1999a, 149 fig. 4.21a; Hielkema, Prangsma & Jongste 2002, 128 fig. 3.23; 148 fig. 3.33; Hielkema, Brokke & Meijlink 20002b, 240, but see also Appendix V.

57 Archis: *http://archis2.archis.nl*. Palaeogeographical maps as published by Berendsen & Stouthamer 2001 and downloadable updates at *http://www.geo.uu.nl/fg/palaeogeography/*; Berendsen *et al.* 2001. The digital geomorphogenetical and geological overview maps and laser-altimetry maps (managed by the Netherlands Ministry of Housing, Spatial Planning and Environment (*http://www.vrom.nl*)), maps made available through *http://www.bodemdata.nl*, *http://www.dinoloket.nl* and *http://www.ahn.nl*).

58 For geological corings see *http://www.dinoloket.nl*.

59 See Tol *et al.* 2004 for a detailed statistical analysis of the effectiveness of different coring strategies in archaeological research.

60 Even with this grid, the discovery rate for these deposits (57 %) as argued by Weerts (1996, 69) is well below the 80 % considered to be an acceptable archaeological detection rate for archaeological coring as proposed by Tol *et al.* (2004, 68).

Corings should penetrate into the Pleistocene subsoil if possible, but should in any case penetrate sand bodies (channel-bed deposits and crevasse splay deposits) for several (*e.g.* > 3) meters.[61] If sand bodies of more restricted thickness are encountered, corings should continue downwards until the Pleistocene subsoil is reached. If (initial) coring transects are planned, these should be oriented to cross the possible fluvial system as perpendicular as possible. For the coring grid structure, several options are available (distance between transects, interval between corings in a transect, transects off-set in between or not), which influence the chance of detection and the amount of required investment (Tol *et al.* 2004). From a statistical point of view and assuming fully detectable circular sites, a grid with transects of 15 m apart, with 17.32 m between the corings and every odd transect off-set by 8.66 m, is the most cost-efficient strategy for detecting phenomena exceeding 20 m in size.[62] In fieldwork, a grid of 17.5 by 15 m (odd transects off-set by 8.75 m) could be a 'practical' translation. It should be stressed at this point, that this is the fine grid density necessary from a technical point of view (to detect phenomena of 20 m diameter size and up) and it is by no means indicated that fieldwork should *start* with such dense grids. Larger coring grids can very well be used initially to indicate a minimal presence and depth of various geogentic units.[63] Nonetheless, if the presence and distribution of (potential locations of) archaeological sites is to be adequately mapped, the 20 m detection size should be adhered to. If not, there is no scientific base to state that areas are 'positively' archaeologically empty.

For instance, for a fictive prospective campaign in an area where the presence of a former fluvial system's deposits is expected, fieldwork could start by executing two rows of corings at a close interval (< 20 m) oriented along and at right angles to the orientation of the fluvial system. After thus presumably pinpointing the channel-bed deposits, a few transects oriented along (on top of), and outside the levees proper, are necessary to detect the exact locations of crevasse splays. These transects should start from the levees and gradually move into the more distant parts of the floodbasins. In the parts where levee and/or crevasse splay deposits are documented, the grid should thereafter be refined until the proposed detection requirements are met. In areas with exclusively floodbasin deposits, some (random) corings should be executed in order to check the assumed absence of other fluvial deposits, but here – if there are no specific research questions targeting these areas – less dense coring grids may be justifiable. In order to maintain a proper understanding of the geological genesis of a given area, these grids should however still be able to detect phenomena of 50 m in size.[64]

If no fluvial system is indicated on the available analogue and digital maps, two initial perpendicular – yet now arbitrarily orientated – transects of corings at again close (< 20 m) intervals across the investigated area should be executed. If these yield a fluvial system, the abovementioned strategy should be applied. If not, additional transects along a chosen axis are in place. Based on the results, the strategy for more detailed mapping (eventually up to the 20 m detection size) should be undertaken.

The focus of all prospective coring campaigns in the study area should be to map the topography of palaeo-landscapes. If not eroded, vegetation horizons can provide some guidelines.[65] In addition, calcareous content, lithological and geochemical characteristics, soil formation and archaeological indicators of the sediments should be studied. Decalcification, phosphate enrichments, unnatural grain-size distributions, soil formations and minute archaeological materials in sediments can all hint at former surfaces. Based on such analyses, an expert judgment assessment on where, for a particular period, which kinds of archaeological remains are to be expected in what areas,

61 This measure of 3 m is arbitrary. The main point is that corings are not ceased when sand-bodies are encountered, as these may be levees or crevasses, and may or may not have scoured into the subsoil, all of which affects their archaeological potential. However, there is little use in executing corings deep into the sand bodies underlying evident main residual gullies.

62 With 15 m being the height of the equilateral triangle circumscribed by a 20 m circle, the triangle's sides measure $15 / \cos(30) \approx 17.32$ m.

63 Such as the frequently used grid consisting of transects at 40 m apart, with corings at every 50 m, odd transects off-set by 25 m; *cf.* Tol *et al*. 2004.

64 In addition, the boundary between areas that are less intensively investigated (presumably 'empty areas') and the areas with channel-bed, levee and crevasse splay deposits, should be defined by extending the denser grid into the 'empty area' and this boundary should be considered to be fluid. It does not suffice to draw this boundary after initial coarse-grained mapping and not to check, conform and adjust it.

65 To assume a general presence of continuous archaeological (find- and/or vegetation-) layers as characteristic for Bronze Age occupation in the Dutch river area (Tol *et al.* 2004, 15) seems unwarranted.

may be made. At those locations, even if no archaeological indicators have been found during the coring campaigns, test trenches penetrating as deeply down as possible into the fluvial deposits should be executed. Preferably, these are elongated trenches at right angles and along the orientation of the fluvial system in question. As present-day high groundwater levels are often a problem, more restricted (mechanically drained) test-pits (> 16 m^2) at a 20 m interval can be used. Based on the results of the test trenches and after consultation with the relevant authorities, revised legislation, protective measures or more extensive excavation can be opted for.

The methodology proposed above is much generalized and simplified, and does not take into account preconditions like a limited depth of the disturbances necessitating the archaeological research, specific research questions, alternative strategies used if, for instance, aeolian dunes are encountered, limits set by time or budget or practical problems such as high groundwater levels or present-day land use. Nonetheless, its key elements deserve application in current archaeological prospective coring campaigns in the present study area. These are;

(1) A detection size of 20 m should be used, based on the dimensions of the smallest lithogenetic unit (the crevasse splay deposits) and acceptable detection rates. Only if there are no indications of a fluvial system being present in the study area, the use of larger coring grids (yet not exceeding *c.* 50 m detection size) may be justified;

(2) At least some (transects of) corings, but preferably all, should penetrate the entire Holocene sequence if possible, but should certainly not be ceased when a sand body of limited (*e.g.* < 3 m) thickness is encountered;

(3) Archaeological prospective coring should have the reconstruction of palaeo-landscapes as its ultimate goal. The mapping of archaeological indicators is a secondary goal. Expert judgment on the potential for human use of the reconstructed landscape should guide the subsequent research strategy;

(4) Absence of archaeological or geological (*e.g.* vegetation horizons) indicators in the corings is not an argument not to investigate the areas of the reconstructed palaeogeographical landscape where according to expert judgment past human activities are to be expected.

3 Terminology, models and premises: backgrounds to studies of Dutch Bronze Age settlement systems

3.1 Introduction

I have shown earlier in this study that past research on Bronze Age settlement sites has only rarely put forward and tested specific hypotheses aimed at studying the nature and dynamics of Bronze Age settlements (section 1.4). It was argued that predominantly the individual house plans received most attention, while detailed studies on the level of farmsteads or settlement sites as a whole were undertaken less frequently. In part, the seemingly 'self-explanatory' nature of the settlement evidence may have accounted for this. Where farmhouses and outbuildings are found, the validity of structured farmhouse environments, or farmsteads, does not seem to be in need of much scientific elaboration. Similarly, the settlement is simply the area in which house plans are recognized. I feel that such an *a priori* and unproblematic interpretation of settlement sites is not justified.

For example, what exactly is implied when archaeologists speak of a 'farmstead'? Can we use this label even if no house plan has (yet) been uncovered, as is nowadays frequently done in excavation reports? Are current archaeological views of how a prehistoric farm functioned and how its surroundings are structured not overly based on false analogy with the contemporary Dutch rural landscape? Why should so-called farmsteads wander in the first place? How many farmhouses do actually make up a settlement? These are the kinds of questions that have thus far been predominantly ignored in studies of Bronze Age settlements.

To answer these and similar questions calls for specific and direct analyses of settlement site data at three specific levels: that of the house, that of the house and its direct surroundings (*e.g.* the 'farmstead') and that of the occupied area in its entirety (*e.g.* the 'settlement'). First, however, it has to be defined what exactly constitutes these separate levels and what labels do apply to describe them. This seems trivial, but presently there is much terminological confusion over what is implied when using terms like 'cultural landscape', 'sites', 'settlements' or 'farmyards'. Therefore, this chapter starts off with a critical discussion of the terminology of settlement studies and pays considerable attention to the problems of definition for concepts pertaining to the three spatial levels referred to above.

I will argue that the presence of a house ground plan is minimally implied with the use of concepts like 'house-sites' and 'settlement sites'. This puts much weight on the certainty of identification of houses. How can we be sure that reconstructed ground plans were indeed farmhouses in the past? To assess and increase the certainty of interpretations, an overview and discussion is provided of the different parameters (*e.g.* excavation extent, feature density, validation strategies) that affect the recognition and reconstruction of houses in archaeological context.

After setting clear boundaries for the concepts used in this study in the first part of this chapter, the second part focuses on a discussion of common models for Bronze Age domestic mobility. In this part, historical backgrounds to the popular 'wandering farmstead' model are presented as well as a discussion of current applications and extended versions of that model. I will argue that instead of having any explanatory value, these models have thus far been essentially only descriptive in nature and that several important questions – like 'How many houses were actually contemporaneous?', 'Were the houses spaced close to each other or wide apart?', 'What is the role of the frequently depicted funerary monuments?' and 'Do houses in case of periodical relocation (often?) return to former house locations?' – arise from these models, but that they have rarely been addressed.

The third part of this chapter will asses the validity of three processes that are commonly seen – albeit often implicitly – as steering Bronze Age domestic mobility: wood durability (affecting the life-span of timber), soil-depletion (suggesting relocation in search of better arable) and correlation between house and household life cycles (*e.g.* social norms determining relocation in case of change of the household composition). I will demonstrate that none of these three processes forms a strong argument in explaining Bronze Age domestic mobility. Combined, the three parts of this chapter form stepping stones for the interpretation and more detailed discussions of Dutch Bronze Age settlement sites in the chapters that follow.

3.2 Concepts in settlement archaeology and definitions used in this study

Labels for prehistoric occupation places carry various connotations. Some of these labels carry social connotations (*e.g.* 'hamlet', 'redistribution site'), others are solely dependent on the number of houses that are recovered (*e.g.* 'single farm', 'two farm settlement'. Two broad categories are discernable: the first concerns labels that apply to settlements or settlement sites. The second category comprises labels that describe the immediate environment of the prehistoric farmhouse (tables 3.1 and 3.2).

As to the labels used for settlement site classification, there is much variation due to the fact that different parameters are used for classification and that these parameters often are combined as well. Five primary classification parameters can be identified (table 3.1). The most frequently used parameter concerns the number of houses. The – spatial or topographic – structure visible within or between settlement sites is also regularly used as a base for classification. Interpretation of settlement sites on the basis of their reconstructed socio-political or economical function also occurs. The fourth parameter often used is the reconstructed settlement dynamics. A classification of settlement sites that is predominately based on their topographic situation, represents a fifth classification system.

The labels used in archaeological studies to describe the direct surroundings of prehistoric farmhouses are as diverse, but cannot be grouped into similar categories (table 3.2). Save for a few examples, the presence of a house proper is essential to most of them. Besides this common denominator, labels diverge strongly as to which elements are classified as being part of the 'immediate' surroundings of a farmhouse. The presence of outbuildings, fences, pits or 'open spaces' may or may not be implied. Attempt to translate these labels to different languages – or use them without translation – causes additional lack of clarity.

To avoid any terminological confusion, the content and connotation of the labels as used in this study are discussed below. Although archaeological site terminology in a sense always belies the diffuse and presumably different classification or perception of sites by prehistoric people, they may and do serve as commonly used handles for interpreting human action and as such need to be made explicit.

3.2.1 Defining the settlement

Settlement sites are the locations where everyday (domestic) activities such as sleeping and cooking occur (*cf.* Brück 1999a, 55). In this study, the emphasis lies on the aspect of sleeping, in other words the function of the settlement as an overnight shelter for people. Clearly, such a viewpoint has some pitfalls. Not all locations where prehistoric people spent the night may be equally archaeologically visible. Followed to its extreme, one would have to scrutinize archaeological ground plans (of houses) for the presence of beds or the like (*cf.* Pope 2003, 258), which is impracticable because of generally poor preservation of surface features and the sheer numbers of houses published. Therefore, it is instead assumed here that for the period in question, the structures recognized or interpreted as houses (see Chapter 5, section 5.2) were the domestic spaces where people slept and cooked or consumed food.

Accordingly, the presence of a house plan *de facto* implies the presence of a settlement site. Yet frequently, the modest scale of excavation or the nature of the house construction involved (see examples in Zimmermann 1998) does not allow for the recognition of house ground plans. In such cases, the presence of constructional activities (*e.g.* the digging of pits, wells and/or postholes) combined with domestic debris (*e.g.* (burned) food remains, ceramics) may still indicate the presence of a settlement site. Such sites may be classified as possible or presumed settlement sites.

Settlement sites can comprise multiple contemporary houses. It is this grouping or clustering of houses and the assumptions of social interrelations attributed to such clusters, that are most often implied with the label 'settlement' or 'village'.[1] Establishing this communality or feeling of belonging to a larger social whole (*e.g.* a neighbourhood?) archaeologically is problematic.[2] Consequently, the interpretative label 'settlement' is reserved in

1 For instance, Heringa argues that a historical neighbourhood (*buurtschap*) is not defined by the number and proximity of the houses, but as being the community of occupants of houses considered to be neighbourhood houses (*buurthuizen*) that are bound by rights and duties (Heringa 1985, 69). The within-group acknowledged and defined neighbourhood-membership and social rights and obligations, more than spatial proximity, creates a neighbourhood (*cf.* Becker 1982; Haarnagel & Schmid 1984, 194; Jäger 1985; Jankuhn 1985). Denyer (1978, 19) in discussing African traditional architecture, states that '…in most areas, villages were conceived of as groups of people, rather than groups of buildings'.

2 *Cf.* Rindel 1999; Canuto & Yaeger 2000; Gerritsen 2003, 111-115; 2004.

Criteria		Examples of terminology used
Reliant on the presence of a house		
1. Number of houses		
Exact		
	1	Single farm (*Einzelhof* (D), *Ensamgård* (SE))
	2	House group / Two-farm settlement
	> 2	Settlement (assumed social ties)
	> 3	Settlement (assumed social ties)
Not exact		
	Small	Hamlet (*Gehucht* (NL), *Weiler* (D), *Hameau* (F), *Landsby* (DK)
	Large	Village (*Dorp* (NL), *Dorf* (D), *Village* (F), *By* (DK)
2. Structure or patterning / Physical appearance		Structured settlement
		Regulated settlement
		Agglomerated / clustered / nucleated vs. dispersed / open settlement
		Enclosed vs. unenclosed settlement
3. Sociopolitical / Economical / Subsistence function		Fortified site
		(Re)distribution site vs. subordinate site
		Neighbourhood / Ward (*Buurtschap*, (NL))
4. Settlement dynamics		Wandering farmstead (*Zwerferf* (NL), *Wandersiedlung* (D))
		Continuously occupied site (*Kernnederzetting* (NL))
		Seasonal site
5. Topography / landscape		Cave vs. open-air vs. height/mountain settlements
		Wetland/lowland vs. dryland/upland settlements
Not reliant on the presence of a house		Chronological and spatially related group of features
		Dwelling site

Table 3.1 Examples of terminology and criteria frequently used in classification of prehistoric settlement sites.

Terminology	Criteria or definition
Farmstead	House and its environs (archaeological use)
Farmstead	House and its yard (archaeological use)
Farmstead	House and its outbuildings (archaeological use)
Farmstead	House and a grouping of structures around it (archaeological use)
Farmstead	House and a fenced-off area (archaeological use)
Farmstead	A farm and the buildings upon it (Oxford English Dictionary)
Farmstead	A farm, including its land and buildings (American Heritage Dictionary)
Farmyard	The yard or inclosure attached to a farmhouse or surrounded by farm buildings (Oxford English Dictionary)
Farmyard	An area surrounded by or adjacent to farm buildings (American Heritage Dictionary)

Terminology	General labels, synonyms and translations
Farmstead	Farmyard, Holding, House-site, Habitation site, Compound, Household cluster, True farm, Farm unit, Settlement unit, Yard
	Erf (NL), *Gård* (DK, SE), *Bruk* (N), *Hofplatz* (D)

Table 3.2 Terminology frequently used in archaeological studies to indicate prehistoric farmsteads and farmyards. Examples are given of (archaeological) definitions, synonyms and translations.

this study for those settlement sites where archaeological correlates that are hinting at such feelings can be discerned. Structures defining a communal outer limit or perimeter, such as ditches or palisades around the neighbourhood houses, may be valid correlates.[3] Sites lacking such indications will be designated with the more analytical term 'settlement sites'.

The definition of a settlement site as put forward above does seem somewhat loose. Various types of non-domestic sites coexisted. Fields, pastures, barrows, cemeteries, production sites, extraction camps and cultic sites are on a theoretical level distinctly different from domestic sites. Sites for which no domestic function is reconstructed or assumed can be classified as non-domestic sites (for a discussion of the site-concept see Carman 1999, *cf.* Fokkens 1998, 36).[4] In practice however, the small areas studied in archaeological coring and test-trenching campaigns often hamper site interpretations. Settlement sites can often be characterized by the presence of a wide variety of archaeological phenomena. Features of a varied nature (stakes, postholes, pits and ditches) are found in association with various categories of material culture (burned and unburned flints, bones, stones and ceramics). Non-domestic sites are generally characterized by a more restricted set of features or find-categories. Taphonomic processes, however, influence this variation and it is not only hard, but also pointless to strive for quantitative thresholds between domestic and non-domestic sites. It seems rather more promising to study if and how the 'life histories' of domestic and non-domestic sites are entwined. I will argue below that the settlement site and the house-site will be appropriate scales of research to answer such questions (fig. 3.1). Moreover, 'settlements' and settlement sites may have formed a spatial arena where non-domestic activities were also carried out. Agricultural, ritual, artisanal or industrial activities may have been carried out within settlement sites. Because these activities can often not be proven to have been contemporaneous with reconstructed habitation phases, they are here labelled as 'non-domestic activities'. These may be younger or older than or contemporary with the settlement sites under study.

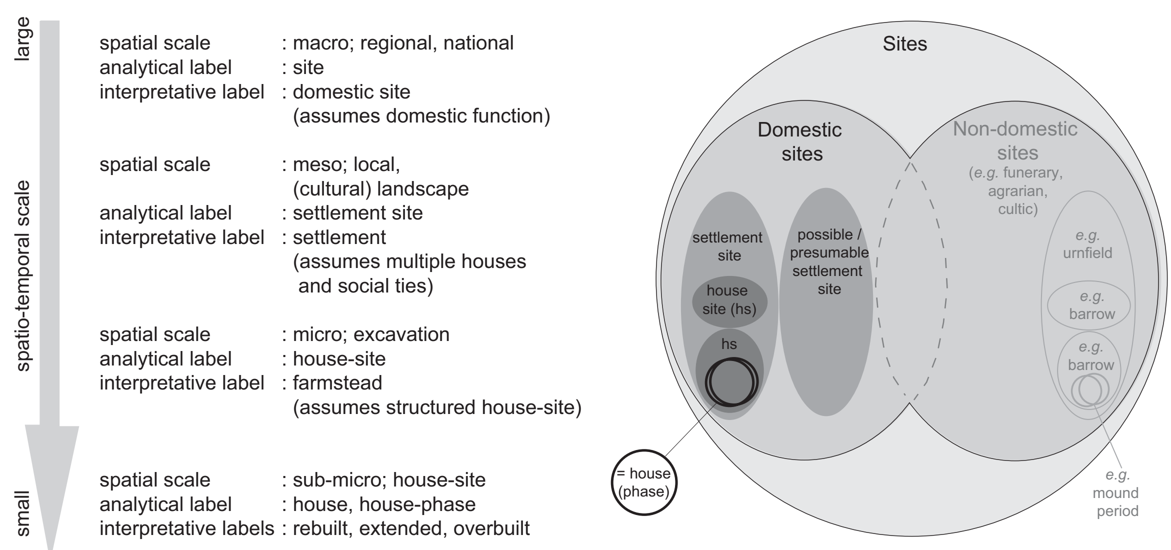

Fig. 3.1 Visual representation (right) and the distinction between analytical and interpretative settlement site terminology in this study used at the different spatio-temporal scales.

At the highest level, the label 'site' will in this study be used for an area – regardless of size or methodology (*e.g.* from a single coring to an extensive excavation) – where indications (*e.g.* artefacts or soil processes) have been

3 See section 7.3; Waterbolk 1982, 99, *cf.* Mikkelsen 1999, 178.

4 Fokkens (1998, 36) reserves the term 'site' for find-locations where a determination of function (*i.e.* information on the systemic context (*sensu* Schiffer 1972, 157)) can be made. In the present study, the label 'site' is also occasionally used to designate find-spots for which no such determination could be made.

documented that indicate past human activities. Consequently, it is used solely in an administrative sense and not as part of the site/off-site dialectics discussed in other archaeological studies.[5]

It is a moot point to discuss maximum allowed distances between houses in a settlement.[6] Occupants of houses situated several hundreds of meters apart may still have felt, and expressed, a feeling of togetherness that archaeologists like to associate with the notion of a 'settlement'.[7] Apart from the fact that this is essentially an immaterial social category, possible material expressions of these sentiments are rarely preserved (*e.g.* iconography on textiles or woodwork). Consequently, interpreting contemporaneous houses as a 'settlement' is only done here if archaeological evidence expressing a 'sense of togetherness' – implying contemporaneousness – can be provided (*cf.* Chapter 5, sections 5.5-5.6; Chapter 7, section 7.3). Although spatially isolated houses may have functioned, and have been perceived as identical to those within settlements, these are – for sake of clarity – not interpreted here as 'one-house-settlements' (*contra* Mikkelsen 1999). Moreover, the frequently limited excavation extents do not allow for a positive exclusion of the presence of other house-sites nearby. In addition, the house-sites that are found close to each other need to show a different composition than more widely scattered house-sites, in order to postulate a different nature for the latter. Only if such a difference exists, is there a need for a more detailed classification.[8] In order to study this, the house-site is the appropriate level and label to use.

3.2.2 Defining and studying house-sites: approach and terminology

Frequently, studies in settlement archaeology make use of an intermediate spatial level, usually labelled the 'farmstead', between that of the house and the settlement as a whole (table 3.2 and fig. 3.1). A prehistoric farmstead in most definitions comprises a prehistoric farmhouse and its immediate surroundings (*cf.* Roberts 1996, 16-19). Sometimes this is interpreted spatially as a zone of 20 m around the farmhouse or as a rectangular *c.* 50 by 50 m space centred on the house.[9] In this area, features and structures associated with habitation and agricultural tasks (*e.g.* barns, granaries, pits and postholes) can be found.

In principle, the terms 'farmyard' and 'farmstead' may both be used to refer to structured farmhouse environments as interpretative labels. The label farmyard – implying the presence of open areas surrounding farmhouses – is thus sometimes used as an alternative to the 'farmstead' label and sometimes as representing one of its components.[10] In this way, it adds little to the archaeological operability of house-site analysis. Therefore, the label 'farmyard' will not be used in this study.[11] In some definitions of farmsteads, the lands belonging to a farm are also classified as being part of them (table 3.2; *cf.* Gerritsen 2003, 38). Thus, if looking for a label to describe the direct vicinity of prehistoric farmhouses, the label 'farmyard' somewhat ignores the buildings while the label 'farmsteads' may involve an unwanted implication of the inclusion of fields. For want of a less ambiguous term (such as the Dutch *erf* or German *Hofplatz*), in this study the term farmstead will be used as an interpretative term for structured house-sites. To what extent such structured house-sites ('farmsteads') existed during the Dutch Bronze Age will be examined in detail in Chapter 6 (esp. section 6.5).

In order to test the hypothesis that an area directly outside the farmhouse was structured in a particular manner, the concept of hypothetical house-sites is introduced here. A hypothetical house-site may be defined as an arbitrary spatial area centred on an attested prehistoric house. For the extent of the hypothetical house-site, in this

5 For discussions and examples of non- or off-site archaeology see Foley 1981; Dunnell & Dancey 1983; Dunnell 1992; Robins 1997; Wandsnider 1998; Peterson & Drennan 2005; Kantner 2008, 44-47.

6 See section 6.5 and Table 6.2, *cf.* Wesselingh 2000, 20, ref. to Hingley 1989, 180; Roberts 1996, 24; Gerritsen 2003, 109-110.

7 Gerritsen 2003, 111-113, *cf.* Van Gelder 1960; Cohen 1985; Lund 1994; Ridderspore 1999.

8 This does not appear to be the case here: see Chapter 6, fig. 6.59 (the broader distribution of outbuildings in fig. 6.59, E is presumably related to the duplication effect (see section 6.2.4)).

9 *E.g.* Whalen 1976, 78; Hessing 1991, 44; Kuna 1991, 335; Fokkens 1997, 365; Theunissen 1999, 112; Harding 2000, 22; Fokkens & Jansen 2002, 11; Hielkema, Brokke & Meijlink 2002, 188.

10 Schinkel 1998, 26; Wesselingh 2000, 23, note 25; Gerritsen 2003, 38.

11 Gerritsen (2003, 38) defines the farmyard as an area surrounding the house where outbuildings are found and domestic activities take place. A farmstead, according to him (*ibid.*) comprises a farmhouse and yard, but fields are excluded. He also proposes the term farmstead to be used if one wants to indicate the diachronic nature (farmsteads can have several house phases, but with possibly different yards) and for referring to a 'dwelling place in the wider landscape' (*loc. cit.*). Using the terminology of this study, Gerritsen's farmstead is the house-site, and his farmyards would be here labelled farmsteads (*i.e.* structured house-sites).

study a 50 by 50 m square is used as a starting point (but see Chapter 6, section 6.4.2). This implies in theory that the methodology is less suitable to detect larger farmsteads. In practice, however, the excavation limits are usually less than 50 m apart from the prehistoric farmhouses, representing an innate problem in the analysis of possible larger farmsteads. In addition, the relationships between the house proper and other settlement site elements such as barns, granaries or pits will be examined. The interpretation of these relations will also be relevant to evaluate or characterize Bronze Age farmsteads (for results and detailed methodology see Chapter 6).

Unfortunately, all too often the term 'farmstead' is used in archaeological reports as a kind of catch-all term for the assumed nearby presence of domestic activities, structures or finds. This causes an unwanted blurring of the categories of settlement sites, house-sites and farmsteads. In this study, therefore, the analytical label 'house-site' is set apart from the more interpretative label 'farmstead' that is used to indicate a structured prehistoric house-site.

3.2.3 Criteria for Bronze Age house recognition and reconstruction

As the presence of (reconstructable) houses has been put forward as a defining element of house-sites, it is justifiable to briefly consider what factors affect the possibility and certainty of recognizing houses in an archaeological context. Evidently, several criteria affect the validity of house reconstructions from discovered ground plans in archaeological fieldwork (fig. 3.2). Yet on the whole, these criteria are rarely explicitly addressed in excavation reports, leaving the reader at a loss when trying to assess the certainty or validity of the reconstructions put forward.[12] Evidently, houses reconstructed from dense post-clutters during post-excavation analysis are more prone to error than house plans that were already recognized during fieldwork in areas of low feature density. Some important criteria of relevance to house reconstruction will be discussed below.

Constructional properties of houses

Primarily, for remains of houses to be encountered in an archaeological context, requires them to have been preserved in archaeologically visible ways. As for much of the later prehistoric and proto-historic period in the Netherlands domestic building techniques relied on earthfast posts, traces thereof can (if feature preservation is adequate) generally be expected to have been preserved. It cannot be excluded, however, that parts (*e.g.* stall partitions, sod walls, dividing walls, *et cetera*) of such houses, and possibly some houses in their entirety, relied on other construction techniques such as more shallowly dug down foundation trenches and/or sleeper-beam based foundations (*cf.* Zimmermann 1998, 25; Rasmussen 1993b, 26-36; Billaud 2005). Such construction techniques are evidently more dependent on the quality of surface level and feature preservation to be recognized in an archaeological context in the first place. We must face the reality, that for any period in later prehistory, types of domestic structures may have existed that completely escape our observation because of the poor archaeological visibility of their construction techniques.

Related to this, are more specific properties of the archaeological relicts of house constructions. Houses with continuous foundation trenches such as those from the later Roman periods (*e.g.* Schinkel 1998, 194-204) can, by the continuous nature of their features, be identified with more reliability and ease compared to houses whose archaeologically visible traces present discontinuous phenomena (*i.e.* isolated postholes). In the former case, the grouping of features is comparatively easy, whereas in the latter case it can be highly problematic.

Extent of excavation

Obviously, the excavation strategy can affect house-recognition. If trenches are smaller in size than the average largest size of the houses for the period under investigation, recognition is hampered. In large-scale excavations, levels are generally opened in checkerboard strategies in order to have minimal transport of dug-away spoil. With such an excavation strategy houses are frequently uncovered in several trenches that have not been excavated at the same time. This complicates the comparison of features and the assigning of them to individual house plans. As a general rule, a larger extent of continuously exposed surface increases the probability and validity of house-recognition, although frequently practical problems (*e.g.* high groundwater tables, spoil transport, desiccation of the feature level) complicate this.

12 But see Huijts 1992, 7-35; Waterbolk 1995a, 74-75; Fokkens & Jansen 2002, 10 and Berkvens, Brandenburg & Koot 2004, 57-58 for notable exceptions.

Whereas partially uncovered house plans (*e.g.* situated at the excavation limit) need not by definition be of lower quality, the general positive correlation to excavation extent remains for the simple fact that the more (archaeologically visible) constructional elements of the house are exposed, the better the chances of recognition will be.

Feature density

Archaeological sites are generally palimpsest collections of various use phases of a given plot. If these activity phases leave archaeological traces that are hard to distinguish by feature types and/or shapes (*e.g.* simple earthfast posts, see above), the recognition of individual use phases and structures can be harder. As earthfast posts were probably used throughout the later prehistoric periods, feature density can – with due caution – be used as an indirect indicator for the time-depth of human activities at a particular place.[13] As posthole features frequently differ only minimally between (consecutive) prehistoric use phases, the more features there are, the more challenging the task is to assign these to individual above ground structures.

criteria	BETTER	WORSE
1	Building tradition of earth-fast posts	Building traditions of sleeper beams or other
2	Large size of excavation	Small size of excavation
3	Large size excavation units	Small size excavation units
4	Continuous features (*e.g.* foundation trenches)	Discontinuous features (*e.g.* isolated postholes)
5	Low feature density	High feature density
6	Similar shapes in plan	Varied shapes in plan
7	Similar shapes in sections	Varied shapes in sections
8	Similar posthole fills	Varied posthole fills
9	Similar depths for posts with same reconstructed functions	Varied depths for posts with same reconstructed functions
10	All features compared as representing a single structure	Not all features compared as representing a single structure
11	All features sectioned in relation to house structure	Not all features sectioned in relation to house structure
12	All features sectioned	Not all features sectioned
13	Parallels for structure available	Parallels for structure lacking

Fig. 3.2 Simplified list of criteria effecting the recognizability and validity of house reconstructions.

Feature appearance

On later prehistoric settlement sites, postholes are generally the dominant feature type. As they share a common functional genesis, they generally differ little in their main characteristics between later prehistoric periods. In the horizontal plane, most postholes are round because this required minimal energy in construction, while they provided good lateral fixation of the posts placed in them.[14] If the wood was allowed to rot *in situ*, the part of the posthole where the posts was once placed is frequently darker in colour because of organic decay. Some posts may have been rammed down (*i.e.* not requiring a posthole) or sunk down by applying pressure onto posts placed in artificially moist-saturated subsoil conditions (Zimmermann 1998, 2). For a single structure, one would expect posts of one structure with formerly similar function to have been placed in the ground with a similar technique. As a consequence, the shape of the features in the horizontal plane of (parts of) former structures may be expected to be reasonably similar in appearance (posthole or solely postpipe). Similarly, postholes of posts with formerly comparable functions may be expected to be similar in shape of cross-section for individual structures.[15]

13 A high feature density may however be the result of intermittent activity periods and cannot be used as an approximation of settlement site duration without additional supporting arguments for the degree of functional and spatial continuity.

14 Rounded posts are generally tree stems (whose outer bark and sapwood is removed), that are again the type of construction wood requiring the lowest amount of energy in preparation (*E.g.* Hyde 1997, 253, *cf.* Theunissen & Hulst 1999b, 175; Brinkkemper *et al.* 2002, esp. 520-521; Vermeeren 2005; Vermeeren & Brinkkemper 2005).

15 The apparent shape of postholes in section can be distorted by the orientation of the line of sectioning. Normally, postholes of a single structure are sectioned perpendicular to the presumed structure's long axis in order to detect inward declination (a-frame constructions). If section lines are orientated arbitrarily, feature shapes in sections may differ as a consequence thereof.

Finally some comments need to be made on the components and colour of feature fills. Although the observed feature colour is affected by various processes (*e.g.* later soil formation processes, moisture content, weather conditions, individual observer discrepancies, uniformity of the fill *et cetera*), colour still can be an important aid in grouping features into structural entities. While dating by colour in absolute terms is impracticable, features at some sites can be grouped and phased by feature colour. The colour is in those cases frequently affected by the amount and nature of the on-surface debris that is unintentionally incorporated into the posthole when the empty areas next to the posts are backfilled. As all posts of a structure were dug down or taken away at the same time, one may expect them to be comparable in colour. In any case, unexplainable differences in colour of postholes grouped into single structures should be considered as problematic.

Relative feature depth[16]

Based on the assumption that posts were dug down sufficiently deep to allow them to be freestanding, a relation between the subsoil depth of the posthole and above ground height may be assumed.[17] For earthfast posts of Dutch (pre-)historic farmhouses, feature depth has been expressed as disproportionally increasing with post height (Huijts 1992, 42) but also linear correlations have been put forward (Wainwright 1979, 237; Harsema 1980c, 27).[18] It seems in any case plausible that the resistance of earthfast posts to angular or laterally applied forces increases with foundation depth (assuming a tight fit between posthole and post) and it seems unlikely that vertically placed posts were dug down less than one-fifth of their overall length.

Furthermore, it may be expected that for the posts to which a similar roof-bearing load (or function) has been assigned, similar remaining depths are observed. Additionally, the absence of postholes should be interpreted in the light of assumed original feature depth, original reconstructed roof-bearing load and the remaining depth. For example, in situations of uniform later erosion, it is strange to have (high, so relatively deep) ridge-posts missing when (lower, so relatively more shallow) wall postholes have been preserved. Accounting for differential disturbances, the posts of comparable function in reconstructions should provide relatively uniform feature depths.

Structure validation strategies

Initial recognition or postulation of a tentative structure is just the first phase. In an ideal situation, the features interpreted as being part of the same structure are dealt with in a single excavation strategy that aims at ascertaining their association as well as at determining their former structural role. This implies that if houses have been excavated in multiple, consecutive trenches, comparison of the features in plan and section is rendered impossible. Moreover, the orientation of all sections is preferably determined in relation to the overall structure. In more dim scenarios, parts of reconstructed structures have been sectioned in some trenches, but not in others. Preferably, a description of the excavation strategy should be added to catalogues of published structures (*cf.* Hiddink 2005, 286).

Available parallels

The availability of structures that can be compared to those that are already reconstructed can strengthen the validity of proposed archaeological reconstructions. Such use of analogy should involve parallels from not too distant regions and the reasons for its use as parallel should be explicitly mentioned. House plans that 'look the same' in plan view

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16 Absolute feature height has here been left out, but can of course also be an argument to refute certain reconstructions. For instance, the postholes of 'house' 45FH at De Bogen proved (based on the original documentation) to be situated at three discretely separated levels of absolute height, arguing against the interpretation of it as a single structure (see Appendix III; Hielkema, Brokke & Meijlink 2002, 218-221).

17 This is no necessary prerequisite. It is, for example, possible that the postholes of high medieval Dutch farmhouses were as wide as they generally are (*c.* 80-100 cm for 40 cm diameter posts) to allow for a pre-joint frame of two roof-bearing posts and a crossbeam (a truss) to be erected after having been combined lying flat on the surface (*cf.* Huijts 1992, 30; Arnoldussen 2002; 2006, 8).

18 Huijts 1992, 41: M (clasping momentum) = F (factor of force) * l (length)^2, *cf.* Hodara 2005, 66. Marshall 1969, 168: S (structural strength index) = depth * diameter^2 (but see also Loten 1970). Wainwright (1979, 237) assumes that D (depth) approximates 0.3 of the overall post length, a factor also used as a rule of thumb by Louwe Kooijmans (pers. comm., Jan. 2006). Harsema (1980, 72(157)) observed depth/overall post length ratios of 0.2 of the overall length for the inner, and 0.5 for the outer roof-bearing posts of an Iron Age farmhouse from Hijken.

may differ distinctly in the depth or shapes of their postholes. In addition, houses may be similar in structure or structural rhythm of their roof-bearing structure, whilst their dimensioning is different. Therefore, publication of the reconstructions and suggested parallels to the same scale and with the same additional information (feature shapes, depths *et cetera*) is preferred, especially for 'new' or 'variants of' types of houses.

The interpretation of the validity of archaeologically reconstructed structures should take the different criteria as listed in fig. 3.2 into account. As a shorthand, more synthesized classes of 'construction-reliability' like those suggested by Fokkens and Jansen (2002, 10) and Berkvens, Brandenburgh and Koot (2004, 58) may be used. These allow the relatively straightforward communication of structure-reliability based on the most common situations in archaeological fieldwork (table 3.3). This classification entails a basic threefold division into: (1) very reliable to reliable, (2) plausible to possible, and (3) tentative to improbable reconstructions. A more detailed discussion on the terminology, structure and dating of Bronze Age houses will be presented in Chapter 5 (section 5.2).

Class	Class description
Ia	Very reliable house-plan, recognised and described during fieldwork. Constituent features checked for consistency as being part of the structure within a wider group of features. Preferably exposed and investigated in full. There are no doubts on its validity by the excavator.
Ib	Reliable house-plan like those of category Ia, but for which elements are missing due to limited excavation (unit) size or local soil-processes or disturbances. There are no doubts on its validity by the excavator.
IIa	Plausible house-plan that was recognised and investigated as such during fieldwork. Some results of the investigation are inconclusive; post are unexplainably absent, or differ distinctly in shape, section or fill. There are some doubts on its exact former nature by the excavator.
IIb	Possible house-plan of which the main parts have been discovered during fieldwork, but during post-excavation analysis the structure has been revised, extended or altered. As the association of the posts added during post-excavation analysis was not based on field-observations on their properties, these houses of inherently weaker quality than classes Ia, Ib and IIa. There are some doubts on its exact former nature or overall validity by the excavator.
IIIa	Tentative house-plan which was reconstructed during post-excavation analysis. Based on the documentation there is sufficient evidence to suggest that constituent features were once part of a single structure. As the association of the posts during post-excavation analysis is not backed or checked by field-observations on their properties, these houses of inherently weaker quality than classes I & II. There are some or ample doubts on its exact former nature or overall validity by the excavator.
IIIb	Improbable house-plan which was reconstructed during post-excavation analysis. Based on the documentation there is insufficient evidence to suggest that constituent features were once part of a single structure. As the association of the posts during post-excavation analysis is not backed or checked by field-observations on their properties, these houses of inherently weaker quality than classes I & II. There are severe doubts on its exact former nature or overall validity by the excavator.

Table 3.3 Classes for house-reliability (after Fokkens & Jansen (2002, 10) and Berkvens, Brandenburgh & Koot (2004, 58)).

Houses in diachronic perspective

Whereas house recognition and house-typology entail a perspective that considers house plans as being 'frozen in time', houses may perhaps be more informatively studied from a diachronic perspective, as they have life histories of their own (Waterson 1991; Carsten & Hugh-Jones 1995; Gerritsen 2003). They are erected, extended, shortened, rebuilt, moved or overbuilt. The outcomes of these processes will be called 'house phases' in this study. Thus far, these processes have not been studied systematically for Dutch Bronze Age houses (but see IJzereef & Van Regteren Altena 1991; section 7.3.2; table 7.2). Whereas the erection, overbuilding and to a lesser extent repairs and extensions of houses can be identified archaeologically, other processes are harder to identify in the archaeological record (*cf.* Gerritsen 2003, 75).[19] Apart from moving house, all these processes are interpreted as taking place on the house-site. Distinguishing between rebuilding and overbuilding is harder. In this study, the term 'rebuilding' is reserved for

19 In this study, doubled (added or replaced) posts are – in cases of sufficiently low feature density or with otherwise established security of association – considered as evidence of repairs. This may cause an unwanted blurring of the categories of reinforcements (post added) and replacements (post replaced), but both are structural alterations intended to increase the farmhouse's use-life. Furthermore, without detailed section information, the distinction often cannot be made. Extensions are frequently visible in (a combination of) overbuilt former house ends, added posts and slight changes in orientation of the lines of the roof-bearing posts.

those cases where two or more superimposed plans of structures with the same function are found that bear a strong resemblance in constructional details (*e.g.* placement, dimensioning, orientation; fig. 3.3, d). Rebuilding has two important connotations, namely broad (within a human generation) contemporaneity as well as the suggestion that the same social group (*e.g.* local community, family or household) was responsible for the erection of both structures.[20] As such, rebuilding is set apart from overbuilding. For the latter, no contemporaneity is implied, nor the assumption that its builders belonged to the same social group, nor that the function of the superimposed structures was the same. Overbuilding may consequently be defined as an overlapping of structure ground plans where the structures differ sufficiently in dimensions, orientation, placement and overall nature to suggest that they belong to a different use phase of the settlement site (fig. 3.3, e).

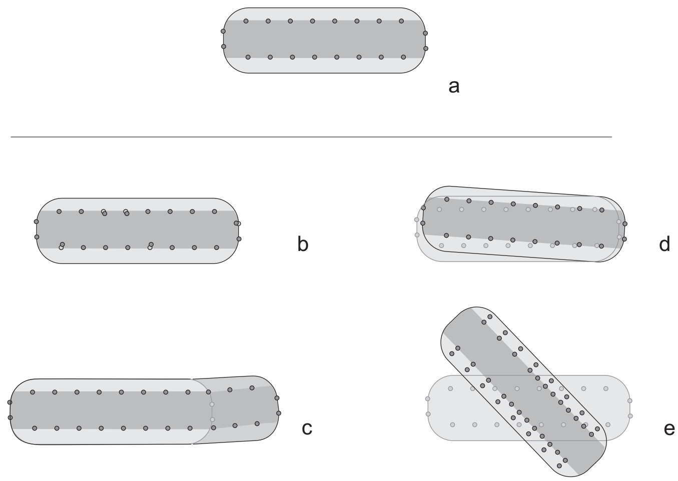

Fig. 3.3 Schematic overview of house(-site) diachronic processes according to definitions used in this study.

a: original, b: repairs, c: extensions, d: rebuilding, e: overbuilding.

3.2.4 Settlement sites and house-sites as units of study

The concepts of 'settlement sites' and 'house-sites' can furthermore be differentiated from concepts such as 'settlements' and 'farmsteads' through their relationship with time. Settlements and farmsteads are functional interpretations of a 'snap-shot'/synchronic type of reconstruction. The concepts of settlement sites and house-sites allow us to better study the diachronic aspects of prehistoric habitation. It is possible to reconstruct house-site 'occupation histories', that may inform us on aspects like preferred locations for house-sites (*e.g.* near barrows, on former fields) and human perceptions of earlier habitation (*e.g.* are house-sites never overbuilt? Are granaries preferably erected on former house-sites?). If houses proper are lacking, diachronic information on the function of – parts of – prehistoric settlement sites can still be studied – albeit in a less detailed way – on the level of the settlement site. These interrelations have not been yet studied systematically for the Dutch Bronze Age.

3.2.5 The cultural landscape: concepts and approaches

Studies of prehistoric settlement dynamics frequently involve a multi-scalar approach. Starting from the smallest level of individual settlement site elements, such as pits and ditches, the next scale entails studies of domestic compounds or farmsteads and finally the settlements as a whole are studied. For the spatial scale that transcends that of settlements as a whole, the term 'cultural landscape' is often used (*cf.* Waterbolk 1999).[21] At a landscape level, the interrelations of domestic, agricultural, depositional, funerary and other places in the landscape may be meaningfully outlined and discussed. In the last decade, several archaeologists have suggested that even more information may be obtained by adopting a 'biographic' approach to studies of both material culture as well as to cultural landscapes.[22] Despite the present popularity of such approaches, the main elements – cultural landscapes and biographic approaches – are ambiguous concepts and open to various interpretations. Therefore, in this section I will briefly trace the origins of these approaches and make explicit what is meant by them in this study.

20 *E.g.* Therkorn 1987a, 219; Borna-Ahlkvist 2002, 197; Pope 2003, 325; Gröhn 2004, 333, *cf.* Padma *et al.* 2001, 29.

21 For other archaeological commentaries and uses see: Birks *et al.* 1988; Berglund 1991; Bender 1993; Gosden & Head 1994; Pickering 1994, 150; Ashmore & Knapp 1999; Ucko & Layton 1999; Jones 2003.

22 *E.g.* Gerritsen 1999a-b; Marshall & Gosden 1999; Fontijn 2003, chapter 13; Wentink 2006, chapter 9. For some more examples of the cultural biography of landscapes see note 27 below.

Cultural landscapes

In this study the term 'landscape' is used to denote the spatial properties of areas of anthropogenic, anthropogenically influenced and/or (seemingly) natural genesis.[23] Superimposed on previously shaped land, domestic sites and non-domestic sites jointly (be it spatially overlapping or separated) constituted the everyday environment of Bronze Age communities. This realm of coexistent and intertwined domestic, economic, agricultural and ritual locations in a landscape may be designated as a 'cultural landscape'. This notion of cultural landscapes can be traced back to the Berkeley school of geography, founded by C.O. Sauer. In his inaugural lecture, Sauer claimed that cultural landscapes were fashioned from natural landscapes by cultural groups. Culture is the agent, natural areas are the media and the cultural landscape is the result (Sauer 1925, in Leighly 1963, 343).[24] Although at that time a provocative break from environmental determinism in geography, its Cartesian separation of nature and culture is now considered untenable.[25] Nonetheless, the concept of 'cultural landscapes' has spawned various studies and research traditions. What exactly constitutes a cultural landscape from an archaeological perspective is difficult to establish. For instance, 'empty' areas in excavations or survey projects (*i.e.* areas in which human influence is not archaeologically visibly preserved) may very well have been conceived of in prehistory as being part and parcel of the 'cultural landscape' of the people that dwelled in it. Because on theoretical grounds the differences between 'natural' and 'cultural' landscapes are blurred – and even (seemingly) completely natural areas may in reality have been constituent parts of past cultural landscapes (*cf.* Bradley 2000; Fontijn 2007) – the operationalization of the 'cultural landscape' in archaeological studies is difficult. Both the potential significance of 'empty areas' as part of prehistoric perceptions of 'cultural landscapes' needs to be acknowledged, while also more precise interpretation of the spatial characteristics of particular humanly influenced areas should be possible. Therefore in this study the prefix 'the built-up part of' is used with the term 'cultural landscape' in cases where clear (archaeologically visible) human influence in the form of subsoil features is implied.[26] Conversely, the use of the designation 'the cultural landscape' concerns the more abstract and all-embracing form of 'cultural landscape' as (past) human landscape perception and structuration.

The cultural biographic approach

Since Kopytoff's 1986 contribution on the 'cultural biography of things', archaeologists have frequently integrated a biographic approach into the study of material culture or even of complete landscapes. This approach is best introduced by two quotes from Kopytoff's seminal study:

> *'In doing the biography of a thing, one would ask questions similar to those one asks about people: What, sociologically, are the biographical possibilities inherent in its "status" and in the period and culture, and how are these possibilities realized? Where does the thing come from and who made it? What has been its career so far, and what do people consider to be an ideal career for such things? What are the recognized "ages" or periods in the thing's "life," and what are the cultural markers for them? How does the thing's use change with its age, and what happens to it when it reaches the end of its usefulness?'* (Kopytoff 1986, 66-67).

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23 Or in Sauer's words: '(…) an area made up of a distinct association of forms, both physical and cultural.' (Sauer 1925 in Leighly 1963, 321). In some parts of this study the term 'micro-topographic landscape' is used to indicate spatial properties (in three dimensions) of the landscape within spatial scales not exceeding hundreds of meters. For an art-historic approach to the 'landscape' concept see Lemaire 1996 (1970), esp. 21-51; Thomas 1993; Gleason 1994 and references therein.

24 Although Duncan (1980, 186) and Jones (2003, 21) trace its origins even further back in early German geography to F. Ratzel (1895). For a historical introduction to the German evolution of the *Kulturlandschaft*-concept see Cosgrove 2004, esp. 64.

25 *E.g.* MacCormac 1980, esp. 5-11; Ingold 1993, 153-157; Tilley 1994, 37; Cronon 1995; Descola & Pálsson 1996, esp. 2-9; Lemaire & Kolen 1999, 12-16; Ingold 2000a, chapter 3; Tilley *et al.* 2005, 219-222.

26 Such a label appears to exclude the interpretation of areas void of features – despite possibly many anthropogenic indicators – as being part of the cultural landscape (or humanly influenced areas), which clearly would be erroneous. Accordingly, establishing the 'limits' or 'extents' of cultural landscapes may be a moot point. A label such as 'activity zone within the cultural landscape' could be used as a more appropriate designator for such locales. In this study however, a label for indicating built-up areas is predominantly needed because of the strong correlation between post-built areas and domestic sites for the region and period in question.

Yet such an approach alone is still solely biographic. What makes it a *cultural* biography is the following:

> *'(...) not what it deals with, but how and from what perspective. (...) [it would look at an object] as a culturally constructed entity, endowed with culturally specific meanings, and classified and reclassified into culturally constituted categories.'* (Kopytoff 1986, 68).

There are significant gains for material culture studies that follow this 'cultural biography' approach. Like with current applications of the '*chaîne opératoire*' (Leroi-Gourhan 1964, *cf.* Edmonds 1990; Renfrew & Bahn 2005, 25-30), it forces archaeologists to consider explicitly the different options available during the different stages in an object's production and use-life, combined with considerable attention paid to (past) societal perceptions of what 'proper' life-path choices and stages were.

During the last decade, the 'cultural biography' approach has also been forwarded as a favourable methodology for studying past landscapes.[27] Although the strategy and approaches involved in writing a 'cultural biography of landscapes' are likely to yield important results, the name itself is perhaps somewhat of a misnomer. The essence of a biographic approach is the analogy between the study object and human life cycles. Whereas artefacts may be considered to be 'born' (*i.e.* created, assembled) and to have 'died' (*i.e.* discarded, lost, broken), assigning such 'life stages' to landscapes seems erroneous. Only from a human, chronocentristic point of view, can arbitrary 'starting' or 'ending' points be ascribed to landscapes.[28] Essentially, landscapes almost by definition outlive their occupants and any ascribed starting point of their life history ('birth') is more defined by usage than by acts of creation, unlike with artefacts. As such, 'cultural biographies of landscape' are at risk of being reduced to a fashionable cloak for what are essentially occupation histories.

Furthermore, a critique of the use of the label 'cultural biography of landscape' by Bender (1995, 25-26) targeted its tendency to be nodal (*i.e.* focusing on 'place' rather than on paths, movements, *et cetera*). [29] Such an unwanted focus on nodality also underlies Roymans' assertion that cultural biographies of landscapes are:

> *'(...) to study not only the physical, but also the mental dimension of cultural landscapes in the past. (...) by analysing the 'cultural biography' of* dominant elements *in the landscape (ancient barrows, moors, wells, etc.).'* (Roymans 1995, 33, my emphasis). [30]

Clearly, such interpretations of biographic approaches steer away from what Kopytoff *cum suis* originally intended, which was to write culturally specific narratives inspired by a biographic approach (*cf.* Rooijakkers 1999a, 277). Biographies of landscapes should therefore never be nodal in nature in approach or application.[31] Rather, they should be culturally sensitive narrative structures, geared towards perceived life stages of the objects under study.

3.3 Models current in Dutch later prehistoric settlement archaeology

Bronze Age settlement archaeology has been shown to reflect a long tradition in the Netherlands, with the oldest Bronze Age houses recognized in the mid sixties of the 20th century (Chapter 1, sections 1.3-1.4). During the last two

27 *E.g.* Samuels 1979; Meredith 1985; Kolen 1993; Roymans 1995; Rooijakkers 1999a-b; Hidding, Kolen & Spek 2001; several contributions in Van der Knaap & Van der Valk 2006.

28 A point also raised by Van der Valk & Bloemers (2006, 30), *cf.* Lemaire 1996 (1970), 185; Waterbolk 1999, 115. See also Meinig's (1979, 44) famous quote that '(…) life must be lived amidst that which was made before. Every landscape is an accumulation'.

29 Her second critique (1995, 26) that use of the label 'cultural biography of landscape' is risky because '…at a given moment it carries different meanings for different people' (*loc. cit.*) is off mark since this applies equally to objects, both within or outside biographic narratives (*cf.* Verhart 2000, 20-22 figs. 1.5-1.7).

30 Van Londen (2006, 172) takes this approach even further by stating that 'A landscape biography provides a yardstick for researchers to use in distinguishing important landscape objects from unimportant ones, and for policy makers to use in selecting objects to protect'. This is a far cry from how biographic approaches are originally intended.

31 For an overview of recent uses and definitions of 'the cultural biography of landscapes' see the contributions in Van der Knaap & Van der Valk 2006 and Witte 2006.

decades in particular, a number of models describing settlement patterning and dynamics have been put forward. The most popular model for later prehistoric settlement site dynamics can be described as that of the 'wandering farmsteads'. Its origin and applications are discussed below.

3.3.1 The 'wandering farmstead' model

The 'wandering farmstead' model gained significant momentum since the publication of Schinkel's dissertation on the Bronze and Iron Age occupation remains from the large-scale excavations at Oss-Ussen, which had '*Zwervende Erven*' (wandering farmsteads) as it title (Schinkel 1994; 1998). As an introduction, the following quotation from his work will suffice:

> *'A settlement comprises one or more spatially related farmyards (...). As the farmyards were moved around in the sandy part of the Netherlands in the Iron Age (a custom known as Wandersiedlung in German (...)), a settlement can be defined as a territory within which one or more farmyards were moved around. This definition leads to fairly large settlements. In most cases the farmyards within a territory are diachronically related: they represent successive phases in the occupation of one or at most two farms.' (*Schinkel 1998, 26 with references to Hingley 1989, 75 and Kossack *et al.* 1984).

Two elements of his argument must be considered. First of all, the area of relevance is characterized as 'the sandy part of the Netherlands', which we can generally interpret as the Pleistocene part of the landscape (see Chapter 2). Secondly, the archaeological period in question is the Iron Age. Over time however, this 'wandering farmstead' model has been applied in Dutch archaeology to sites beyond these two boundaries of both space and time (see below). Two aspects of Schinkel's application of the 'wandering farmstead' model on the archaeology of Oss-Ussen were soon criticised (Fokkens 1998b, 2-3). The first was his notion of the settlement as a well-defined spatial topographical entity for that period. The second aspect was the extent to which archaeological resolution (dating and completeness of the excavated area) would support his seriation of individual recovered house plans into 'wandering house' sequences. Despite such critiques, the wandering farmstead model is commonly regarded as best reflecting Bronze Age settlement dynamics, which calls for a somewhat more detailed discussion of its origins and applications.

3.3.2 The 'wandering farmstead' model: tracing its origins

Some initial ideas on the mobility of Dutch later prehistoric villages, agricultural fields and graves were published by Waterbolk (1982) and Roymans & Fokkens (1991). Waterbolk used the German term '*Verlegung*' (relocation/shifting) to describe the mobility of farms in the province of Drenthe from the *La Tène* to the Medieval period (Waterbolk 1982, esp. 102-103). In Schinkel's introduction to wandering farmsteads, reference is made to a study on rural and pre-urban 5th to 11th century AD settlements in the German coastal area (Kossack *et al.* 1984; Schinkel 1998, 26). However, the examples presented by Kossack *et al.* to illustrate the wandering of the farmsteads (*cf.* Kossack 1984, 20; Zimmermann 1997, 421), originate from a wider geographical and chronological scope. They include the Roman period village near Wijster (NL, Van Es 1967), the 2nd to 5th century AD site of Hamburg-Farmsen (D, Schindler 1956, esp. 25) and the 5th to 2nd century BC site of Grøntoft-Hede (DK, Becker 1971). Kossack's comments on Hamburg-Farmsen entail all elements essential in the model of the 'wandering farmsteads':

> *'Er fand früheisenzeitliche Gruppensiedlungen verschiedener Größe und abweichender Wohndauer, deren Zeitspannen sich zwar übersnitten, die ihren Standort aber innerhalb von nicht mehr als 300 Jahren (5.-2. Jahrhundert vor Christi Geburt) unter ständigem Wechsel von Baugelände und Ackerflur mehrmals verlagerten.'* (Kossack 1984, 21).

In the same volume, Haarnagel classifies the (Bronze and) Iron Age houses and agricultural field system of the Drenthe heathland excavation at Hijken (NL, Harsema 1991) as a typical example of such wandering farmsteads (Haarnagel & Smidt 1984 with references to Harsema 1979c; 1980b, *cf.* Waterbolk 1987, 193):

> *'Als typisches Beispiel für Wandersiedlungen, also für Standortwechsel von Gehöften innerhalb der Wirtschaftsfläche, gilt der Celtic Field-Komplex von Hijken (...). Dort wurde innerhalb eines Ackers von 70 ha ein schachbrettförmiges System von rechteckigen, umzäunten Parzellen freigelegt, innerhalb derer ein Teil als Wohnplatz diente, ein anderer als Acker- oder Weideland. Nach einiger Zeit gab man den Wohnplatz wieder auf, verlegte ihn an eine andere Stelle und nahm den ehemaligen Hofplatz wieder unter Kultur.'* (Haarnagel & Smidt 1984, 216).

In their 1991 overview of Dutch Bronze Age and Early Iron Age settlements, Roymans & Fokkens stated the following:

> *'Most researchers agree on the fact that in the Bronze Age and early Iron Age large settlements, like villages, did not exist. Although often more than one house plan is present, they represent different phases of a small settlement of one to three house plans that were relocated regularly.(...) The settlements display a diffuse spatial structure; the farmyards are scattered and are mostly single-phased. This points to the fact that the farmsteads were regularly replaced, presumably after a period of c. 30 years when the principal buildings were in need of replacement. Rebuilding on the same farmyard occurred only incidentally.'* (Roymans & Fokkens 1991, 11-12, my translation)

The last sentence of this quote perhaps contains the essence of why this model has almost naturally been applied to Bronze Age settlements too; [32] it was implicitly assumed that the Dutch Bronze Age house-sites discovered prior to 1991 displayed only one building phase. However, of the 25 excavated (and published) Bronze Age settlement sites known then, only eight displayed a single Bronze Age farmhouse (see table 3.4).[33] Eight more did yield multiple house plans, which did not intersect and as such may have led to discussions on contemporaneity. The remaining nine excavations displayed at least two house plans that did overlap. Therefore, the convenient term '*Wandersiedlung*' evidently belies the complexity of the then known settlement dynamics and was used foremost as a descriptive model.[34] Quite often, the difference between the long estimated time span of occupation (occupation history) and the small numbers of farmhouses recovered were taken to be in support of this.

3.3.3 Extending the 'wandering farmstead' model

Graves and fields

Roymans and Fokkens interpreted the 'wandering' pattern of domestic architecture in conjunction with both graves and fields and considered changes over time (fig. 3.4), thus adding more spatial and temporal dimensions to the model (Roymans & Fokkens 1991, 12 fig. 7). In the Middle Bronze Age, the graves and fields generally shifted along with the houses, while in the Late Bronze Age and Early Iron Age the houses are seen as wandering around a fixed burial site; the urnfield (*op. cit.*, 12-13). The results from barrow- and urnfield research (especially calculations on social group size) were used to support the notion of the existence of ephemeral small settlements (consisting of two or three contemporary farms).[35] Obviously, assumptions on the number of persons per settlement (or farm) and the use-life of wooden farms affect the validity of such inferences (see sections 3.4.1 and 3.4.2).

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32 Additionally, ideas on Early Neolithic Linear Band Ceramic '*wanderbauerntum*' (Moddderman 1970, 208-209; Van de Velde 1979, esp. 126) may have influenced archaeologists working in later prehistoric periods.

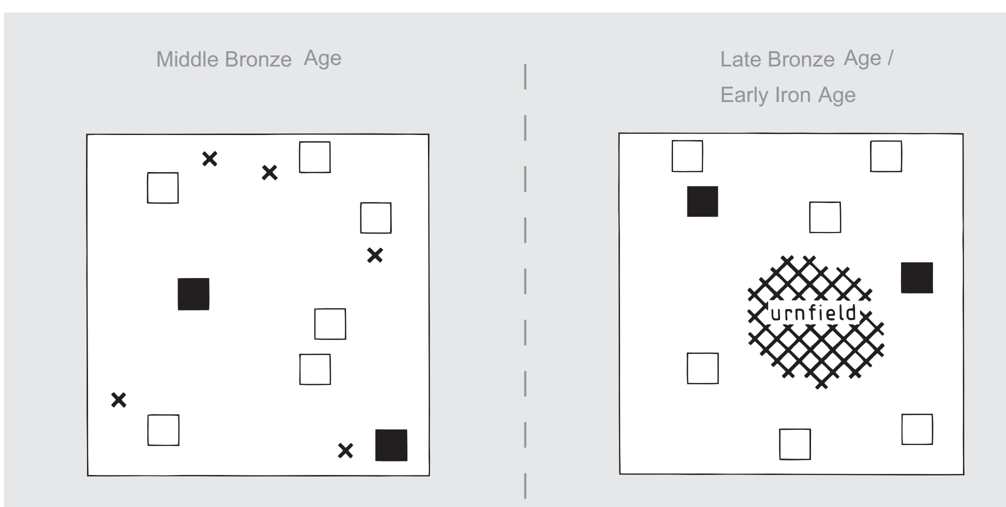
33 The houses from the settlement sites Den Dungen - Kloosterstraat (Verwers 1991) and Vasse - Tubbergen/ Zandgroeve (Verlinde & Theunissen 2001) had already been discovered, but not were not yet published.

34 Here, the term '*wandersiedlung*' is used somewhat inappropriately as a shorthand for the diffusely spaced, mostly single-phased house-sites such as described by Roymans and Fokkens (1991, 11-12). While in fact a return to former house locations (*i.e.* multiple house-site phases) is not contradictory to a '*wandersiedlung*' in more general terms (*i.e.* the periodical relocation of houses within a settlement territory) as such, I want to emphasize here that the possibilities for contemporaneity (*i.e.* more houses) and larger longevity (*i.e.* rebuilt houses) of house-sites were at that time somewhat overlooked.

35 Roymans & Fokkens 1991, 11 with references to Kooi 1979 (but see Kooi 1979, 179); Verlinde 1985, *cf.* Van Regteren Altena 1975, Klok & Van Haaff, 17; Gerritsen 1999a, 78.

Site	No. house phases	Interpretation	References
Zijderveld	1 [currently 4]	Single house plan, originally published as extended	Hulst 1967a; 1975a-b; 1991a; Theunissen & Hulst 1999b
Loon op Zand	1	Single house plan	Roymans & Hiddink 1991
Velsen - Rugbyveld	1	Single house plan	Brandt 1988a
Zwolle - Windesheim	1	Single house plan	Verlinde 1988
Nijnsel - Hazeputten	1	Single house plan	Beex & Hulst 1968
Rechteren	1 [2?]	Single house plan [possibly extended]	Verlinde 1980; 1982; 1983; Goutbeek & Verlinde 1989
Emmen	1 [2]	Single MBA and single LBA house	Drenth 1988
Deventer - Margijnen Enk	3	Multiple house plans, not overlapping	Modderman 1955a
Colmschate	> 5	Multiple house plans, not overlapping	Verlinde 1991a; 2000
Hoogkarspel - Watertoren	5	Multiple house plans, not overlapping	Bakker 1959; 1966; *et al.* 1977
Oss - Ussen	2 [3?]	Multiple house plans, not overlapping	Vasbinder & Fokkens 1984; Fokkens 1991; in prep.
Medemblik - Schuitenvoerderslaan	2	Multiple house plans, not overlapping	Slofstra 1970
Texel - Den Burg	7	Multiple house plans, some overlapping, extended or rebuilt	Woltering 1975; 1979;1991; 1997; 2000
Wijk bij Duurstede - De Horden	12	Multiple house plans, one overlapping, possibly two	Letterlé 1981; Hessing 1991
Elp	13	Multiple house plans, multiple overlap	Waterbolk 1964; 1987
Angelslo - Emmerhout	*c.* 23	Multiple house plans, multiple overlap, some extended	Van der Waals 1967; Van der Waals & Butler 1976
Dodewaard	3 [4?]	Multiple house plans, one rebuilt, possibly twice	Hulst 1967b; 1970; 1971b; 1991a; Theunissen & Hulst 1999a
Hijken	9	Multiple house plans, one overlapping	Harsema 1991
Andijk & Bovenkarspel	*c.* 200	Multiple house plans, various extended and/or overbuilt	IJzereef 1981; 1989; IJzereef & Van Regteren Altena 1991
Hoogkarspel - Medemblikker Tolhuis	11	Multiple house plans, one rebuilt	Bakker & Brandt 1966; Bakker & Metz 1967; Bakker *et al.* 1968
Velsen - Velserbroekpolder	3	Multiple house plans, one with two phases	Beemster & Brandt 1986; Therkorn 1987b; Bosman & Soonius 1990

Table 3.4 Numbers of house-phases and their interrelations for Bronze Age settlement sites excavated and published by 1991.

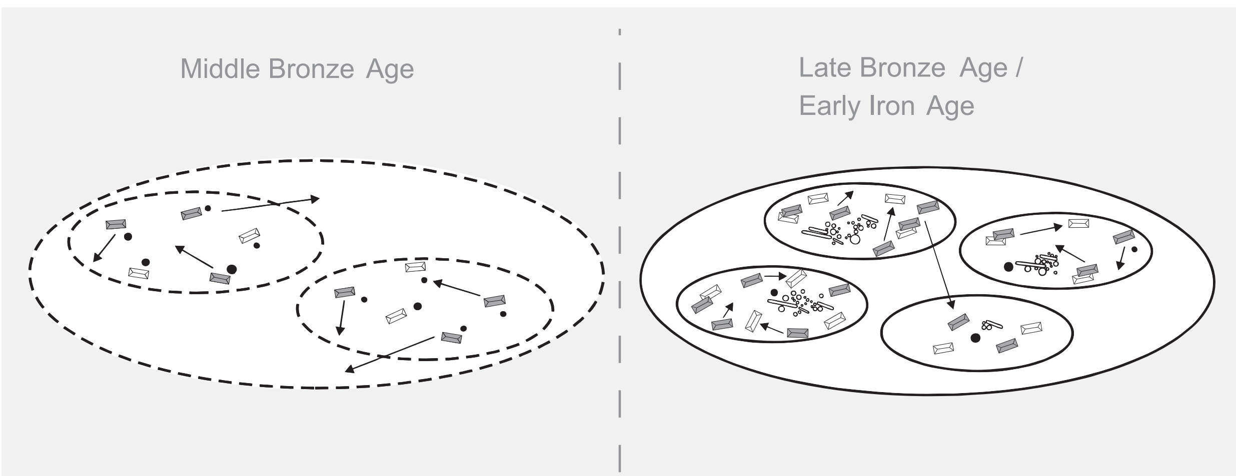


Contemporary farmsteads (filled squares) which periodically (generationally) change location. No fixed funerary site; crosses indicate some isolated barrows. Open squares indicate farmsteads from other phases.

Contemporary farmsteads (filled squares) which periodically (generationally) change location, while the funerary location remains fixed. Open squares indicate farmsteads from other phases.

Fig. 3.4 Roymans & Fokkens' 1991 Model (after Roymans & Fokkens 1991, 12 fig. 7).

In 1999, Roymans and Kortlang published a slightly revised version of this model (fig. 3.5). The main differences are the fact that they assume that in the Middle Bronze Age barrows are situated next to the houses and that they put a stronger emphasis on the concept of territoriality.[36] Middle Bronze Age territories, according to them, were less sharply defined, the relations between the families inhabiting the more separated farmsteads were less close and individual households had a greater autonomy in the management of the land which was cultivated in small, dispersed plots (Roymans & Kortlang 1999, 51). They propose that from the Late Bronze Age onwards, the fixed and communal nature of the urnfield, the emergence of 'Celtic-field' agriculture and the larger number of farmsteads situated next to the urnfield (and within the fields) points towards a more territorial approach to landscape usage (*op. cit.*, 52-53). A reconstructed population increase (as documented by the increase of funerary sites (Middle Bronze Age isolated or small groups of barrows versus numerous and extensive urnfields)) in the Southern Netherlands is seen as the driving force behind these changes (Roymans & Kortlang 1999, 38-40 fig. 2, *cf.* section 8.3.2).



Filled grey houses represent farmsteads that shift location after some time. Filled black circles represent a household's barrow, situated near the farmhouse. Open houses represent farmsteads from earlier phases. Local group territories (enclosing ovals) are relatively large and weakly defined.

Filled grey houses represent farmsteads that shift location after some time. Open houses represent farmsteads from earlier phases. Filled black circles represent older barrows, the other geometric shapes represent urnfield graves. The urnfield formed the fixed collective cemetery of a local group. Local group territories (enclosing ovals) are smaller and more fixed.

Fig. 3.5 Model of the territorial organisation by Roymans & Kortlang (1999; after Roymans & Kortlang 1999, 52 fig. 10).

Local communities

In accordance with the critique on the spatial dimensions of 'settlements' for this period as knowable (*supra*), the concept of the 'local community' as a research topic was introduced.[37] A 'local community' is a social group that is defined by the fact that it shares ideas on common myths, history, makes use of the same grave fields and ritual places, cooperates in harvesting, building graves, houses or the reclamation of new stretches of forest *et cetera*. In general, it is a socially related group that wanders in and works the same landscape.[38] The benefit of this approach for Bronze Age settlement studies as put forward by Fokkens is as follows:

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36 Roymans & Kortlang 1999, 38-39; 50-52. On territoriality see Kooi 1979, 149-179; Waterbolk 1987, 191-215; Fokkens 1998a, 86-89; Meijlink 2002b, 762-787; 798-810; Gerritsen 2003, 115-116.

37 See section 3.4.1 and Fokkens 1998b, 3, reference to Fokkens 1996, esp. 209; *cf.* Gerritsen 2003; 2005.

38 Fokkens 1996, 209; Fokkens 1999, 31; Theunissen 1999, 212; Fontijn 2003, 241; 273; Gerritsen 2003, 109-115, *cf.* Agorash (1985), who described the Ghanese core minor family groups (*mbuno*, singular *kabuno*) as units '… each of which has a male head and its own residential area, ancestral shrine, land, and inter- and intra-village relationships. (…) Membership in society is determined by membership in a kabuno, which includes not only the living but also, and primarily, the dead. Traditionally, kabuno members are required to live around the ancestral shrine, usually located in the kabuno head's house.' (Agorash 1985, 104).

> *'Analysing settlements and landscapes from this perspective comprises not only spatial and economic, but also ideological aspects of dwelling and farming. Moreover, it concerns not only the living, but also their relations with their ancestors and the supernatural.'* (Fokkens 1999, 31).

So instead of using a (physically or symbolically) narrow-defined settlement concept, the various phenomena that leave physical (archaeological) remains (*e.g.* houses, graves, cult places) in the landscape are interpreted as reflecting (the knowable) part of the 'space' of a local community. Members of such a local community evidently felt related and may have lived close together (and may even have used physical structures such as ditches, fences, palisades *et cetera* to materialize their 'community (*e.g.* village, kin group or household?) boundary', but they need not to have done so).

In addition to that, Gerritsen (2003, 111-112) has rightly stressed that such communities are ambiguous, flexible and relational, meaning that communities are primarily defined in relation to more general or specific 'others' (Cohen 1985, esp. 12). Moreover, local communities may be fluid, negotiable and overlapping entities. Burial communities may have differed in their behaviour and composition from cultic communities, that will in their turn have differed from agricultural or martial communities (*cf.* Gerritsen 2003, 145; 164-165; 191). Depending on the context, different group affiliations will have been expressed in behaviour and material culture. Bronze Age farmers may have been part of an agricultural local community for most of their time, take on warrior roles only when appropriate or when they are forced to do so and acted as part of cultic communities only very rarely.[39] This is hardly different from the different behaviours (*rôles*) and material culture (*e.g.* outfits) used in present-day society depending on our role as office professional, parent, supporter or sportsman, possibly all occurring within a single day. This indicates that local communities are perhaps best not regarded as singular entities and that when talking of local communities in an archaeological sense, one has to specify what kind of group membership (burial community, cult community *et cetera*) is implied. Bronze Age people may very well have felt part of many local communities (Gerritsen 2003).

Although such an approach to studying 'local communities' presumably ties in better with past realities (and keeps possibly misleading or even incorrect use of the term 'settlement' at bay), it will not help at all to inform us on the physical and spatial properties of a specific element of these local communities: the patterning of their house-sites. Often, both the scale of excavation and the resolution of dating techniques limit us at this point. But even if one is lucky enough to date several houses at a certain distance (whether it be 3, 30 or 300 m) to exactly the same year (subduing discussions on contemporaneity), what will inform us on the sense of 'being part of a (which !?) local community' of the inhabitants? This example serves to illustrate that the level on which the elements defining a 'local community' are studied, transcends that of the study of house-sites and probably also that of the settlement site.

Theunissen (1999, 212) has tried to apply this concept of a 'local community' to settlement analysis of later prehistoric societies:

> *'Based on settlement evidence, a local community is defined as the group of occupants of a small number of byre-houses. It appears to entail a small neighbourhood consisting of a few farmhouses that lay several hundreds of metres apart.'*(Theunissen 1999, 212, my translation).

Theunissen acknowledges that ascertaining contemporaneity of the farmsteads is important as well as highly complicated. According to her, the often large distances (minimally 100 m) between contemporaneous farmsteads in the southern Low Countries complicate their association even further (Theunissen 1999, 113, but see also section 6.5).

This remarkable statement on the (minimum!) distance is presumably based on her analysis of various settlement variables (like distance between farmsteads) for three Bronze Age 'culture groups' (Theunissen 1999, 192 table 4.12). According to Theunissen, the average distance between two house-sites or between two phases of a

39 Such a partible (or part-time; *cf.* Brück 2005, 142) nature of different social roles seems, for instance, a more plausible approach to Bronze Age martiality (*cf.* Fontijn 2003, 224-232; Brück 2004b, 310) than assuming full-time social warrior classes (*e.g.* Kristiansen 1984, 203; 2007, fig. 2; Earle 2002, 305; Kristiansen & Larsson 2005, 218; 246). See section 8.2.3.2 for a discussion.

wandering house-site, is *c.* 300 m on the southern sandy soils and in the river area *c.* 100 m (Theunissen 1999, 212-213). The Bronze Age sites used in her study, however, may provide a more variable viewpoint.

The three sites from the southern sandy soils yielding more than one house plan or farmyard were Oss-Ussen – for which Schinkel is rightly very hesitant to postulate contemporaneity (Schinkel 1998, 36) –, Geldrop (the distance between assumed contemporaneous farmsteads is 325 m (Theunissen 1999, 194 with reference to Wesdorp 1997)) and perhaps Maldegem-Burkel, where two or three possible – partially excavated or preserved – house plans were found at 2 to 14 m apart (Crombé & Bourgeois 1993, 46; Crombé *et al.* 2005). In the river area the excavation of Dodewaard displays two (possibly or presumably) contemporary house plans as close as 16 m apart (Theunissen 1999, 143; 155). For Wijk bij Duurstede this was as close as 30 m apart (Hessing 1985, 17 fig. 9; 1991, 43).

The data above seem to suggest that Bronze Age settlement sites with houses at much closer distances than the '100 m minimally' as suggested by Theunissen (1999, 212-213) are present. Clearly, establishing the spatial and chronological properties of local communities based on (the distribution of) their house-sites remains quite complicated (see section 6.5; table 6.2, *cf.* Gerritsen 2003, 58).

Landscape characteristics

Generally, local characteristics of the landscape have only played a marginal role in the 'wandering farmstead' model. Perhaps this is implicitly related to the dominance of the Bronze Age excavations from the Dutch Pleistocene soils, whose vast, undifferentiated coversand plains have possibly almost subconsciously (yet erroneously) been interpreted as being void of the topographical characteristics like slopes, streams and marshes that formed an innate part of them. The differences in Bronze Age settlement dynamics as attested by Theunissen are discussed for (and found between) five large geogenetic regions of the Netherlands (Theunissen 1999, 192-197, *cf.* Arnoldussen & Fokkens 2008, 19 fig. 3).[40] The settlement parameters explicitly stated by Theunissen are the frequency of wandering, the distance between contemporary house-sites and the degree to which the later house-sites returned to former domestic sites (Theunissen 1999, 197). Although Theunissen succeeds well in accounting for the (local geological and geomorphogenetical) complexity of the landscape within these regions, only the value of the parameters involved are changed between these five larger regions, still implying an overall validity of the mechanisms underlying the 'wandering farmstead' model.

A more differentiated model for Bronze Age settlements within one such region (the Northeast Netherlands sandy soils) was put forward by Verlinde (2000, 35-38; 51-60). He distinguishes the presence of two main types of settlements from the Bronze Age onwards; 'core settlements' (NL: *kernnederzettingen*) and 'wander-farmsteads' (NL: *zwerferven*) (Verlinde 2000, 35-37). The first are located on the fringes of substantially larger coversand ridges (interpreted as being steered by demand for large areas of arable) and are thought to yield more house plans (although no discussion is presented on their contemporaneity) and are thought to have been in existence for a longer period of time (Verlinde 2000, esp. 35-38; 59). The latter are situated on much smaller patches of coversand elevations and consist of single house-sites (Verlinde 2000, 37).

For Bronze Age occupation in the river area too, a comparable – landscape specific – settlement model has been put forward (fig. 3.6; Jongste 2002b, 613-621). This model is used to describe the different settlement site patterns of the 'Eigenblok' (Jongste & Van Wijngaarden 2002) and the 'De Bogen' (Meijlink & Kranendonk 2002) excavations (Chapter 4). Jongste also assumes the presence of two types of settlements within a single larger region. These are 'core settlement sites', larger settlement sites with continuous occupation – and displaying sequences of overbuilt houses – and 'smaller settlement sites' – lacking overbuilt houses – where 'wandering farmsteads' are to be found (Jongste 2002b, 217 fig. 11.9).

The role of the funerary sites in the graphical depiction of the model is ambiguous. It is certain that both types of sites (core settlement sites: 'De Bogen', smaller settlement sites: 'Eigenblok') on which the model is based once comprised an (older) burial mound.[41] The model does, however, leave room to assume that the presence of a burial mound was preferred or even essential for the construction of Bronze Age house-sites. The notion that the

40 Regions used by Theunissen (1999, 192-197): south Netherlands sandy soils, the river clay area, the northeast Netherlands sandy soils, the West-Frisian estuary (inverted creek deposits) and the sand dunes of the western Netherlands.

41 See sections 4.3.5 and 4.4.3; Hielkema, Prangsma & Jongste 2002, 137; 157-159; Hielkema, Brokke & Meijlink 2002, 206-236.

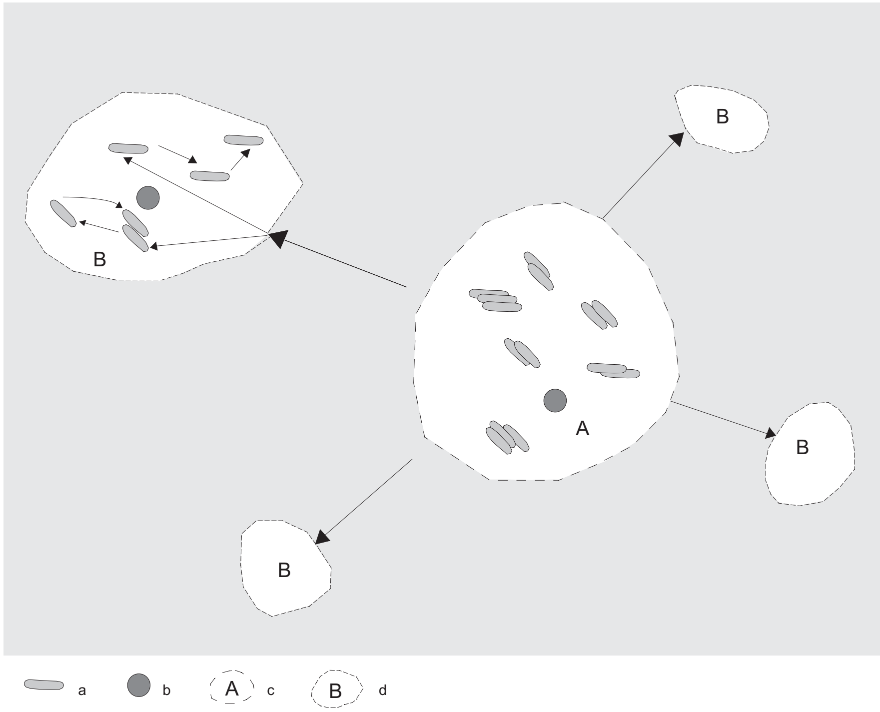

Fig. 3.6 Model for the Middle Bronze Age settlements in the Dutch river area (after Jongste 2002, 617 fig. 11.9).
a: houses, b: barrows, c: settlement site with continuous occupation, d: settlement site with wandering farmsteads.

presence of (older) burial mounds may have been crucial in Bronze Age settlement dynamics has been voiced earlier by Harsema (1982, 156) and Kolen (1999). Kolen (1999; 2005, 145) argues that older barrows were not only used for later Bronze Age burials, but that these were sometimes even ‘incorporated’ into (or at least showed a ‘spatial association’ to) ‘farmsteads’. Starting from these observations, he assumes that possibly these older barrows may be central to the attractiveness of the location for Bronze Age occupation.[42] At this point, he encroaches upon the more social explanations of Bronze (and Iron) Age settlement dynamics like those forwarded by Gerritsen (1999b; 2003).

Social aspects; biographies of houses and households
Gerritsen (2003) has argued that based on anthropological studies of ‘House societies’ (*sensu* Lévi-Strauss 1984; 1991) in Madagascar, Kenya, New Ireland and Cameroon, there is sufficient evidence to postulate that: [43]

> *‘In many societies a structural and dynamic relationship can indeed be distinguished between the domestic circle of a household and the house it inhabits.’* (Gerritsen 2003, 36).

Inspired by the concept of ‘the cultural biography of things’ (see above), he entwines the life cycle of the household with that of the house (fig. 3.7).[44] In this model, domestic social events such as marriage and death, rather than soil-depletion or the durability of construction wood, are seen as the main driving force behind the wandering of later prehistoric farmsteads. According to Gerritsen, this entwining of life cycles is reflected archaeologically by the high number of single-phased house plans, the evidence of modifications of the houses over time and in special deposits made within (postholes of) the house (Gerritsen 1999a; 2003, 31-108, but see also section 3.4.3).

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42 Kolen 1999; 2005, 145; 149, *cf.* Harsema 1982, 156 but see also Bourgeois & Arnoldussen 2006; Bourgeois & Fontijn 2008.
43 Madagascar: Bloch 1995, Kenya: Moore 1986, New Ireland: Küchler 1987; 1993, Cameroon: Van Beek 1986; 1991.
44 As had also already been suggested by Goody (1958b, 80), Moore (1986, 91), Horne (1994, 186), several contributions in Carsten & Hugh-Jones (1995) and Brück (1999b, 149). See also Waterson 2003, esp. 40.

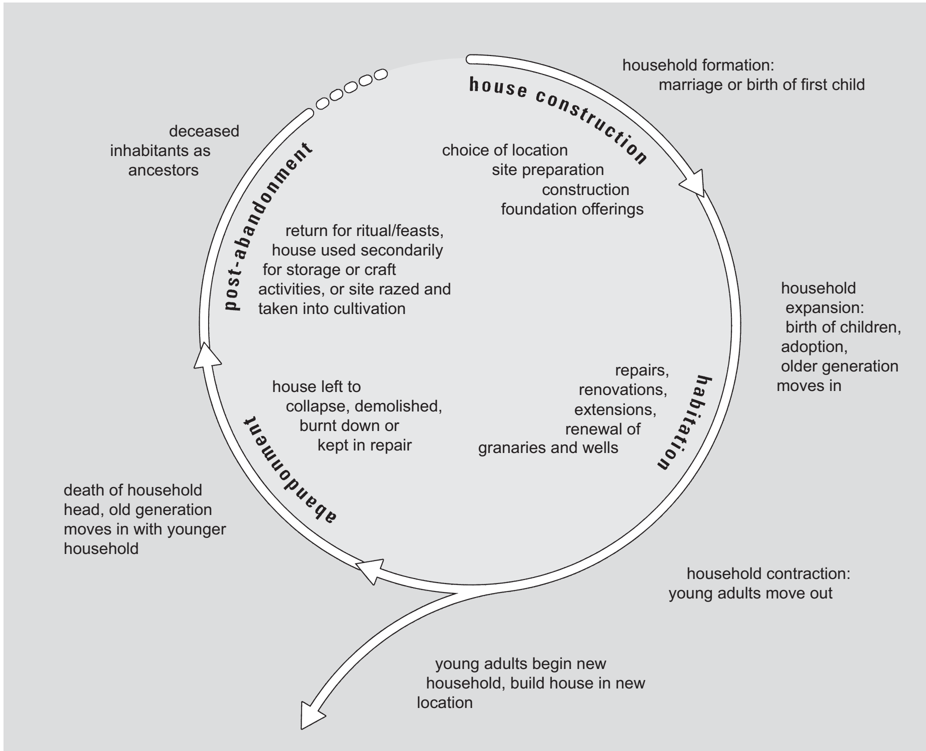

Fig. 3.7 Potential cultural biography of a single-phase farmstead, based on the assumption that the life-span of a house corresponds to the life cycle of a household (from Gerritsen 2003, 40 fig. 3.1).

3.3.4 Models for settlement dynamics: a conclusion

Descriptive models

An important aspect of the models for Bronze Age settlement dynamics introduced above is the fact that these are predominantly descriptive models (*i.e.* a simplified visual representation of archaeologically documented patterns). This means that several important aspects are unclear, of which causality, representativeness and scale (and to a lesser extent periodization and regionality) are the most salient.

For instance, barrows are part of all Middle Bronze Age phases of the models by Roymans & Fokkens, Roymans & Kortlang and Jongste (figs. 3.4-3.6). However, their presence in relation to houses can be interpreted as ‘isolated/wandering with farmsteads’, ‘one per house’ and ‘one per settlement site’ respectively. The fact that barrows are generally only seldom encountered on Bronze Age settlement sites and seem frequently to pre-date the Middle Bronze Age(-B) occupation phase indicates that this relationship must have been much less frequent and less causal in prehistory.[45]

As a second example, consider the number of coeval houses in the different models. Again these differ between ‘two’, ‘three’ to ‘unspecified’ in the models by Roymans and Fokkens, Roymans and Kortlang, and Jongste (figs. 3.4-3.6). Neither does unity exist on the distances of assumed periodical relocations. According to Roymans & Fokkens, relocation took place within the same settlement site (1991, 12), whereas Roymans & Kortlang (1999, 52) suggest that relocations occurred within the ‘local group territory’. In both models, relocation is reflected by the exclusive occurrence of single-phased house-sites. In Jongste’s (2002b, 617) model settlement sites with continuous occupation (as reflected by house-sites with multiple house-phases) as well as with ‘wandering farmsteads’ occur

45 *E.g.* Bourgeois & Arnoldussen 2006; Bourgeois & Fontijn 2007, *cf.* Cherretté & Bourgeois 2005, 259.

within the same 'region'. Note that the spatial extent within which these processes are thought to have take place is ill-defined in all cases. Essentially, the relative frequency of relocation and the distances involved (let alone possible motives) are far from clear.

A final observation is that generally the models do not reflect or account for chronological or regional differentiation. The 1991 model is national in scope, the 1999 model implicitly applies to the southern Netherlands, whereas only the 2002 model was compiled for a specific region; the Dutch river area. Possibly, quite different models are likely to apply to other areas, such as for instance in the north(eastern)-Netherlands where farmhouse extending was a current phenomenon (section 5.2.3.3, esp. fig. 5.22). Neither do these models sufficiently stress the fact that it is predominantly the Middle Bronze Age-B data on which they are based, as Middle Bronze Age-A (and early Late Bronze Age, for that matter) settlement sites are far fewer in number and less well understood. Evidently, pictorial simplifications cannot but belie the particularities of past prehistoric settlement dynamics, that are perhaps better served by less (pictorial) simplification and more extensive discussion within detailed regional and chronological frameworks (*cf.* section 7.3.6).

Useful models?

Despite the pitfalls and limitations inherent to the models as discussed in the paragraphs above, the discussed models have nonetheless retained important usefulness. Besides offering interpretational frameworks, they can also be used to compile testable hypotheses. It is especially this latter use of such models that has thus far been neglected. Models are frequently 'applied' to sites, rather than that settlement site data are used specifically to test or refute propositions derived from them. This is precisely one of the goals of the present study.

For instance, the 'wandering farmstead' model predicts that house-sites show only one phase of occupation (but see table 3.4 and Chapter 5, table 5.6). The models by Roymans and Kortlang and that of Jongste may suggest that Middle Bronze Age barrows were preferably or invariably placed near Middle Bronze Age houses (yet see Bourgeois & Arnoldussen 2006; Bourgeois & Fontijn 2007). Gerritsen's model (fig. 3.7) suggests that foundation deposits were common markers of the start of house biographies (but see section 3.4.3). If such models and the premises on which these are based are critically assessed (*infra*), they may steer important questions about settlement dynamics.

3.4 Premises in settlement archaeology

The models current in the settlement archaeology of later prehistoric communities rely on several widespread but infrequently explicitly discussed assumptions, such as those on social group size, household dynamics, wood durability and soil-depletion. As these have all been forwarded as (partial) elements in explanations of domestic mobility (see above), a brief discussion of them is merited here.

3.4.1 Farmhouse occupants and social group size

As we will see, archaeologists have used three main strands of circumstantial evidence to arrive at educated guesses for occupant group sizes (table 3.5). The first of these are cross-cultural studies on the mean space available per occupant. The classic example is Narroll's (1962) study of the relation between settlement population and cumulative floor areas and later refinements and critiques.[46] Perhaps somewhat inappropriately, his observed correlation entered studies of (post)neolithic households in North-Western Europe as a 'one occupant per ten square meters' rule of thumb (*e.g.* Bakels 1978, 143-145; Van de Velde 1979, 129).[47] With mean Bronze Age house dimensions of 20 by 6 m (see section 5.2.3.4), this would lead to estimates between 12 (Naroll 1962, 588), 17 (Cook 1972, 16) and 19 (Casselberry 1974, 121) 'mean' persons per house. If one subtracts some surface area to allow for indoor stalling of livestock during the Middle Bronze Age-B (Fokkens 1998a, 115; 137), estimates of 10 to 15 persons seem reasonable. Yet while being *plausible* numbers, they are no more than just that.

46 LeBlanc 1971; Cook 1972; Casselberry 1974; Read 1978; Wilk 1983, esp. 101.

47 The use of the label 'inappropriate' concerns the factor of scale. Naroll (1962, 588 table 1) used cumulative floor spaces at scales of hundred to hundred thousand square metres (*cf.* Casselberry 1974, 119 table 3). He clearly did not intend usage of 10 square meters as a counting threshold value for occupant numbers.

nos.	argumentation	reference
10- >20	estimates, correlated to size	Fokkens 1997, 365; 1998b, 115; 137; 2003, 23
8-12	estimate, correlated to size	Theunissen 1999, 113; 212
6	analogy with Late Medieval periods	Verlinde 1985, 396 (15th century AD village of Voorst)
8-16	analogy Late Medieval census	Harsema 1980a, 18-19; 1980b, 94 (17th century AD village of Rolde)
5-6	(sub)Modern census	Bieleman 1987, 59; 67 (1630 AD census of dingspel Beilen)
5-6	(sub)Modern census	Berkner 1972, 400 (1763 AD census of 36 Austrian villages)
6-8	(sub)Modern census	Schlumbohm 1995, 200 (1772-1858 AD Osnabrück census)

Table 3.5 Estimates and possible analogies for BA household sizes.

The second line of enquiry uses census data for Late Medieval and (sub)historic period farmhouses to estimate household size. For example, the mean figure of six occupants for a Bronze Age farmhouse as offered by Verlinde (1985, 496) is ultimately based on 15th century AD census data of the village of Voorst.[48] Likewise, Harsema's estimate of 6-10 occupants for Bronze Age farmhouses is based on 1630 AD census information (Harsema 1980a, 18-19).

The third option is to speculate on the 'nutritional capacity' of households based on reconstructions of their subsistence base and number of cattle stalls visible in byres. Quite indirectly, the six-person (Roman period) agricultural household as forwarded by Bloemers (1978, 55) is ultimately based on such argumentation.[49]

These three approaches may be criticised for their snap-shot conception of household size and for their lack of attention to cycles or patterns in the development of households.[50] However, research by Berkner (1972, esp. 417) has shown that mean household size may be relatively stable in cases where fixed farmhouse sizes, fixed labour requirements and stem family organisation were in play. Based on anthropological observations, it has been suggested as well that family structure may be tailored to meet the labour requirements of the agricultural systems at hand (Denyer 1978, 18).[51] Essentially, the composition and number of people to have occupied a Bronze Age farmhouse is unknown and is very likely to remain so.

nos.	argumentation	reference
3-4 families	… estimate MBA	Roymans & Fokkens 1991, 13; 16
16-36 persons	… estimate MBA	Theunissen 1999, 212
20-40 persons	… estimate (occupants two houses)	Fokkens 2002, 139
12-50 persons	Analogy Late Medieval census	Harsema 1980b, 94 (17th century AD village of Rolde)
6-23 persons	Acsádi & Nemerski 1970	Kooi 1979, 174 (LBA urnfields northern Netherlands)
6-20 persons	Acsádi & Nemerski 1970	Verlinde 1985, 395-396 (LBA urnfields eastern Netherlands)
15-50 persons	Acsádi & Nemerski 1970	Gerritsen 2003, 146; 2004 (LBA urnfields southern Netherlands)
5-20 (50) persons	…estimate MBA	Brun & Pion 1992, 120 (French Aisne valley)
c. 25 persons	…estimate BA	Bewley 2003, 84 (Bronze Age Dartmoor)

Table 3.6 Estimates of BA local group sizes.

48 Verlinde (1985, 396) refers to Heidinga (1984, 196-197) who refers to Slicher van Bath (1964, 26-27) who uses census information on the 15th century AD village of Voorst.

49 Bloemers (1978, 55) refers to Jankuhn (1976, 288-291) who refers to Abel (1967, 22-28) who bases himself on caloric value yielded by cattle that could be stalled in the Roman period houses discovered at Feddersen Wierde and Buckigau.

50 On household dynamics and composition(s) see Berkner 1972, esp. 405-410; Burch 1979, esp. 176-178; Janssens 1993, 50-57; Gerritsen 2003, 35, *cf.* Goody 1958, esp. 4-5. See also Agorash (1985, 104) who observes that only 21 % of the Ghanese Nchumuru households consist of members that regularly eat and sleep in the house.

51 Denyer (*loc. cit.*) states that the continuous but small labour requirement of sedentary farmers is often tiered with nuclear families, while the larger, but for shorter time necessary, labour force of shifting cultivators is positively correlated to extended families (*cf.* Netting 1965).

The size of local communities?

At a higher level, the estimates on the number of people forming a local community, regardless of how many people inhabited a house, vary (generally between 10-30 persons, see table 3.6), yet it seems more important to investigate how this group defined their communal identity (and how this may be archaeologically visible), rather than to speculate on exact group size.[52]

Generally, cooperation in the execution of social and agricultural tasks forms the defining trait of social units at the first level above that of individual households.[53] As many (sub)modern historic references to such social clusters (frequently called neighbourhoods) exist, the comparability in subsistence base, low technological nature and low social complexity of the former may allow some comparison to prehistoric local communities.[54] Insights into the degrees of such social interweaving and interdependence may be glanced from a quote by Glassie, who discusses notions of justice in an Ulster agrarian local community:

> *'(...) the District's people class lying, theft, and murder together.' (...) Neighbors cooperate. Cooperation requires accurate communication. The community is founded on truth. A lie is an act of contempt and withdrawal, a theft of honour from individuals and order from society. In a neighborhood, compact and socially intense, all things have known owners. Theft is not the illicit appropriation of property, it is – like ridicule – a direct attack made upon a known individual. In a scene of material scarcity, where all artefacts are in some measure tools, stealing removes the means to gain a livelihood and pursue the happy life. The thief is death's ally.'* (Glassie 1982, 144-145).

Small-scale agrarian local communities are dynamic entities in both space and time, temporarily defined and redefined by the participants involved and the tasks at hand. Yet they are by no means contingent, as the security of being able to rely on the help of neighbours in times of high work-load as well as scarcity form – and formed – the veritable base or foundation of agricultural strategies (*cf.* Wahab 1996). Crop yields and animal products cannot but come second. This is again all captured by Glassie:

> *'The fundamental contract is established between (...) those who live near one another – the neighbors. But a neighbor is more than one who lives nearby. Neighbors are those with whom you work, those who can be trusted to help. And the proper behaviour of a relative is framed on the model of the good neighbor. Friends should help in times of need. "Your neighbor forenenst your friend." Community is not a thing of territory or law or blood. It is not predestined. (...) these people cannot count on their families for help, and they have no name for their place. "Our district of the country" shifts, forming and reforming itself through endless negotiation during ceili and work. Here is a challenge: community is the product not of tradition but of personal responsibility, yours to build or to destroy.'* (Glassie 1982, 583).

Evidently, these quotes indicate both the flexibility and necessity of local communities beyond the mere occupants of a house. The size and composition of them largely escape us, but this does not mean that the social dynamics of local communities may be ignored or overlooked in settlement studies. For instance, with the quotes above by Glassie in mind, the concept of single farm settlements (D: '*Einzelhof*', SE: '*Ensamgård*') should perhaps not be taken too

52 *E.g.* 10-30 persons (Gerritsen 2003, 100), 'a few dozen' (Gerritsen 2003, 112), 'three to six households' (Roymans & Kortlang 1999, 36), 'maximum of two farms' (Fokkens 2002, 139).

53 *Supra* and Theunissen 1999, 21; 212; Canuto & Yaeger 2000, esp. 124; 129; 137; Gerritsen 2003, esp. 111-115; 2004, esp. 142. *Cf.* Wahab 1996, 45; 91 and see Bewley (2003, 83-84) on the Welsh *trefgordd*, which was defined legally as 'nine houses and one plough and one oven, and one churn and one cock and one bull and one herdsman', outlining the importance of cooperation.

54 For examples of the expression (and necessity) of close-knit neighbourhood groups in sub-Modern Dutch agricultural societies see for instance Blink 1902, 21; Edelman 1943b, 52-53; 353-356; 371; Slicher van Bath 1944, 37; Elemans 1958, 245; Bieleman 1987, 19; references in Hospers & Van Lochem 2002.

literally.[55] No man in prehistory could afford to be on an island, and neighbours should be situated at distances where help could still be effectively offered.[56]

3.4.2 Wood durability

On the longevity of wood used on Bronze Age house-sites

As already outlined above (section 1.4), a common explanation for the periodical relocation of Bronze Age house-sites is the idea that the durability of the construction wood used would have been a limiting factor. Furthermore, the assumed use life of prehistoric houses is frequently used in calculations on the number of coeval house(-site)s.[57] Consequently, it is important to investigate on what grounds estimates of wood durability (and the house-phase duration frequently linked to it) have been based. Allowing for different species of wood and thicknesses of the posts involved, between 10 to 40 years has been suggested to be a reasonable estimate (table 3.7).[58]

durability	argumentation	reference
< 5-50 yrs	experiments TNO, different species & conditions	Bakels 1978, 82 table 6 (ref. to Anonymous 1972)
c. 40 yrs	analogy Trelleborg Viking house	Van der Sanden 1981, note 36
20-25 yrs	Roman period farms direct dates; Bakels 1978	Brinkkemper 1992, 43 table 7
max 35 yrs	estimate for Iron Age farms	Therkorn 1987a, 219
15-20	estimate alder and willow posts	IJzereef 1988, 643
2-26	Purslow 1976, alder, different sizes and shapes	IJzereef & Van Regteren Altena 1991, 74-76
2-24	Purslow 1976, willow, different sizes and shapes	IJzereef & Van Regteren Altena 1991, 74-76
c. 60 yr	oak, c.15 cm, estimate based on Purslow 1976	IJzereef & Van Regteren Altena 1991, 74-76
mean 25 yrs	estimate	Verlinde 1991b, 34
20-40 yrs	estimate	Harsema 1993b, 106
25-30 yrs	(Brinkkemper & Bakels; *supra*)	Schinkel 1994, 27
mean 25 yrs	(Brinkkemper & Bakels; *supra*)	Fokkens 1996, 212
40 yrs or longer	(IJzereef & Van Regteren Altena *supra*) and observations on reconstructed houses	Fokkens 2002, 135
4-56 yrs	experiments, different species 5 by 5 cm stakes	Smith & Orsler 1996
mean 25 yrs	estimate	Verlinde 2002,
mean 25 yrs	estimate	Meijlink 2002b, 803
25-30 yrs	(Brinkkemper & Bakels; *supra*)	Jongste 2002b, 598
> 50 yrs	direct archaeological observations (wood dated)	Arnoldussen, *infra*

Table 3.7 Estimates of wood durability, especially in relation to Bronze Age farmhouses.

The different parameters affecting wood durability are depicted in fig. 3.8. As many of these factors are dependent on local conditions and cultural choices, only some experimental results can be quoted here. Unsheltered oak posts in moist soils are likely to last 10-25 years, while placed in dry soils figures up to 50 years are possible (Brinkkemper 1991, 42 with ref. to Bakels 1978). Alder and willow posts are thought to have lasted somewhat shorter, in the order of 6-20 years if placed in dry subsoils (*ibid.*; Theunissen 1999, 156). If placed in moist soils, the durability of willow posts may be confined to no more than 5 years (*ibid.*, with ref. to Barker 1977, 86). The results of the BRE experiments indicate that unsheltered, half-buried, *c.* 60 long and 5 by 5 cm stakes of different species last between 3.9 (mean) and 6 (maximum) years for alder, between 4 (mean) and 9 (max.) for ash, between 4.5 (mean) to 10 (max.) for elm, between 5.5 (mean) to 13 (max.) years for willow and between 26.8 (mean) to over 56 years (max.) for oak (Smith & Orsler 1996, tables 4-6).

55 Hendrikx (1989, 58 with reference to Kortlang 1987) also stresses the fact that historical (11th century AD) single-farm settlements depended heavily on the amount of labour that could be summoned.

56 Wahab's study of modern Javanese farmers shows that in five of six well documented cases, starting farming households could not cope without the help (land-use, seed, livestock) offered by kinsmen and neighbours (Wahab 1996, 56-58; 110; 130-131; 165; 185).

57 *E.g.* IJzereef 1981, 178; Van der Sanden 1981, 326; Roymans 1990, 180; Hiddink 2000, 14; 72; Dautzenberg, De Koning & Vaars 2003, 70, *cf.* De Hingh 2000, 34.

58 Purslow 1976; Bakels 1978, 79-82; Van Regteren Altena *et al.* 1980, 31; IJzereef & Van Regteren Altena 1991, 74; Brinkkemper 1993, 43; Schinkel 1998, 27; Louwe Kooijmans 1998, 335, but see also below and Zimmermann 1998, 50-63; 2006; Dinwoodie 2000, 211 table 8.1.

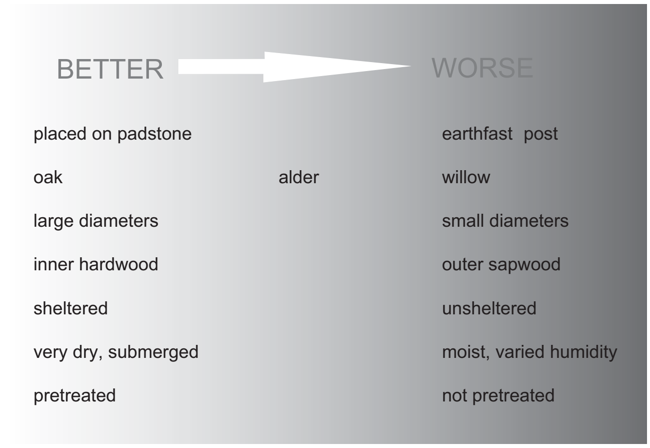

Fig. 3.8 Parameters affecting wood durability.

The figures for durability quoted above (esp. table 3.8) may give some approximation as to the generic life-span of construction wood,[59] but it should be stressed that wooden constructions with much more prolonged use-life are known from historic[60] and anthropological studies.[61] For other constructional elements, such as unprotected wattle-work or thatching, different figures apply.[62] Besides such considerations, some additional points need to be kept in mind.

The first is that the experiments on which estimates for the use-life of construction wood are often based, have usually been conducted 'out in the open' (Clarke & Boswell 1976; Smith & Orsler 1996, 2-3, but see also Adam 1994, 87-88). This means that the wood was fully exposed to the elements and biotic processes. However, construction wood is generally sheltered from rain, thus slowing down moisture-enhanced processes of decay.[63] But even in a sheltered situation, insects and fungi remain main causes of wood decay.[64]

	standard durability class (Dinwoodie 2000)	Purslow 1976 (loam)	Purslow 1976 (sand)	Smith & Orsler 1996 (mean)	Smith & Orsler 1996 (max)	Adam 1994 (soil contact)	Adam 1994 (no soil contact, exposed)	Adam 1994 (no soil contact, sheltered)
Alder	app. 5 yr	4 yrs	4 yrs	3.9 yrs	6 yrs	n.a.	n.a.	n.a.
Ash	app. 5 yr	4-6 yrs	4-5 yrs	4.4 yrs	9 yrs	n.a.	n.a.	n.a.
Elm	app. 5-10 yrs	6-8 yrs	3-6 yrs	5.2 yrs	10 yrs	10 yrs	60-120 yrs	> 200 yrs
Willow	app. 5 yr	7 yrs	5 yrs	5.5 yrs	13 yrs	n.a.	n.a.	n.a.
Oak	app. 15-25 yrs	17-43 yrs	8->63 yrs	26.8 yrs	> 56 yrs	10 yrs	60-120 yrs	> 200 yrs

Table 3.8 Experimental results and estimates of wood use-life of selected wood species, based on Zimmermann 2006, 297 table 1 and Smith & Orsler 1996, tables 4-6. The experiments published by Purslow (1976) and Smith & Orsler (1996) concern 61 cm long stakes of 5 by 5 cm cross-section buried over halfway (to 38 cm) in unsheltered conditions and the results for Adams 1994 concern estimates based on unknown sources.

Furthermore, the outer parts of posts could have been protected to slow down rotting by charring[65] or other methods of pre-treatment such as such as reducing the diameter to the inner hardwood proper or applying an outer tar or clay plastering (Zimmermann 2006, 298-300).[66]

A final comment is that the complete decay of roof-bearing posts at surface level need not always have caused full-scale structural instability (Reynolds 1995, 23; Bennet 2001, 29). If the superstructure was adequately

59 For details see: Morgan 1975, Zimmermann 1998; 50-63; 2006, 297 table 1; Vermeeren & Brinkkemper 2005, 578.

60 *E.g.* Larcom 1843, 337; see Zimmermann 1998; 2006 for excellent overviews of historic and sub-modern data.

61 *E.g.* Thompson 1940, 160; Gryseels 1988, 69; Thomas 1998, 432; Vellinga 2000, 51; 211; Kerlogue 2003, 183; Kelley *et al.* 2005, 404.

62 The figures quoted in table 3.8 for unprotected wood tie in with Reynolds' (1993, 103) observation of 3-7 years as a mean use-life for unprotected wattle hurdles. For thatch, figures range between 10-20 (uncombed winter wheat), 25-40 (combed wheat), 20-50 (heather) and 40-60 years for water reed (Pope 2003, table 7.3, with references to Morgan & Cooper 1961; Coggins & Fairless 1984 and Thomas & Reynolds 2006).

63 If the granary-type outbuildings were indeed storage structures raised above ground (*cf.* section 5.4), the exposure of their posts may explain why they were rebuilt relatively more frequently than the houses within whose vicinity they appear.

64 Rideout 2000, 23-29, see Pope 2003, 332-341 for an excellent overview and references to Cartwright & Findlay 1958; Coggins 1980; Zabel & Morrell 1992.

65 Not yet frequently documented for the Bronze Age; but see Van der Waals 1961, 100.

66 On the charring of posts see C. Huijts in: Boivin 2003, 32; Grön 2004, 220; Zimmermann 1998, 59 and references therein, *cf.* Draiby 1991, 129; Vallet *et al.* 1997, 85, but see Clarke & Boswell (1976, 21) who found no significantly different values for charred stakes in field tests.

rigid (interconnected), rotting of posts at ground level need not have led to the abandonment of a given building. Zimmermann (2006, 295) however questions whether this also applies to long rectangular houses, as the observations were made on experimentally reconstructed round houses. In addition, repairs of posts rotting beyond what was considered acceptable was always an option (see section 5.2.3.3; table 7.2).[67]

In any case, based on historical data and experiments, life expectancies for buildings constructed with wooden earthfast posts range from a little as ten years to a century and possibly even longer (Zimmermann 2006, 303). The exact use-life is determined by the complex – and archaeologically not disentangleable – interplay of wood species, diameter, removal of soft wood, types of pretreatment, soil type, humidity and types of maintenance applied (fig. 3.10). But is there no direct evidence? Luckily, the good state of organic preservation of Bronze Age settlement site remains from the Dutch river area provides some indications.

Direct evidence for Bronze Age construction wood durability

At the excavation called 'Eigenblok' near the hamlet of Rumpt, parts of several Middle Bronze Age-B house-sites have been excavated (section 4.3; Jongste & Van Wijngaarden 2002). At house-site 5 most post-stumps (all alder) had been preserved and two roof-bearing posts were radiocarbon dated to *c.* 1495-1400 cal BC (fig. 3.9).[68]

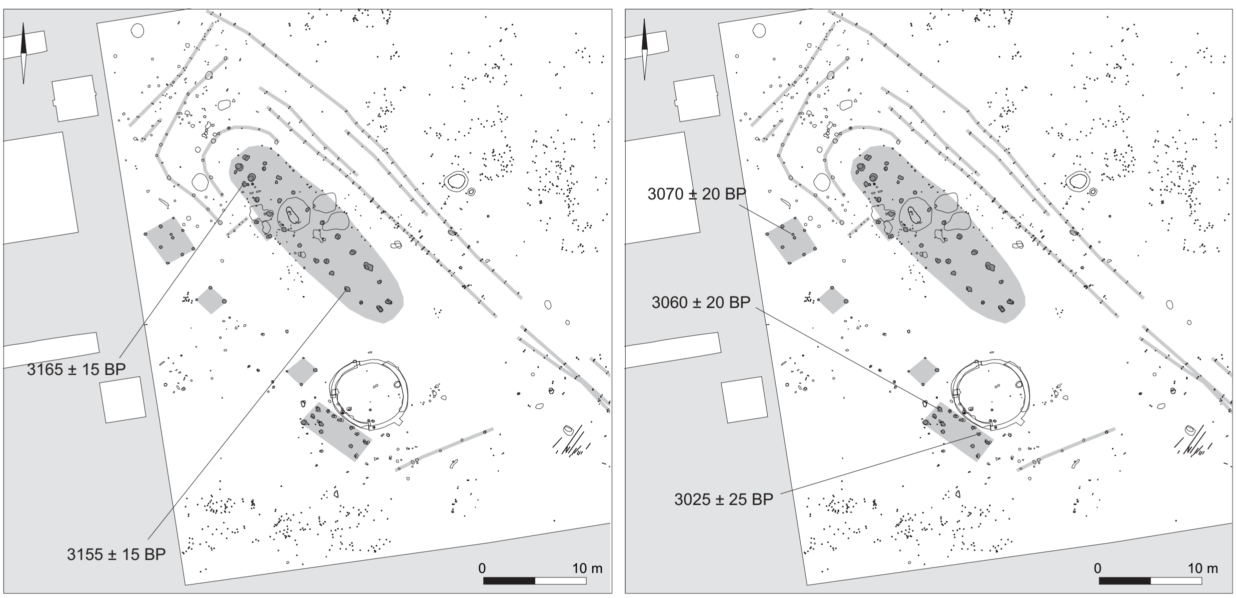

Fig. 3.9 Radiocarbon dates for construction wood (all *Alnus* posts) at Eigenblok site 5.

A post-stump from a nearby outbuilding was radiocarbon dated to *c.* 1410-1270 cal BC.[69] This means that this outbuilding could be contemporaneous, but may also be as much as 225 years younger than the house. If midpoints of the date range in cal BC are used for both structures, this outbuilding could be 107 years younger. Another outbuilding could be dated by an alder post-stump and a sample of cereals.[70] Using the former, this outbuilding was erected at the same time or as much as 235 years later than the house. Midpoints in calibrated years BC would suggest a 117 year age difference. The low feature density and the corresponding orientations of house and outbuildings suggests that these two outbuildings were indeed part of a single house-site (Chapter 6, esp. section 6.3.7), which may have existed for (over) a century.

67 For an anthropological example to the contrary (*i.e.* deliberate refusal of repairs) see: Vellinga 2000, 191; 202.
68 GrN-23647: 3165 ±15 BP and GrN-23646: 3155 ±15 BP; Jongste 2002a, 35.
69 GrN-23838: 3070 ± 20 BP; *ibid.*
70 GrN-23873: 3060 ± 20 BP and GrN-24101: 3025 ± 25 BP; *ibid.*

One could object that this is a unique example, but it is not. In this respect, the data from yet another site in the Dutch river area, Zijderveld, need to be considered. Although four Middle Bronze Age-B house-sites were uncovered at Zijderveld (section 4.2 and references there), construction wood was only preserved at one of these (fig. 3.10). One alder post-stump of the farmhouse was radiocarbon dated to *c.* 1500-1300 cal BC and two oak posts could be dated by dendrochronology to 1421 ± 5 cal BC and 1396 ± 6 cal BC respectively (Knippenberg & Jongste 2005, 17).[71] The latter two dates indicate that this house was constructed between 1426 and 1390 cal BC. This uniquely short time-span (*i.e.* 36 years) within which the construction of this Bronze Age house can be placed allows for interesting observations (see below).

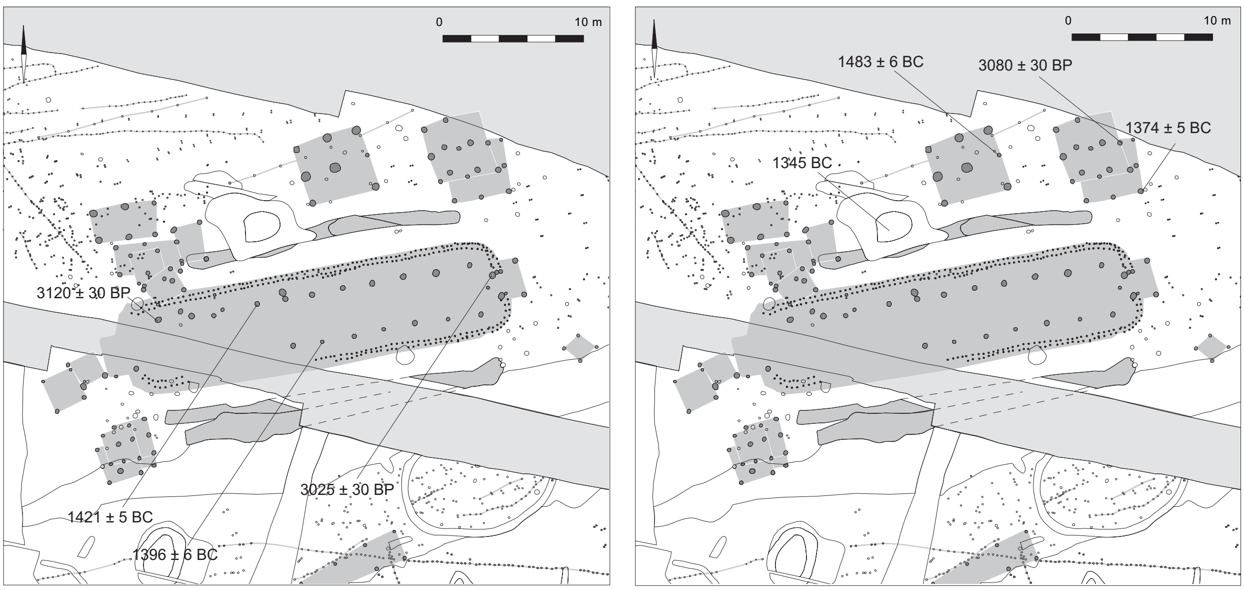

Fig. 3.10 Radiocarbon dates for construction wood and wood-fragments at Zijderveld, house-site 3.

An alder post which was presumably added later-on to reinforce the eastern short side entrance, was dated to *c.* 1390-1120 cal BC, suggesting a reinforcement after 156 years if midpoint ages are used.[72] In a more plausible scenario, this repair may have taken place after several decades.

Looking at the three dates available for the nine-post outbuildings to the north of this house, again remarkable outcomes could be documented. One oak post could be dated by dendrochronology to 1483 ± 6 cal BC (Knippenberg & Jongste 2005, 17), suggesting that either this outbuilding predated the house or – more likely – that construction wood of already significant (51-99 years) old age was (re)used for the construction.[73] Another nine-post outbuilding yielded an oak post that could be dated to 1374 ± 5 BC (*loc. cit.*), suggesting that it was constructed between 11 to 57 years after the house or, using midpoints, after 37 years. This outbuilding was presumably replaced by yet another nine-poster of which an alder post was dated to *c.* 1420-1260 cal BC, indicating that it was broadly contemporary to 130 years younger and – if using midpoint ages – 71 years younger than the house.[74]

One final relevant date for this house-site must be discussed. After a given period, the eaves-drip gullies to the south of the house were redug (fig. 3.10). The northern drip gully, however, was not redug in the same manner. Here a large pit was dug instead that presumably interconnected laterally to the eaves-drip gully. The morphology in the horizontal plane of this pit suggests that it respected the presence of the former drip-gully and the house wall to

71 GrN-28929: 3120 ± 30 BP; Knippenberg & Jongste 2005, 17.
72 GrN-28932: 3025 ± 30 BP; Knippenberg & Jongste 2005, 17.
73 See Waterson 2003, 45; Janowski 2003, 102 for anthropological examples of preferable re-use of old 'ancestral' building materials.
74 GrN-28927: 3080 ± 30 BP; Knippenberg & Jongste 2005, 17.

the south of it. Presumably, his pit was a drinking pool for cattle, that was filled by the roof's watershed. Cattle hoof-imprints around it testify to this function.[75] From the bottom fill of the drinking pool, a worked oak fragment was recovered that was dated by dendrochronology to 1345 cal BC.[76] This means that this pool was not filled in until 45 to 81 years after the construction of the house. For this site too, the low feature density and corresponding orientation of the outbuildings to the farmhouse suggest that they belonged to a single house-site (Chapter 6, esp. section 6.3.6).

These direct data from Rumpt and Zijderveld indicate that where direct dates (*i.e.* dated construction wood) could be obtained, repairs occurred and outbuildings were (re)built several decades after the construction of a Middle Bronze Age farmhouse. This suggests that, rather than the 20-40 years usually suggested for the life-span of Bronze Age house(-site)s, figures above five decades (approaching a century?) appear very reasonable. Perhaps such house(-site)s functioned as a home base for many generations (of a specific kin group?), rather than as providing housing for a(n extended) household only once.

3.4.3 The fit between houses and household life cycles

The possibly long duration of occupation of Bronze Age houses as suggested above (section 3.4.2), complicates the convenient fit between house and household life cycles from the viewpoint of neolocality at the interval of a human generation (section 3.3.3; fig. 3.7). This does problematize Gerritsen's (1999a-b; 2003) model wherein the construction, habitation and (post-)abandonment phases of later prehistoric houses and house-sites are linked to household development phases (*cf.* Abrahams 1991, 2-3). It is necessary to evaluate whether a frequently assumed tight correspondence between house and household life cycles, as suggested by Gerritsen's model (fig. 3.7), is still tenable.

A systematic biographic approach to settlement site data is indeed very informative and allows to differentiate between commonplace and extraordinary 'biographies' of houses and house-sites. A fortiori, Gerritsen's 2003 publication is of great value for its specific, detailed and systematic analysis of settlement site data that is all too often 'taken for granted'.[77] Yet there are some difficulties in interrelating house- and household life cycles the way Gerritsen does. To start, if we accept (even if only for the sake of argument) that foundation deposits and abandonment deposits on later prehistoric settlement sites reflect rituals carried out at house construction and abandonment, we are solely concerned with the house's (*i.e.* the building) life cycle. To assume that house-construction took place because of household changes, does not inform us on the *temporality* of such changes. Social rules may have caused house construction and abandonment at moments (in the household life cycle) quite counter-intuitive to our western-modernist views of, for example, leaving house in case of marriage.[78] From cross-cultural studies it is clear that marriage and death of household members are often related to some form of domestic mobility (mostly neolocality), but claims that these – and not other – social causes motivated later prehistoric farmstead relocation are unproven and likely to remain so. Formulated otherwise: the 'fit' between the temporalities of the life cycles of houses and households is by no means universal and archaeologists should accordingly not build narratives based too heavily on such propositions.

Therefore, we shall now focus on the aspects of Gerritsen's model that *are* situated within the realm of archaeological research: foundation- and abandonment deposits. For the present study an inventory of Bronze Age house plans has been compiled that comprises over 240 Bronze Age houses that have been published in sufficient detail to allow discussion here. Of these 240 Bronze Age houses, only few have yielded acceptable evidence for foundation deposits (fig. 3.11 and *infra*).[79]

At Hoogkarspel, two miniature ceramics cups were recovered from one of the roof-bearing postholes of a three-aisled farmhouse. Presumably, this house was rebuilt and from a posthole of the entrance portal of its successor, yet another miniature cup was retrieved (fig 3.11, A).[80]

75 Knippenberg & Jongste 2005, 44; 63-65.
76 Knippenberg & Jongste 2005, 17.
77 Especially Gerritsen 2003, chapter 3 and table 3.6, see section 1.2.
78 See for some alternative examples: Prindle 1984, 294; Goody 1990, 139; 2000, 58; Dietler & Herbich 1993, 253; Vellinga 2000, 232; Gerritsen 2003, 37; Goody 2004, 78.
79 See also Bourgeois, Cherreté & Bourgeois 2003, 179 for a Late Bronze Age foundation deposit at Sint-Denijs-Westrem.
80 Van den Broeke 2005, 660, *cf.* Bourgeois, Bourgeois & Cherreté 2003, 179; 268-269.

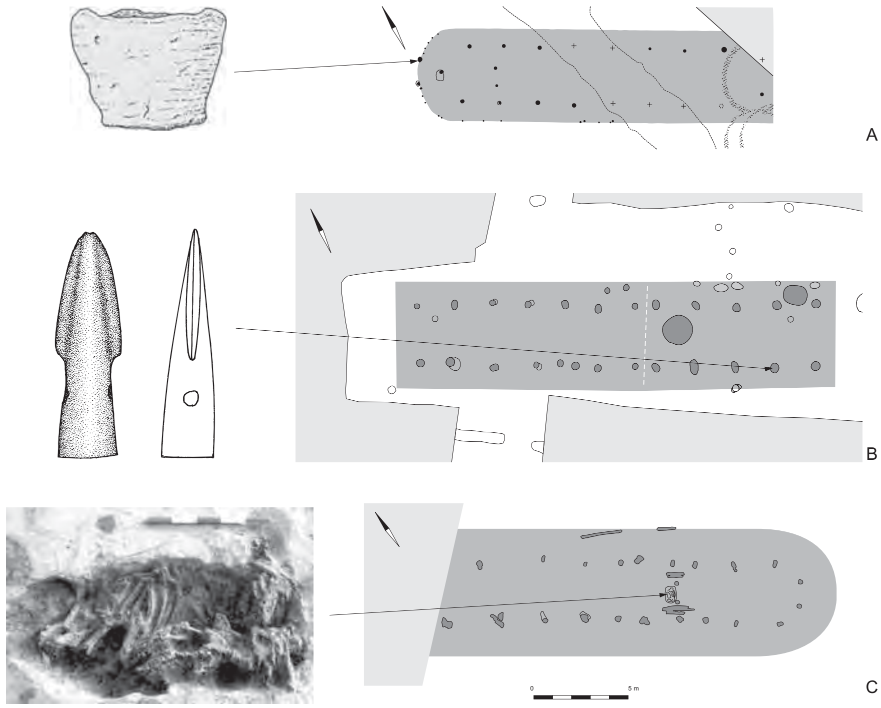

Fig. 3.11 Presumable foundation deposits from (Middle Bronze Age-B to Late-) Bronze Age houses in the Netherlands at Hoogkarspel (A; after Bakker *et al.* 1968, 197 fig. 4; Van den Broeke 2005, 660 fig. 29.2, height vessel 3.6 cm), Rhenen (B; after Van Hoof & Meurkens 2007, 38 fig. 5.12, height pegged spearhead 7.2 cm) and Velsen (C, after Bloemers & Therkorn 2003, 18 fig. 9)

For two Middle Bronze Age houses at Meteren - De Bogen, two possible house-offerings were recorded. In a possible entrance posthole of house 28-1AH, fragments of a partly burned neonate piglet were recovered.[81] From a roof-bearing posthole of house 45AH, a fragmented and incomplete loom-weight was discovered in the postpipe.[82] The context of the latter indicates that the loom-weight fragments had become incorporated after post-extraction.

At Velsen - Velserbroek P63, a calf and two skulls of mature cows had been buried inside a large rectangular pit inside the entrance portal of a presumably extended Bronze Age farmhouse (fig. 3.11, B; Bloemers & Therkorn 2003, 18 fig. 9). Possibly, this concerns a foundation deposit below the threshold into the byre section.

A house ground plan from Rhenen that presumably dates to the 12th or 11th century BC, yielded a small pegged bronze spearhead (fig. 3.11, C).[83] This spearhead was retrieved in a relatively horizontal position and high up in the posthole of a roof-bearing post. As it could not be discerned whether the spearhead was situated in the posthole or the postpipe, the possibility remains that this find represents activities carried out upon abandonment, instead of upon construction of the house.[84]

Another bronze object that has been interpreted as a foundation deposit concerns a Middle or Late Bronze Age sickle from a pit with Bronze Age ceramics at Venray - Hoogriebroek (Krist 2000, 21). Through this pit, the posthole of a house had been dug. Accepting that this was no coincidental overlap (*loc. cit.*; Fontijn 2003, 146), the find may be interpreted as a foundation deposits, but this is not a strong case.

From a posthole of a wall post of a Late Bronze Age house at Boxmeer, over 3 kg of secondarily burned ceramics were recovered (Van der Velde 1998, 23; Van den Broeke 2002b, 52). A similar situation was encountered at

81 Total 37 fragments, *c.* 10 g of different body parts; Van Dijk, Esser & Zeiler 2002, 584; Hielkema, Brokke & Meijlink 2002, 252. Another posthole of this house contained the remains of at least six mice (Van Dijk, Esser & Zeiler, *loc.cit*).

82 Total 23 fragments, 132 g; Hielkema, Brokke & Meijlink 2002, 197.

83 Van Hoof & Meurkens 2007, 37-41, for other examples of bronze weaponry deposited on Bronze Age settlement sites see Nowakowski 2001, 145; Fontijn 2003, 144-147; Ziermann 2004, 408; Gaffrey & Deiters 2005.

84 A possibly Late Bronze Age *henkeltasse* pot in a feature of a house dated to the Early Iron Age at Goirle, is also interpreted as an abandonment deposit (Bink 2005, 23 fig. 2; 24; 27 fig. 12).

Sittard, where the postpipes of two roof-bearing posts of a Late Bronze Age house yielded over 100 secondarily burned sherds and a fragment of a loom-weight (Tol & Schabbink 2004, 27).[85] These two examples seem to indicate a Late Bronze Age start of an Iron Age pattern of interring secondarily burned ceramics into postholes upon abandonment for which some more (Iron Age) examples have been documented (Van den Broeke 2002b).[86]

In addition to the examples presented above, several other ‘odd' deposits on Bronze Age house- and settlement sites are known, but as these cannot be directly related to houses proper, these will not be discussed here (see section 8.2.3.5). The important observation that needs to be made at this point is that, if one accepts the examples above as evidence of Bronze Age foundation (*c.* 5-6) and abandonment (*c.* 3-4) rituals, we are dealing with depositional acts with frequencies of slightly above 2 % of the known houses in both cases. Formulated otherwise; for the overwhelming majority (> 97 %) of the houses, subsoil deposition of inorganic material was not part of the rituals executed at house construction or abandonment.[87]

If we want to use a biographic approach to Bronze Age house(hold) histories as Gerritsen (2003) proposes, it is evident that we are – when discussing foundation and/or abandonment deposits – dealing with highly particular biographies. In more typical or ordinary biographies, non-organic depositions associated with key elements of the house(hold) life cycle seem not to have been of prime importance.

This is all the more salient as bronzes were presumably not rare at settlement sites (*cf.* Fontijn 2003, appendix 9). For example, judging by tool-marks, five different bronze axes were used to construct a single granary-type outbuilding at Zijderveld (Knippenberg & Jongste 2005, 123). Moreover, there is sound evidence that the deposition of items of bronze (*e.g.* Essink & Hielkema 1997-1998; Fontijn 2003) and inorganic goods (*e.g.* Prummel & Van der Sanden 1995; Van der Sanden 1995a-b; 1997; 1998) occured in significant numbers. The scarcity of foundation and abandonment depositions should thus not be interpreted as a scarcity of depositional acts altogether, but rather as signifying that settlement sites, unlike the more wet or marshy areas around them, were not the main locations where most of such depositional activities took place (see section 8.2.3.4; Fontijn 2003; 2007).

3.4.4 Soil-depletion

At this point a final assumed cause of Bronze Age domestic mobility, soil-depletion, is discussed. Often quite implicitly, it has been assumed that Bronze Age crop cultivation quickly resulted in over-exploitation of the agricultural soils. This supposedly necessitated the combined periodical relocation of houses and fields.[88]

Soil-depletion and its relation to domestic mobility

Whilst soil-depletion may in some circumstances have reduced agricultural yield to a point where relocation was favourable, several points need to be kept in mind. First and foremost, soil-depletion is by no means a supra-regionally valid explanation. The Netherlands comprise a wide range of geological landscapes, each with distinct benefits and limitations regarding specific kinds of agricultural use (see Chapter 2, fig. 2.1; Arnoldussen & Fokkens 2008, 20 fig. 4). Therefore, regional (and local) differences in lithology need to be taken into account. At the national level, it is important to distinguish between the Dutch soils of Pleistocene age and those of Holocene genesis. The main Pleistocene areas comprise the northern parts and the southern parts of the Netherlands, divided by the central river area.

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85 The corner posts of similar houses at Echt and Sittard may also have contained unusual quantities of pottery (Tol & Schabbink 2004, 290).

86 Possibly, a similar interpretation applies to the fill of a posthole of a Late Bronze Age granary-type of outbuilding at Tiel-Medel 8, from which 136 sherds (*c.* 600 g) were recovered (Arnoldussen 2006c, table 6.8). See also Gerritsen 2003, 66; 84-87 for an overview of later prehistoric pottery deposition on settlement sites.

87 It is in this respect important to realize that in anthropological studies where (house)construction rituals have been described, non-material acts (*e.g.* prayers, songs) and organic deposits (especially foodstuff and blood) are the most common elements (*e.g.* Griaule & Dieterlen 1954, 101; Newell 1957, 25; Goody 1958, 80; Rigby 1973, 269; Turton 1978, 114-118; Waterson 1990, 122-128; Sather 1993, 73-75; Fox 1993b, 163; Young 1993, 194; Blier 1995, 26-27; Bloch 1995, 76; Oliver 1997, 552-569; Thomas 1998, 436; Vellinga 2000, 105; Røkkum 2003, 225, for an example to the contrary (inorganic depositions) see Gibson 1995, 139-142 or Herva 2005).

88 *Cf.* Butler 1969, 68; Wilhelmi 1983, 62; Haarnagel & Schmid 1984, 216; Bantelmann *et al.* 1984, 245; Kortlang 1999, 184; Spek 2004, 131-133; 975; Schinkel 2005, 519; Louwe Kooijmans 2005b, 701.

The northern areas were affected by Saale period glaciation. There, (peri-)glacial phenomena such as the presence of boulder-clay, moraine outcrops and ice-transported boulders can be encountered (Waterbolk 1995b, 1). The southern boundary of this Saalian glaciation is represented by the ice-pushed hills in the central and central-eastern parts of The Netherlands. The prehistoric occupation of the northern areas is strongly correlated to the parts of the landscape where moderately thick (> 30 cm) aeolian coversand deposits overlying the boulder-clay deposits – and nearby water – are found (Spek 1993; 2004, 116-121; 136-138). It has been suggested that, especially if no use was made of manuring, agricultural use may have led to deforestation, heath expansion and sand drifts (*cf.* Waterbolk 1985a, 61; 1987, 204; Spek 2004, 131-133; 975). Although soil-depletion apparently was indeed an intrinsic risk of these dry and mineral-poor sandy soil landscapes (Spek 2004, *loc. cit.*), it remains unsubstantiated that the cycles of agricultural shifts (*e.g.* of fields, fallow periods and/or crop rotations) should coincide with those of the household (*cf.* Van Beek 2001, 57). There is, for instance, no evidence to assume that after several decades all agricultural plots in the vicinity of the house that could be economically viable or cost-efficiently exploited were rendered unsuitable for agricultural use.

More or less the same lines of reasoning apply to the Bronze Age settlement sites uncovered on the southern Pleistocene coversand areas. Here too, Bronze Age occupation took place on the higher parts of sandy, gently undulating coversand landscapes.[89] Based on some pollen analyses and comparison to the situation of the northern Netherlands, these too are suspected to have been prone to deforestation, heath conversion and podzolisation.[90] Yet for this area as well, the link between the (cycles of) change of agricultural plots and relocation of the houses remains unproven (*cf.* De Hingh 2000, 36; 209-210; Willroth 1996, 39).

Quite different lithologies and geogenetical processes are encountered in the two other main areas that have yielded high densities of Bronze Age occupation: the Dutch central river area and the West-Friesland inverted creek ridge landscape (see Chapter 2, fig. 2.1; Arnoldussen & Fokkens 2008, 20, fig. 4). Both are regions that were shaped by a persistent, gradual yet complex fluvial build-up during the Holocene and are as such distinctly different from the Pleistocene regions discussed previously. Yet, an important distinction between the river area and West-Friesland needs to be made. The West-Friesland creek landscape became largely inactive, due to the closure of its coastal inlet, around the start of the Middle Bronze Age-B (*c.* 3200 BP; IJzereef & Van Regteren Altena 1991, 64; De Mulder *et al.* 2003, 224). Due to processes of compaction, shrinkage and oxidation of the surrounding sediments, the former creek levees became the highest parts of the landscape (a process known as relief-inversion) and were densely settled near the end of the Middle Bronze Age-B. By contrast, in the central river area sedimentation continued throughout the entire Holocene period (Chapter 2). There, when rivers altered their course (a process known as avulsion; Stouthamer 2001), a successor to the now fossil channel could normally be found within short distance (*i.e.* several kilometres). The levee- and crevasse splay deposits of such inactive rivers were also densely settled during the Middle Bronze Age-B (Chapter 4; Chapter 7, section 7.3).

Despite these differences, these Holocene parts of The Netherlands are similar in one aspect vital to the current discussion. As both landscapes are of fluvial genesis, their subsoils (especially the levee- and crevasse splay deposits) consist of deposits very rich in mineral content, that are well-drained and that are strongly calcareous in nature. These are soils that are very well suitable for crop-cultivation.[91] For the river area, periodic flooding – resulting in the deposition of new organic matter and mineral-rich sediments – may even have continually replenished the fertility of affected areas. To conclude, it seems unlikely that soil-depletion of these mineral rich soils was ever a problem for Bronze Age agriculture. Systematic analysis of crop weeds and evidence for manuring (*cf.* Brinkkemper *et al.* 2002, 459-460) may in the future confirm (or refute) this proposition.

At this point it suffices to state that if soil-depletion is forwarded as a factor steering domestic mobility, it should be substantiated by analyses that take into account the locally variable properties of the subsoil and one

89 *Cf.* Van der Sanden 1987; Schinkel 1994, 7-9; 2005, 519; Roymans & Theuws 1999, 2; De Hingh 2000, 172; Gerritsen 2003, 17-19. On the lithological composition see Schokker 2003, 26-33; 48-49 and for agricultural suitability see Bles *et al.* 1984, 2-7; Teunissen van Manen 1985, 92-96.

90 *E.g.* Roymans & Theuws 1999, 2; Schinkel 2005, 519 ; Gerritsen 2003, 226-228, but see De Hingh 2000, 159; 172-175.

91 For the river area see Kooistra 1996, 58-62; Berendsen 2005a, 266; 2005b, 107, for West-Friesland see Weerts 2003, 3-4; De Mulder *et al.* 2003, 316.

should provide positive evidence (*e.g.* field weeds, manuring) that soil-depletion was indeed a significant problem in the first place. Based on the brief discussion above, soil-depletion is likely to have been a very locally variable risk for the various geogenetic regions of The Netherlands in prehistory. Lastly, the unwarranted assumption that a combined relocation of fields and house-sites occurred, further weakens the applicability of 'soil-depletion' as a motive for Bronze Age domestic mobility.

3.5 Conclusions: beyond concepts and models

In this chapter, a critical discussion was offered of the concepts, models and underlying premises for the study of later prehistoric settlements in general and Bronze Age settlement sites in particular. I have shown that several frequently used terms such as 'settlements' and 'farmsteads' carry important connotations about how such entities may have functioned in prehistory. As such, there is an evident risk of inordinately projecting back into the Bronze Age a terminology compiled for the description of (sub-)modern rural settlements. Moreover, such concepts are more frequently used as descriptive labels, rather than that the data excavated are interpreted specifically in relation to what such concepts may have meant for prehistoric communities. Therefore, terminology – if not properly defined – may give rise to considerable confusion. In section 3.2, definitions have been provided and the terms 'settlement site' and 'house-site' have, for instance, been forwarded as more analytical alternatives to the terms used as examples above. I have argued that at different spatio-temporal scales, different analytical levels and terminology are needed that serve not to describe, but rather to investigate archaeological remains (fig. 3.1) and specific examples of such analyses may be found in Chapters 5 to 7.

The dominant Dutch model for explaining the settlement dynamics for the Bronze Age ('the wandering farmstead' model) has also been critically examined (section 3.3). I have argued that the motives that may have steered periodical relocation of the house-site often remain implicit. Essentially, three main motives can be outlined: (1) the limited durability of construction wood, (2) the depletion of fields, and (3) compositional changes in the household. These three lines of argument have been analyzed and some weaknesses in their premises have been pointed out (section 3.4). I have shown that the longevity of Bronze Age house-sites can be proven to have been easily more than five decades, whereas established estimates are frequently half this figure. Furthermore, I have argued that while soil-depletion may in theory have affected fields, this is hardly based on sound evidence and does not explain why the locations of *houses* should have shifted. Additionally, some attention was paid to the possible composition and dynamics of Bronze Age households. I have shown that different approaches (floor size, caloric value, historical analogies) to household size yield different estimates (table 3.5) and that most approaches consider households as too static entities. Moreover, the fit between the life cycles of houses and inhabitants may not be as strong and evident as sometimes assumed. The observations on wood durability suggest that farmhouse life-span may have been twice that of a human generation, complicating an easy fit. Moreover, I have shown that foundation or abandonment deposits of inorganic goods are very rare in the Bronze Age and consequently cannot be used to support an assumed house-household interrelation as suggested by Gerritsen (fig. 3.7).

To sum it up, the contents of this chapter provide a background to evaluate various concepts that are used in the remainder of this study and offer insights into the discussions and models current in Dutch Bronze Age settlement archaeology. By providing this information here, ambiguity of concepts is avoided in the qualitative presentation of the data under study in the chapters that follow (Chapters 4 and 5), and the more technical and quantitative approaches to specific hypotheses related to such concepts later on (Chapter 6).

4 Case studies: Bronze Age settlement sites in the Dutch river area

4.1 Introduction

I have argued that the Dutch central river area is an ideal region for research that aims to answer questions on the nature and dynamics of Bronze Age settlements (Chapter 1). Much of this potential, is a direct consequence of the fluvial geogenesis of the region. Generally fair to excellent preservation conditions for features and organic remains – due to high groundwater levels – as well as the occurrence of vertical stratigraphy and protective covering sediments can all help to increase and preserve the information potential of former settlements (Chapter 2).

In six macro-regions in the Dutch river area, this information potential has been explored by excavations of Bronze Age settlement sites. These excavations did take place in different periods, under dissimilar conditions and differed furthermore in methodology and aims at their outset (*cf.* table 1.1). In order to be able to compare data between the various excavations, the differences in backgrounds, approaches and results are discussed in this chapter. The seven main excavations of Bronze Age settlement sites situated within the six macro-regions (*cf.* fig. 1.6), are presented here in a standardized way. First, a brief summary of the research history is offered and an introduction to the archaeological and geological context of the excavation(s) in the macro-regions is provided. Second, for all main excavations the results for the Bronze Age period are presented.

Such a presentation of data is necessary for several reasons. For example, sites like Zijderveld and Dodewaard that were first investigated in the period 1965-1967 and have been published in full in 1999 (Theunissen & Hulst 1999a-b), have seen renewed archaeological research between 1995 and 2007 in their direct vicinity due to motorway and railway construction respectively (Appendices I and VI). In this chapter, the results of the various archaeological fieldwork campaigns for these sites are synthesised and discussed.

Another reason why the results of the seven main excavations are summarized here is that for some sites, the interpretation of the excavation results by the present author differs in important aspects from that of the original researchers. For example, at the 'De Bogen' excavations various ground plans have been forwarded for which a Late Neolithic or Early Bronze Age date is claimed by the original excavators, while this is refuted in this study (section 4.4.3; Appendix III). Another example is the 'Lienden' excavation, for which the validity of a series of Middle Bronze Age structures forwarded by the original researchers is questioned in the present study (section 4.6.3; Appendix V). Such important differences of opinion need to be made explicit in order for the reader to understand in what ways I have interpreted the data published by others throughout the remainder of this study.

A final argument is the fact that not all excavations have been published to a similar degree. In particular for the excavations at Wijk bij Duurstede ('De Horden' and 'De Geer'; sections 4.5.3-4.5.4; Appendix IV) only preliminary reports have been published. For these two excavations, as yet unpublished data have been extracted from the original fieldwork documentation in order to allow comparison to the other excavations presented in this chapter.

The presentation of the excavation results for the six macro-regions in this chapter is as concise as possible, since much data has already been published elsewhere. Nonetheless, especially in cases where differences of interpretation are discussed, more detailed information on the methodology of excavations, regional context or palaeogeographical development may be necessary. Such information can – for all six macro-regions – be found in the appendices. There, for each macro-region a more detailed introduction to the geological context, archaeological research history and additional source criticism is offered. In addition, the appendices offer a combined occupation history and palaeogeographical reconstruction at the scale of the macro-region. Moreover, the relevance of additional find-spots other than the large-scale excavations is assessed in relation to the latter (Appendices I-VI).

With sufficient background information offered in the appendices, the discussion of the results for the main excavations is tailored to a limited number of topics. These are derived from the analytical levels of analysis forwarded in Chapter 3 (*cf.* fig. 3.1). Accordingly, for all excavations the results at the level of the house, the level of the house-site and the level of the settlement site as a whole are discussed for the Bronze Age occupation period. In line with this scalar approach, a final section on the relation between the settlement site and its surrounding landscape is offered for each of the main excavations.

Combined, the information on the backgrounds and results from the excavations in the six macro-regions offered in this chapter, provides a qualitative overview of the nature of Bronze Age settlement sites in the Dutch river area. This serves as a frame of reference for later more specific analyses (like that of specific Bronze Age settlement site elements in Chapter 5 or the nature of Bronze Age house-sites in Chapter 6).

4.2 Zijderveld

4.2.1 Introduction

The village of Zijderveld has given its name to both the fluvial system on whose levee deposits it was built, and to an archaeological site situated *c*. 100-300 m to the northeast of the village centre. This site borders a sand-dredging site dug prior to the Second World War. At that time, no archaeological remains were noticed. In 1965, local archaeologists executed corings and test-pits, which yielded many Bronze Age artefacts.[1] Between 1965 and 1971, the site was excavated by the State Service for Archaeological Investigations.[2] In 2003, 2004 and 2007, additional archaeological fieldwork was carried out on the adjacent plots, which were threatened by widening of the nearby A2 motorway.[3] The various campaigns have unearthed four Bronze Age house-sites with houses, fences, pits, wells and outbuildings as well as an extensive Bronze Age structured landscape outside these (*infra*). The preservation of the features was good (shallow features such as stake holes and cattle hoof-imprints were preserved) and some construction wood was preserved. The available radiocarbon dates suggest that the site was predominately used during the Middle Bronze Age-B (Van Zijverden 2003a; Knippenberg & Jongste 2005, 17). Few younger activities have disturbed the Bronze Age occupation level, but some Iron Age occupation on the same site was attested (see below and Appendix I). In addition to the Zijderveld excavation proper, there are a moderate number of sites in the wider vicinity that can be used to investigate Bronze Age occupation of the wider macro-region (see Appendix I).

4.2.2 General remarks

The Zijderveld macro-region encloses a large and geologically complex part of the Dutch river area. A considerable number of fluvial systems that came into being during the later Holocene are encountered in this macro-region. Together with Late Pleistocene/Early Holocene river dunes also present, they provided prehistoric people with a multitude of landscapes to utilize. Over time, the fluvial deposits (levee and crevasse deposits) as well as river dunes, were recurrently used by prehistoric communities in this region. The distribution maps of Middle Neolithic and Middle Bronze Age(-B) finds from the Zijderveld macro-region show great similarities (Appendix I, figs. I.5 and I.8). However, as many of the find-spots represent results from test-pits with a rather limited extent – hampering the interpretation of the nature of the activities represented by the artefacts – it can only be suggested that the similar distribution plots may reflect comparable views on the preferred location for domestic sites during these two periods.

The intermediate periods, the Late Neolithic, Early Bronze Age and Middle Bronze Age-A, are far less well known. This is especially remarkable as several branches of the Schoonrewoerd fluvial system, whose phase of sedimentation ceased around 2460 to 2140 cal BC, cross-cut the Zijderveld macro-region (Berendsen & Stouthamer 2001, 233-234; see Appendix I). These branches, and the intricate complexes of crevasses associated with them, must have provided a higher, and within a century or so wooded (*cf.* Van Beurden 2008), well drained and fertile occupation space. Downstream, occupation on the Schoonrewoerd deposits has frequently been attested (Louwe Kooijmans 1974; Appendix I). Consequently, the current absence of find-spots from the periods between the Late Neolithic to the Middle Bronze Age-A is interpreted as a consequence of a low research intensity,[4] implying that find-spots from these periods may be encountered on the Schoonrewoerd deposits within the Zijderveld macro-

1 Hulst 1967a, 2; Theunissen & Hulst 2001, 196; Appendix I.

2 RACM, formerly known as ROB; Hulst 1965a-b; 1966; 1967a; 1975a-b; 1991; Theunissen & Hulst 1999b.

3 Arnoldussen 2003; Knippenberg & Jongste 2005; Knippenberg *in prep.*

4 This should, however, also be seen in relation to the generally poor diagnostic nature of settlements datable to the Late Neolithic to Middle Bronze Age-A (sections 5.2.1-5.2.2; 7.2; Arnoldussen & Fontijn 2006, 292-301).

region in the future. The Early Bronze Age sherds in secondary (*i.e.* washed-out) context recovered at an excavation near the village of Culemborg ('Culemborg - Den Heuvel'; Louwe Kooijmans 1966; Arnoldussen & Van Zijverden 2004; Appendix I) also point in that direction.

During the Middle Bronze Age-B, the higher parts of the Zijderveld fluvial system's deposits – by then long inactive – appear to have been used intensively, presumably mostly for settlement. The same may be assumed for the Schoonrewoerd deposits, although direct evidence is lacking. Explaining the absence of Early Bronze Age and Middle Bronze Age-A remains on (Schoonrewoerd deposits on top of) the Zijderveld deposits is difficult. Sedimentation by the Schoonrewoerd system ends well before the Early Bronze Age and the scale of the Zijderveld excavations (total *c.* 2.4 ha) would allow for the recognition of artefacts and features from these periods if present. Two lines of explanation may be forwarded.

According to the first explanation, activities did occur within the excavated areas during the Middle Bronze Age-A (and possibly also Early Bronze Age) and are represented by a wooden post radiocarbon dated to *c.* 1880-1490 cal BC (Theunissen & Hulst 1999b, 158; see Appendix I). The absence of artefacts datable to this period could be explained by assuming that no typical artefacts were incorporated in deep features. Moreover, the erosion that is thought to have disturbed the Bronze Age surface after the main (Middle Bronze Age-B) phase of occupation (see Appendix I) may also have washed away finds from earlier periods. Nonetheless, among the over 3500 sherds recovered from the Zijderveld excavations, not a single sherd could be identified as possibly dating to the Early Bronze Age or Middle Bronze Age-A This renders the erosion-theory suggested above rather unlikely.

In the second line of explanation, the Zijderveld deposits are interpreted as providing a marginal occupation area. During the active phase of the Schoonrewoerd fluvial system, crevasse deposits by this system overlay those of the Zijderveld fluvial system and possibly extended up to (on top of) the Zijderveld levee deposits proper. To the south of the Zijderveld micro-region, peat growth extended from the floodbasin and completely covered the Zijderveld channel and levee deposits (Berendsen & Hoek 2005). Consequently, only the highest part of the Zijderveld fluvial deposits, or the parts heightened by Schoonrewoerd crevasse formation, may have provided suitable locations for occupation. As the sand body of the Schoonrewoerd fluvial system is generally located 1-1.5 m higher than that of the Zijderveld fluvial system,[5] the former would seem the logical choice for occupation in an otherwise (save for the river dunes) marshy and wet floodplain. It may be that the relatively small Schoonrewoerd levee and crevasse deposits were so intensively occupied that also lower lying soils, less suitable for crop cultivation, were in the end used for habitation. Although the current absence of well-documented dense Bronze Age occupation on the Schoonrewoerd deposits within the Zijderveld macro-region – as predicted by this line of argument – may weaken this argument, this line of explanation nonetheless seems the most promising of the two. It may at least offer a suggestion why it was not until the Middle Bronze Age-B, that these parts of the Zijderveld deposits were occupied.

4.2.3 The Zijderveld excavations

Large scale excavations at Zijderveld took place in 1965 (Hulst 1967a), 1966 and 1971 (Hulst 1975a-b; Theunissen & Hulst 1999b), 2004 (Knippenberg & Jongste 2005) and 2007 (Knippenberg *in prep.*). Altogether, 2.6 hectares of a predominantly Bronze Age cultural landscape have been unearthed (fig. 4.1). In the northern and north-eastern part of the excavations, Iron Age features and structures were recognized, implying that some of the features there – assumed to be Bronze Age in date – may in fact date to the Iron Age.[6] Nonetheless, the excavation plans show that alongside the reactivated Zijderveld residual gully, four house-sites were erected and that the areas (as large as up to 180 to 250 m from the houses) around the house-sites were parcelled with fences (fig. 4.1).

Whereas the margins of a cultural landscape, from a theoretical perspective, may never be reached (section 3.2.5), the Zijderveld excavations show that within an area as large as 500 by 300 meters, the landscape was – in a regular fashion – altered or created through the erection of outbuildings and fences. This offers just a minimum size for the extent of Bronze Age built-up landscapes in the river area and one may wonder whether any "empty areas" would ever have been encountered had excavations extended into the northern or southern floodbasin. Despite these observations, particular geographical locations can be outlined within this wider built-up landscape based on

5 Berendsen, Faessen & Kempen 1994, 10; maps 1-2; Makaske 1998, 191; Appendix 3 no 2; Berendsen & Hoek 2005, 23 fig. 8.
6 Theunissen & Hulst 1999b, 177; Van Beek 2005, 80; Appendix I.

feature density, and in the numbers and types of structures reconstructed from these features. Often – but not always (see Appendix I) – feature density and variation in types of structures is highest directly around reconstructed farmhouses.

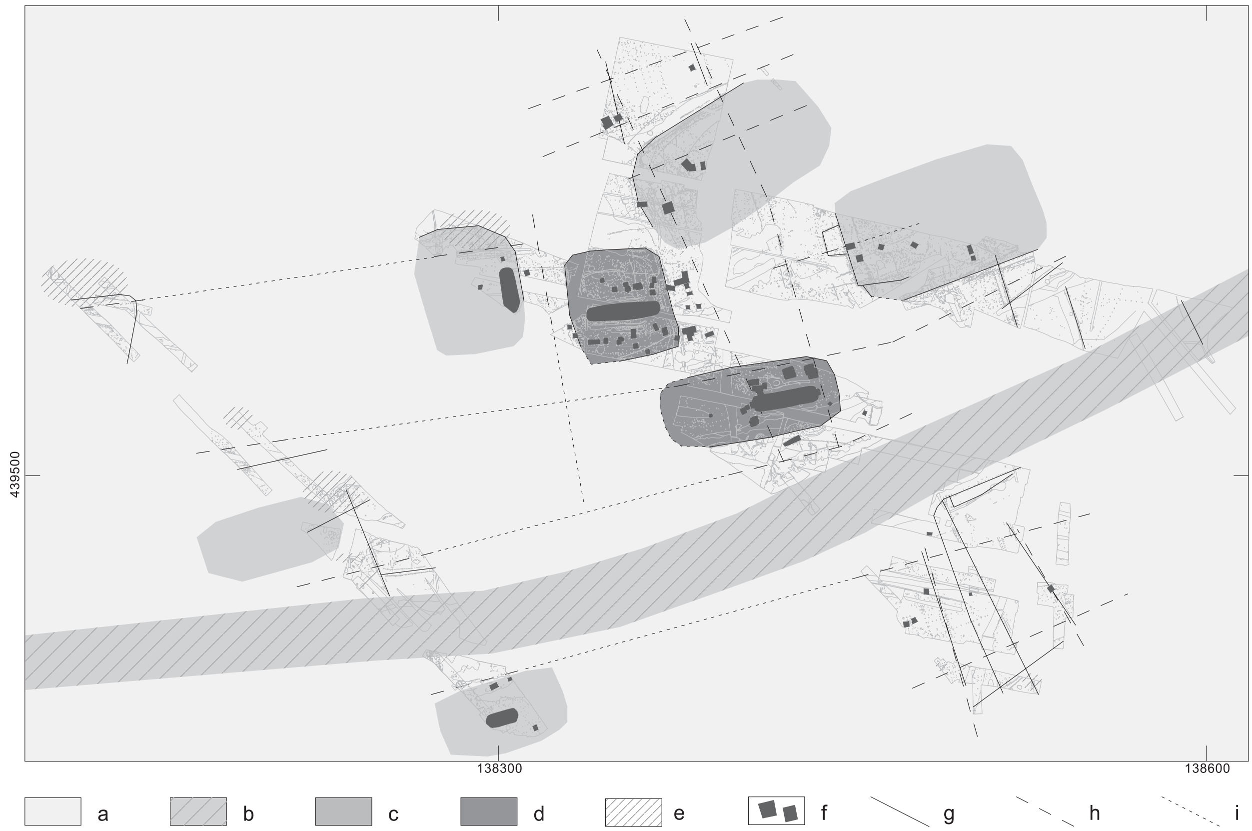

Fig. 4.1 Zijderveld cultural landscape as interpreted by Knippenberg and Jongste (2005, 63 fig. 6.23).

a: levee and crevasse deposits, b: residual gully c. farmsteads (uncertain), d: farmsteads (certain), e: hoof-imprints, f: structures, g: single-stake fences, h: double-stake fences, i: assumed fence connection.

Houses

Four Bronze Age farmhouses have been recognized at Zijderveld (fig. 4.2).[7] Although at first glance they appear rather dissimilar, they share a number of structural characteristics. The roof-bearing structure of all houses is formed by two rows of upright posts, indicating that they – and to a lesser extend possibly also the walls – carried the weight of the roof. The placement of posts within these rows (at generally 2-2.3 m interval and always in pairs perpendicular to the long axis of the building) may suggest the uses of trusses. Rows of stake-hole features at 1.3-1.5 m from these posts show that Bronze Age houses at Zijderveld had walls based on wattle-and-daub techniques. Often, two stretches of wattle-work were used as wall construction, with the area in between presumably filled in with sods or straw – or a combination – for stability as well as insulation. The rows of wall-stakes continue along the entire long sides of these houses and join an elaborate entrance construction on both short sides of the buildings. The word 'elaborate' is used to set them apart from the more generally occurring entrance portals – *i.e.* the first and last sets of roof-bearing posts

7 The tentative 'round houses' once claimed for Zijderveld (Theunissen & Hulst 1999b, 164-166) have been studied in detail by Theunissen, who has argued that these were not houses and that the reconstruction of most must be refuted (Theunissen 1999, 182-185, *cf.* section 5.8).

spanned a smaller distance (thus presumably providing a doorframe, see section 5.2) – which are found in the Dutch river area as well as in the West-Friesland creek district.[8] Whereas only two posts would suffice to create an elevation of the roof and a doorframe, these elaborate entrances comprise a funnel-shaped construction of three (sets of) posts. Such elaborate entrances occur also elsewhere (*cf.* Hessing 1991; Appendix II; VI), but are mainly confined to the (central) Dutch river area. Their function is unknown, but Louwe Kooijmans has suggested that they represent a reinforcement of the entrances to counter the pressure exerted laterally by the interruption of the sod wall (Louwe Kooijmans, pers. comm., May 2003). But the presence of these entrances where no sod wall is expected, pleads against this (*e.g.* the house of house-site 4 (fig. 4.2, 4); Hessing 1991; Appendix II; VI). Perhaps – but this is rather speculative – the outer sets of posts served not so much as plain doorframes, but (additionally served) to more prominently display (household) symbols carved into, or attached to them.[9] The two largest houses have eaves drip gullies, which may have supplied the clay to (re)plaster the walls. Once dug, they served predominantly to keep the moisture away from the wattle-and-daub walls in order to minimize decay.

The houses were erected with alder and oak posts (Vermeeren 2005; Appendix I) and suggest very conscious use of wood-types. Some posts were reinforced with other wood fragments, and one post was placed on a wood fragment, the purpose of which was to act as a 'shoe' preventing settling (Vermeeren 2005, 43; 103). Efficient use was made of wood from oak trees, that were used in lengthwise split sections as posts (*opus cit*., 111).[10] The house on house-site 1 (fig. 4.2, 1) has many doubled posts, which indicate large scale repairs or consolidation, or alternatively, may be related to the construction of a loft

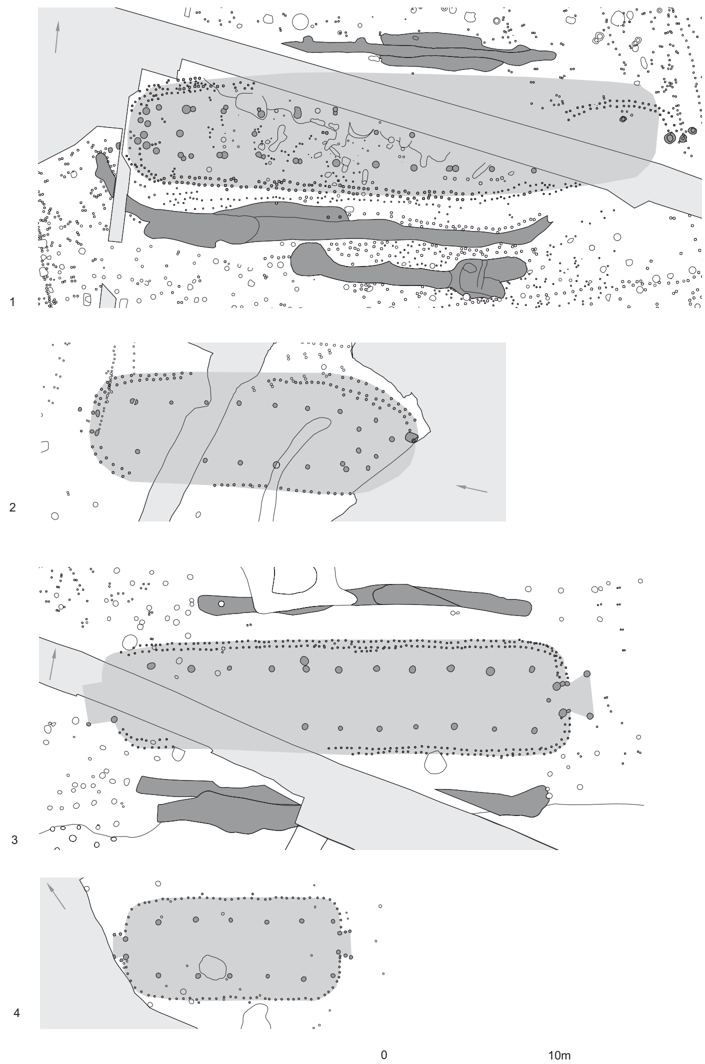

Fig. 4.2 Zijderveld houses. The houses are labelled with the number of the house-site.

8 See section 5.2.3.3, *cf.* Bakker *et al.* 1977; IJzereef & Van Regteren Altena 1991; Appendix V-VI.

9 See Oliver 1997 for various examples of the different types of social messages (*e.g.* clan affiliation, cosmic or ancestral symbolism, occupant status or function) conveyed by such decorations. The special importance of doorways is possibly '…an expression of its importance as an entrance from the outside world to the privacy of the enclosed space within.' (McDermott 1997, 323). Or, in the words of Paul Oliver, 'Decoration is frequently only applied to specific elements within a building rather than to the structure as a whole. The selection of these depends on the surfaces presented by the component, its accessibility and often, its viewability. But it also is a frequent indication of relative importance, either of the component itself, or its function, or of what it defines. (…) Doorcases and door-frames, necessarily substantial to accommodate an opening in the wall structure, are often embellished with ornaments which expands the area of the doorway and makes a statement of access' (Oliver 1997, 500, *cf.* Ali 1997, 593; Fokkens 2005d, 75 with reference to Hodder 1990, 129).

10 Possibly this splitting up of trees occurred because oak was relatively scarce, or simply because this species of wood was strong enough to be used even if split into sections.

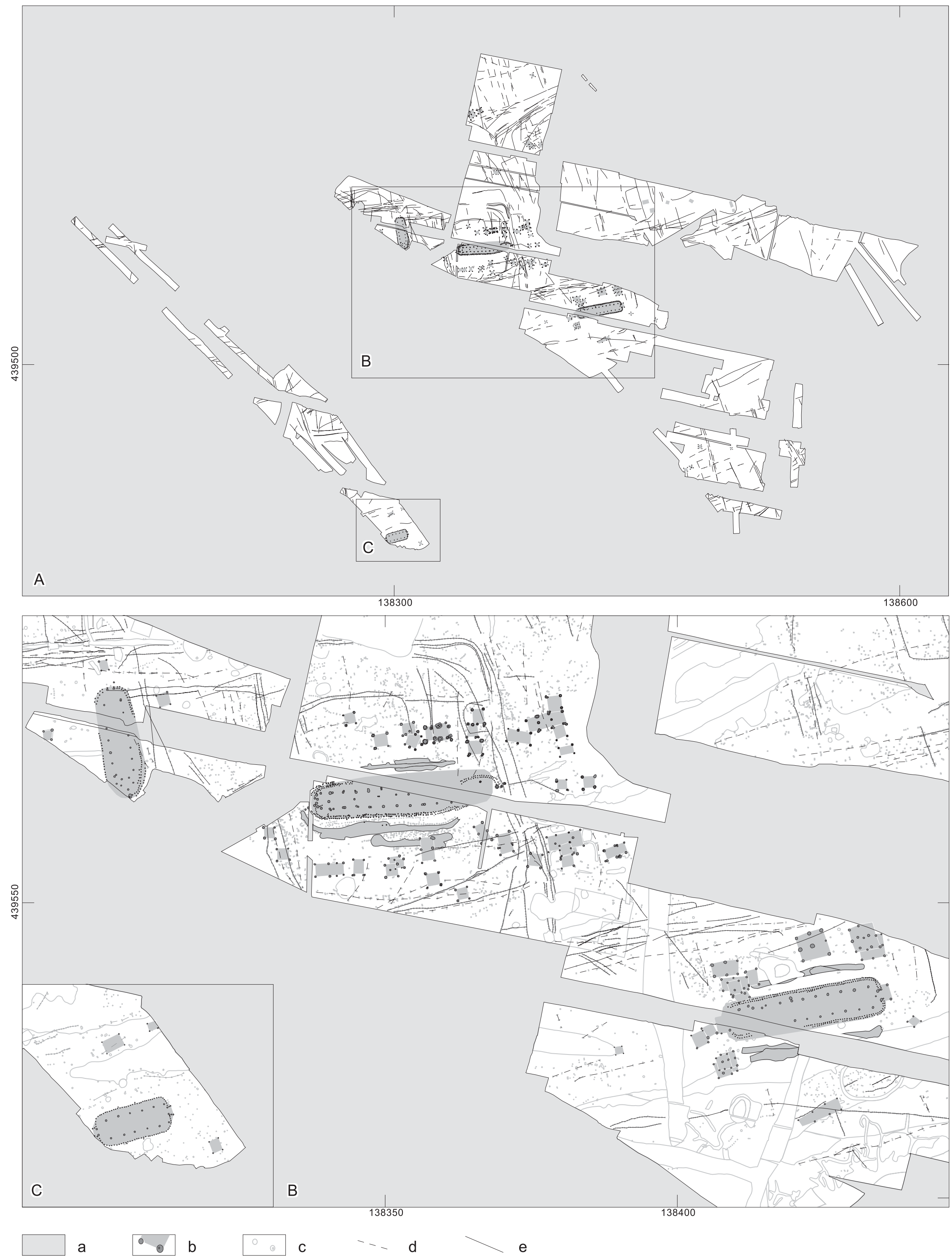

Fig. 4.3 Zijderveld overview of Middle Bronze Age structures.
a: not excavated, b: structures, c: other features, d: double-stake type fences, e: single-stake type fences.

(Theunissen & Hulst 1999b, 160-162). It is unknown when exactly this house was erected, or after which time-span it was repaired or strengthened.

For the house on house-site 3 (fig. 4.2, 3), the time of construction can be determined rather precisely. Two wooden posts of this house were radiocarbon dated and two others were dated by dendrochronology. The two dendrochronological dates show that this house was most likely built between 1426 and 1390 cal BC (Knippenberg & Jongste 2005, 17; 125; Appendix I). One of the radiocarbon dated alder posts has been interpreted as a repair or reinforcement of the east short side entrance and dates between 1390-1120 cal BC, suggesting this took place minimally a decade after the initial construction (Knippenberg & Jongste 2005, 17; 125; Appendix I). The various other dendrochronological and radiocarbon dates from this house-site suggest that the use-life of this house may have extended to 57 or even 76 years (Knippenberg & Jongste 2005, 17; section 3.4.2).

House-sites

Apart from the houses proper, the house-sites at Zijderveld are difficult to define. They show considerable variation in general feature density and particularly, in the number and placement of elements such as fences and outbuildings. The two largest houses have significantly more outbuildings within short (< 30 m) distance from the farmhouse than the smaller houses, despite the fact that clearly not all are contemporaneous (fig. 4.3).[11] Such large numbers of outbuildings could hint at large food or cereal (sowing grain) storage (*i.e.* implying large households or communities) or large fodder storage (*i.e.* implying large herds). In essence, however, with the present absence of arguments ascertaining the function of such structures (see section 5.4), this is impossible to tell.

There may be a correlation between the number of outbuildings on a house-site and the duration of the use-life of the main farmhouse, but again comparative evidence is as yet absent. The fact that outbuildings often conform in orientation to that of the farmhouses and are rebuilt nearly on the same spot several times, suggests that we can interpret them as an integral part of the house-site (see fig. 6.17; Appendix I). The (re)building of these granary-type outbuildings must have been a significant act, materializing the link between their function(s) and a specific household need (or needs) through their orientation and proximity to the farmhouse (*cf.* section 6.4.2).

Several types of fences were used, and in some locations they seem to have been rebuilt (up to four times) in certain parts of the settlement site. Some of these renewed fences give the impression that around the houses, rectangular plots with rounded corners were defined (fig. 4.1; Knippenberg & Jongste 2005, 63; who interpret these areas as farmsteads). Unfortunately, the dating of fences is difficult and some stretches of fence run between the farmhouses and the possibly associated outbuildings, or even into a farmhouse proper (see fig. 5.45; Appendix I fig. I.9 and I.12). Furthermore, most stretches of fence seem not to define house-sites, but to be part of systems of land parcelling at a larger spatial scale (see section 6.4.3).

Pits do not seem to cluster around the farmhouses and only at two house-sites were wells found at 5-19 m from the farmhouse (Appendix I, fig. I.12 and fig. I.14). In addition to the presence of a circular to oval ditch on house-site 3, Knippenberg and Jongste (2005, 71) claim that small (0,5-1 m wide) rectilinear ditches were also used to delimit house-sites and that their function was interchangeable with the fences, but definitive arguments for this hypothesis are lacking (see Appendix I).

Settlement site

The four house-sites of Zijderveld could have formed part of a single Bronze Age settlement site, whose extents were not reached within the current excavations. The presence of the A2 motorway in the middle furthermore hampers our interpretation of the former extents and nature of the Bronze Age settlement site. Available radiocarbon dates for house-sites 2 and 4 are not as precise as the dates for house-site 3, but also indicate occupation during the Middle Bronze Age-B (Knippenberg & Jongste 2005, 17; 127). More direct evidence for social ties between the occupants of the various house-sites – such as communal boundary structures – is however lacking. One may perhaps infer such ties from the specifics of the building tradition of the houses (two double stake walls and entrance portals) or

11 House 1; n = 38; house 3; n = 18; house 2; n = 3; house 4; n = 3, see fig. 4.3, B-C; Knippenberg & Jongste 2005.

in the fact that all house(-site)s conform in orientation to each other and the fences between them.[12] The system of orientation as a whole may have been guided by the trajectory of the reactivated Zijderveld residual gully, which would still have been visible as a marshy depression (Berendsen & Hoek 2005, 45).

Even if the house-sites were not fully contemporaneous, they still reflect an attitude of not disrupting the (pre-)existing methods and orientation of landscape structuring (*cf.* section 8.2). Evidently, Bronze Age communities had no desire to overbuild houses, nor to place their newly erected houses at 'awkward' angles to those pre-existing, both of which are valid options from a functional point of view. This hints at 'respect for what was there before' – or for what was still there – and reflects Bronze Age decision making, for whatever reasons they may have had to do so. It is tempting to interpret the discovery of three similar farmhouses within 150 m distance from each other as a single settlement, but without additional arguments, this is perhaps more telling on contemporary notions of 'what constitutes a settlement' than on prehistoric ones.

The overbuilding of the farmhouse on house-site 3 by outbuildings, and possibly the large number of outbuildings on house-site 1, indicate that the order and lay-out of the Bronze Age landscape changed over time. The reasons to build granary-type outbuildings on (former) house-sites could either be practical (*e.g.* it was an already cleared space, or it formed the highest part of the micro-topography), but was possibly also related to notions on the former (mythical, ancestral) occupation and may even have been connected to cycles of regeneration (entrusting the storage of sowing grain to the ancestors?) but this must remain speculative.

The other sites discovered in the Zijderveld macro-region datable to the Middle Bronze Age(-B) do not allow for a more detailed analysis of the nature and dynamics of Bronze Age settlement sites. This is a direct consequence of the prospective methodology used (corings or test-pits) and the absence of remains dated typologically or by radiocarbon dating to this period (see Appendix I).

Settlement and landscape

Presumably near the end of the life-span of the Schoonrewoerd fluvial system, extensive crevasse formation occurred (cf. Stouthamer 2001, 21-22). Some of these crevasses will have extended – facilitated by the easily erodible sand of the Zijderveld fluvial system's crevasses – into the Zijderveld levee deposits and residual gully. Figure 4.4 shows the location of some of these gullies, but more may have been present. Whatever Neolithic activities took place on the Zijderveld levees,13 these will, in parts, have been reworked or completely destroyed by the Schoonrewoerd crevasse activity. The gullies left by the Schoonrewoerd crevasses gradually got filled by floodbasin deposits, while peat formed in the reactivated residual gully and an alder carr vegetation developed locally (De Jong 1970-1971, 83; Van Beurden 2008).

Some incidental flooding still took place, as is evident from the clay layer intercalated in the residual gully's peat deposits and from changes observed in the pollen data (Van Beurden 2008). Over time, in the higher parts of the landscape, an alluvial hardwood forest of ash, elm and relatively abundant oak evolved, whereas in the lower lying areas the alder carr and open water vegetation still prevailed (fig. 4.4; Van Beurden 2008).[14] This formed the base of the landscape that evolved prior to the main (Middle Bronze Age-B) phase of occupation.

Crop processing – and presumably also cultivation – of hulled barley and emmer wheat, may have taken place on the higher parts of the landscape (De Jong 1970-1971, 80; 83; Knippenberg & Jongste 2005, 148). The crevasse deposits originating from the Schoonrewoerd fluvial system will have provided a natural bridge to maintain communication with people living on the nearby (distance *c.* 500-600 m) Schoonrewoerd deposits. Access to the major fluvial systems, either for fishing or river transport, presumably took place through (crevasses branching from) the Honswijk and Hennisdijk fluvial systems situated 3.5 to 7 km to the north (see Appendix I, fig. I.8).

12 The perpendicular orientation of house 2 is interpreted here as also conforming to this single, albeit bi-axial, system of orientation (*cf.* section 6.4.1).
13 *Cf.* De Jong 1970-1971, fig. 8; Theunissen & Hulst 1999b, 168; Knippenberg & Jongste 2005, 84.
14 De Jong 1970-1971; Theunissen & Hulst 1999b, 171-172; Bakels 2005; Vermeeren 2005; Van Beurden 2008.

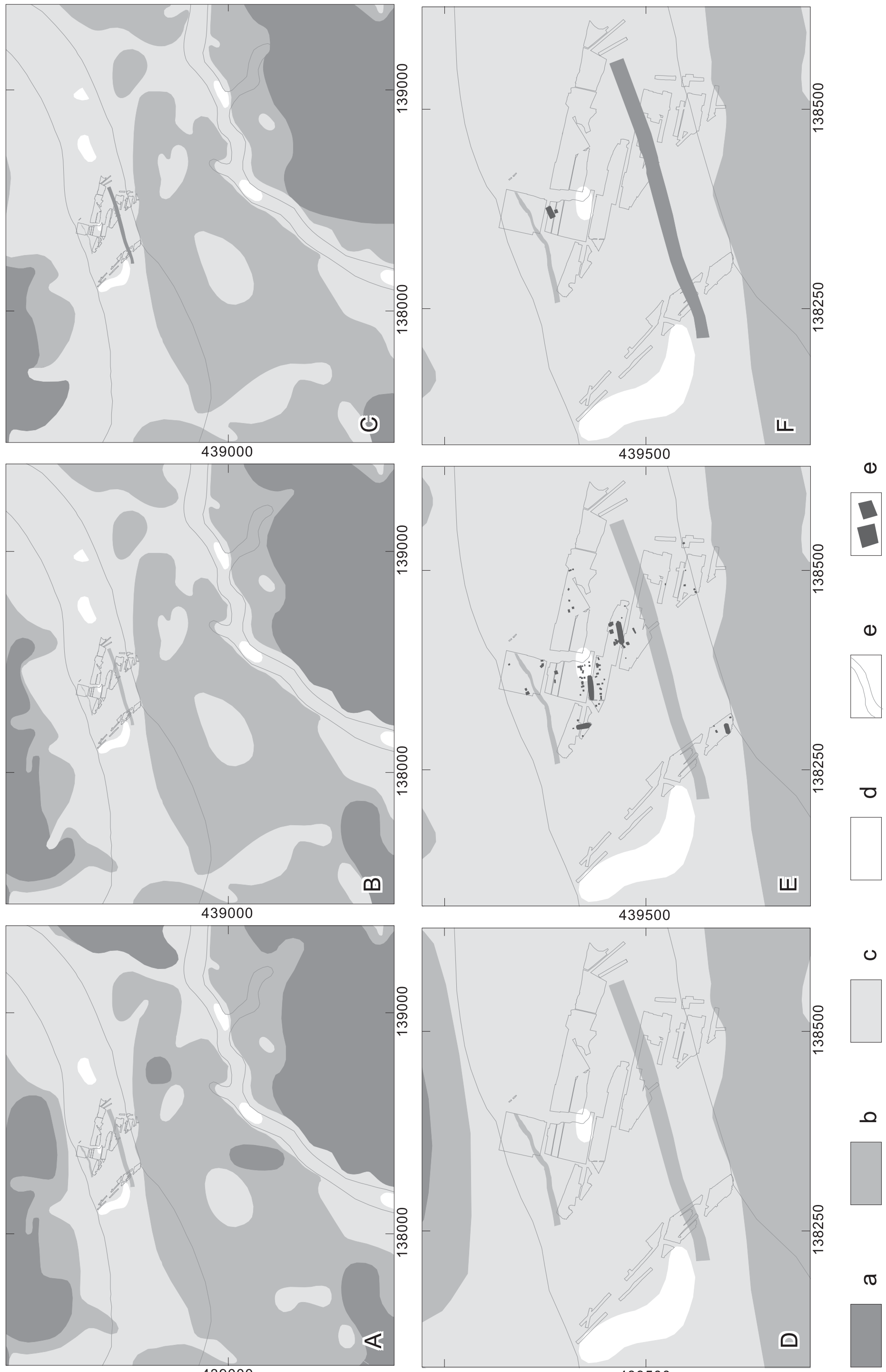

Fig. 4.4 Palaeogeographical development and occupation of the Zijderveld micro-region during the Late Neolithic to Middle Bronze Age-A (A & D), the Middle Bronze Age-B (B & E) and the early Iron Age (C & F)(after Van Zijverden 2003a; Van Beurden 2008).

a: floodbasin deposits; open water and peat development, b: alder carrs and wet meadows, c: alluvial hardwood forest; dryer; poplar, ash, alder and garden plots(?), d: highest parts; oak trees, e: outline of channel deposits of the Zijderveld (north) and Schoonrewoerd fluvial systems, f: structures.

Near the end of the 14th century cal BC, the Zijderveld residual gully was once more reactivated, presumably by a crevasse from the Honswijk fluvial system.[15] This will have started a period of increased sedimentation, effectively ending the Middle Bronze Age phase of use of the site.

4.2.4 Conclusions

The excavations at Zijderveld provide us with a large cut-out of a Middle Bronze Age(-B) settlement site on top of (crevasse deposits on top of) a fossil fluvial system. To both sides of the main residual gully, house-sites were constructed. These were integrated into a much wider system of parcelled land – and possibly fenced-in house-sites – of which the limits were not reached within the 300 by 500 m excavation extents. Within this large area at least four Middle Bronze Age house-sites were present, but the A2 motorway obscures much of our view. The preservation of many fragments of construction wood from the house and some outbuildings on house-site 3, allow for the first time to make an objective estimate of the durability of Bronze Age houses, which may easily be over 50 years. Furthermore, the extensive radiocarbon and dendrochronological dates (n = 13) on house-site 3 allow to assume contemporaneity between the (rebuilt) outbuildings and the farmhouse with more reliability. Besides this remarkable dating evidence, the remains recovered from Zijderveld compare well to those of other Middle Bronze Age sites from the Dutch river area.

4.3 Eigenblok and Enspijk

4.3.1 Introduction

The rich archaeological record for the Bronze Age in the Eigenblok macro-region has only relatively recently been discovered. The macro-region is named after a field toponym of a plot near the village of Rumpt where, prior to the Betuweroute railway construction, prospective coring uncovered archaeological remains.[16] These plots were further investigated with additional coring and test-trenching.[17] As the sites proved to be of good quality and the Betuweroute could not be diverted to miss these sites, they were selected for excavation (Jongste & Van Wijngaarden 2002; Appendix II). These excavated sites were situated on an inactive fluvial channel's levee deposits, and on the crevasse splay deposits that covered this channel's levees and crevasse splays (Van Zijverden 2002a; 2004a). On most sites the normal array of settlement site structures, such as houses, outbuildings, pits, fences and wells were encountered. The overall feature preservation was good and shallow traces such as human footprints, cattle hoof imprints, ard marks and stake holes were preserved. In the postholes of various structures many alder, some buckthorn and a single oak post stumps had been preserved (Brinkkemper *et al.* 2002, 554-555). The dates obtained for these posts, together with available geological *terminus ante* and *terminus post quem* dates, allow for a general date of the Bronze Age occupation to between the 17th and 12th century BC. Most dates, and all direct dates for structures however, point to a main phase of activity during the final 15th and 14th century (Jongste 2002a, 35-36; Appendix II).

Within the Eigenblok macro-region, a second larger excavation of a Bronze Age settlement site has been undertaken at one kilometer to the south-southwest of the village of Enspijk (Ter Wal 2005b). This site was discovered during a combined coring and fieldwalking campaign undertaken prior to the widening of the nearby A2 motorway (Haarhuis 1998, 19). Here too, a campaign of test-trenches preceded the more extensive excavation (Ter Wal 2004a). On this site, parts of two or possibly three house-sites were uncovered. These were situated on the levee deposits of the Enspijk (downstream connection of Hooiblok) fluvial system and date to the Middle Bronze Age-B (Ter Wal 2005b). Here, the feature preservation was comparable to the Eigenblok excavations, but no construction wood had been preserved (Ter Wal 2005b, 7).

4.3.2 General remarks

The palaeogeographical development of the Eigenblok macro-region is comparatively ill-understood. Only the fluvial systems dating to the end of the Holocene (*e.g.* Hooiblok, Enspijk and Gellicum) have been mapped reasonably

15 See Hulst 1967a, 7; 18; De Jong 1970-1971, 83; Van Zijverden 2003a; Appendix I; *contra* Berendsen & Hoek 2005, 22.
16 Asmussen & Exaltus 1993, 55-63; Asmussen 1994, 96-105.
17 Asmussen 1996; Jongste 1996; Bulten 1996.

accurately.[18] Their dating is however often uncertain. For the earlier Holocene fluvial systems, both location and age are not known.[19] The fact that the system on which the Eigenblok sites were found was not known or mapped prior to the Betuweroute construction works is a tell-tale sign (Jongste 2002a, 13). In addition, the Bronze Age occupation discovered at the Enspijk excavations conflicts with the previously assumed younger age for the Hooiblok and/or Enspijk fluvial systems, on which levee deposits the occupation took place.[20]

Presumably, the fluvial system on which the Enspijk settlement site was situated, formed the upstream connection of the Eigenblok system (Van Zijverden, pers. comm., Feb. 2006). Analysis of laser-altimetry data has indicated that various other – as yet unmapped – fluvial systems and crevasse deposits are to be found in the Eigenblok macro-region, whose exact morphology and age remains to be investigated (Van Zijverden 2004a; Van Zijverden & Laan 2005). These ill-mapped or unmapped systems may have affected the possibilities for human occupation of the Eigenblok macro-region, but sufficient data to determine this is lacking as yet.

The limited exposure and knowledge of the early Holocene landscapes within the Eigenblok macro-region explains the absence of finds from the early Holocene. Nonetheless, human activities on small river dunes and levee deposits must have taken place. Pollen analysis of a sample from the residual gully of the Eigenblok fluvial system has, for instance, shown that agriculture and possibly occupation took place during the final fourth and/or initial third millennium BC (Brinkkemper *et al.* 2002, 442; 448-449; Appendix II).

It is only for the (end of the) Late Neolithic period, that more securely datable finds from the Eigenblok macro-region are known. Both the Enspijk and Eigenblok excavations have yielded Bell Beaker period ceramics.[21] Unfortunately, little contextual information for these finds is available. At Enspijk, sherds were recovered from the finds-rich vegetation horizon that covered the (predominantly Middle Bronze Age) settlement site (Ter Wal 2005b, 27-28). At Eigenblok, the Late Neolithic ceramics originated from the finds-layer(s) containing predominantly Bronze Age ceramics (Jongste 2002a, 34-38; Bloo & Schouten 2002). No features could thus be dated by association to the Late Neolithic on either of these excavations.

At two sites of the Eigenblok excavations, vertical stratigraphy allowed to differentiate between an older and a younger period of use. It is not clear what the exact starting date for the former should be, but a residual gully date of *c.* 3340-2930 cal BC (Berendsen & Stouthamer 2001, 199; Appendix II) for the underlying Eigenblok fluvial channel and levee deposits serves as a *terminus post quem*.

These lowermost levels are covered by crevasse splay deposits for which a *terminus ante quem* date of *c.* 1920-1680 cal BC is available (Jongste 2002a, 35; Appendix II). This implies that at least from the end of the Late Neolithic to the first half of the Middle Bronze Age, various parts of the landscape were suitable for human activities. The types of features discovered on this lower level are comparable to those of the later Middle Bronze Age-B occupation phases; stakes of fences, postholes, pits and ard-marks.[22] The apparent similarity is countered by the absence of clearly recognizable house plans and substantial outbuildings.[23] Presumably at the end of the Middle Bronze Age-A, a barrow (and possibly a second barrow) was erected within the Eigenblok excavation extents.[24] Despite the presence of ceramics and preserved posts datable to the Early Bronze Age and Middle Bronze Age-A in the Eigenblok excavations, the nature of the human activities during these periods can often not be reconstructed. Ard-marks discovered on the lower level of Eigenblok site 5, indicate that in any case crop cultivation took place there.[25] Clear house plans or features are lacking for these periods as well, but based on the small number of identified sherds,[26] the intensity of these activities should perhaps not be overrated.[27]

18 *Cf.* Stiboka 1973; Verbraeck 1984; Berendsen & Stouthamer 2001; Van Zijverden 2004b.
19 *Cf.* Asmussen & Exaltus 1993, 14; Asmussen 1994, 27; Van Zijverden 2004a; Van Zijverden & Laan 2005; Feiken 2005, 15-16.
20 Berendsen & Stouthamer 2001, 199; 201; 208; 235; revised dates, Berendsen & Hoek 2005, 31; Berendsen & Stouthamer 2005, 19.
21 Bloo & Schouten 2002, 243-254; Ter Wal 2005b, 27-28; Appendix II.
22 *Infra*; Hielkema, Prangsma & Jongste 2002; Appendix II.
23 But see Appendix II, figs. II.5 and II.7.
24 Jongste 2002a, 35; Hielkema, Prangsma & Jongste 2002, 137; 157-159; Appendix II.
25 Hielkema, Prangsma & Jongste 2002, 131 fig. 3.26; 141-142; Appendix II, fig. II.5.
26 A total of 22 at Eigenblok (Jongste 2002a, 37-38) and 11 at Enspijk (Ter Wal 2005b, 27-28).
27 But see Appendix II, fig. II.8 or Chapter 5, fig. 5.5 no 4 for a tentative Middle Bronze Age-A ground plan.

Nonetheless, the presence of a marginal amount of ceramics from the Late Neolithic, Early Bronze Age and Middle Bronze Age-A on sites with abundant Middle Bronze Age-B pottery, appears to be a consistent factor for Bronze Age sites in the river area (see section 7.3.2). Unfortunately, the excavations executed in the Eigenblok macro-region offer no clear-cut arguments to explain this recurring type of combination. From the lowermost levels at the Eigenblok excavation, only 183 gram of ceramics were recovered, none of which could be typologically dated to the earlier – presumably Late Neolithic to Middle Bronze Age-A – phase (P. Jongste, pers. comm., Jan. 2006).

Nonetheless, the frequent overlap between such earlier (Late Neolithic to Middle Bronze Age-A period) and Middle Bronze Age-B period remains is in need of explanation. Taking an ecologically deterministic viewpoint, one may assume that inhabitable surfaces were sufficiently scarce for frequent overlapping of sites to have occured, and might thus explain why older period remains are so often encountered on younger period sites. This line of reasoning, however, has two main flaws. The first is that it assumes the physical landscape as well as the cultural traditions influencing its use, to have remained unchanged during both periods. For the periods and the geological area under study, both seem unlikely. The second flaw is that – even if one assumes both physical landscape and societal structure to have remained comparable – the size and context of the artefact assemblages is incomparable. To illustrate this, the 20 odd Late Neolithic to Middle Bronze Age-A sherds from Eigenblok originate from a ceramic complex of 9553 sherds (over 146 kg; Bloo & Schouten 2002, 219). Although for the Eigenblok excavations a taphonomic explanation for the unequal distribution is possible,[28] this unequal distribution is encountered too frequently for this to be an entirely satisfying explanation.[29]

Finally, it should be noted that the archaeological information for human occupation of the Eigenblok macro-region is very much confined to the two excavated areas at Eigenblok and Enspijk. For nearly all periods, additional find-spots from other parts of the macro-region are unknown. Only from the Iron Age and the start of the Roman period, a higher number of find-spots is known (Appendix II). This scarcity of prehistoric sites can be explained by an overall low number of extensive excavations carried out, combined with the general depth of later prehistoric remains below the present-day surface, which decreases the recognizability of such sites in fieldwalking campaigns.[30]

4.3.3 The Enspijk excavation

Widening of the nearby A2 motorway necessitated the Enspijk excavation in 2004 (Ter Wal 2004a; 2005b). In total, over more than half a hectare was excavated in the shape of a roughly 240 by 14 to 40 m wide strip orientated perpendicular to the underlying fluvial system (fig. 4.5; Ter Wal 2005b, 11). The diversity of features recovered (single and double-stake types of fences, postholes, pits and a ditch segment) corroborate the interpretation of the site as a Bronze Age settlement site. In this excavation, three Middle Bronze Age(-B?) house-sites were partially uncovered.

It is clear from fig. 4.5 that the Bronze Age built-up landscape was considerable larger than the arbitrary section uncovered in the Enspijk excavation. The cluster of postholes located in the central part of the excavation, may very well extend eastward outside of the excavation limits. Furthermore, to the south as well as to the north of the cluster encompassing the three partial house-sites, stretches of fence – mostly orientated in line with, or perpendicular to house 1 – indicate a scale of landscape parceling that by far transcends the maximal size of the excavated transect.

Houses

Perhaps it is all the more remarkable that within such a narrow trajectory, no less than three ground plans of Bronze Age farmhouses were recognized (fig. 4.6). The arrangement of the roof-bearing posts in two straight rows, the

28 The phase of crevasse formation ending the first period already referred to above, may have washed away much of the older period's surface layer and consequently the finds (Van Zijverden 2002a, 70).

29 *Cf.* Enspijk (section 4.3.3; Ter Wal 2005b), Dodewaard (Theunissen & Hulst 1999a; Appendix VI), Tiel (Hielkema 2002b; 2003; 2004; Ufkes 2005; Van Hoof & Jongste 2007), Lienden (Schoneveld & Kranendonk 2002; Appendix V), De Bogen (Meijlink & Kranendonk 2002; Appendix II).

30 *Cf.* Asmussen & Exaltus 1993, 12; Van Zijverden 2002a; Feiken 2005; Berendsen & Hoek 2005, 28.

presence of a more closely set entrance 'portal' and the double-stake walls of two of them conform very well to other Bronze Age farmhouses in the river area.[31]

Fig. 4.5 Overview of the Middle Bronze Age structures at Enspijk – A2/Op- en Afrit Geldermalsen.
a: not excavated, b: structures (houses, outbuildings, fences), c: structures, d: other features.

The dense concentration of features in the northwest part of house 2 is remarkable (fig. 4.6, no 2), but it is unclear whether these represent an internal construction within this part of the house. Alternatively, they could be the result of repairs, but these posts cannot have carried much weight as most of them were rather small (Ter Wal 2005b, 19; section 3.2.3). Two short perpendicular lines of stakes were found in the south-east part of house 2. They may represent cattle stalls, but the excavator remains cautious in his interpretation because of the small numbers of stakes involved (Ter Wal, *loc. cit.*). If, however, the interpretation is correct, this farmhouse would be the only Bronze Age farmhouse from the Dutch river area with tangible evidence for the indoor stalling of cattle.[32] Presumably, a 5 m stretch of the wall of house 2 was once replaced (Ter Wal 2005b, 19).

House 3 is slightly different. Here, the spacing between the roof-bearing posts is exceptionally large (2.75 m mean; Ter Wal 2005b, 21) and no more closely set entrance portal could be recognized. Perhaps this building had a function different from that of houses 1 and 2, but on the exact function can only be speculated. Samples of charcoal from two postholes of both house 1 and 2 have been subjected to radiocarbon dating. These samples contained different

31 See especially Zijderveld (section 4.2; Knippenberg & Jongste 2005; Appendix I) and Dodewaard (section 4.7; Theunissen & Hulst 1999a; Appendix VI).
32 See section 5.2.3.3, especially figs. 5.16 and 5.17.

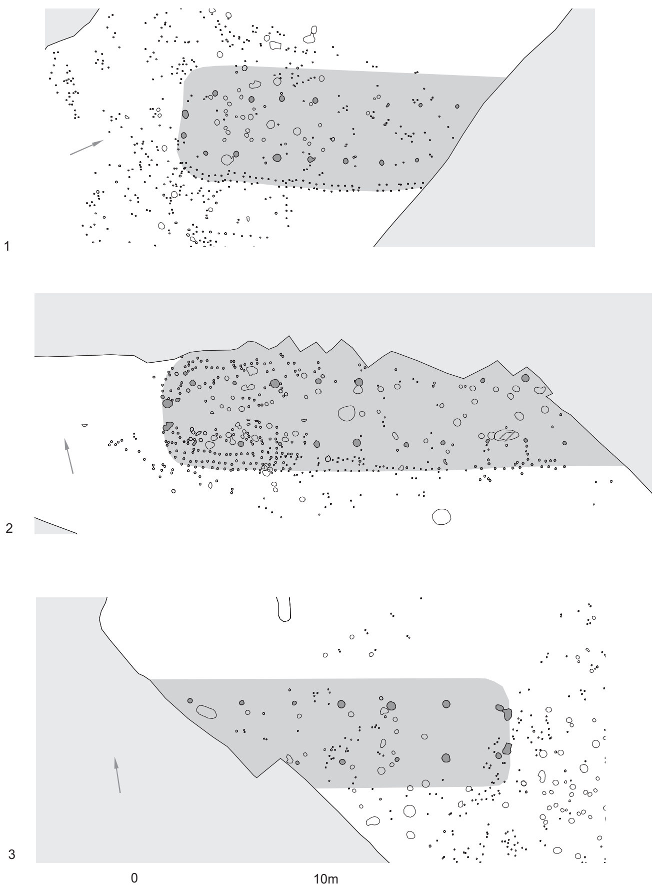

Fig. 4.6 The Bronze Age houses from the Enspijk excavation (house numbers correspond to those in the text).

fragments of charcoal that had been combined and for which no wood species identification was made, which decreases the accuracy of the dates.[33] The calibrated ranges all fall between 1500 to 1130 cal BC (see Ter Wal 2005b, 19; Appendix II). However, as the association between the construction of the houses (the incorporation of the charcoal into the posthole) and sample ages (the time the wood was burned) is inherently weak, these samples cannot but give a rough indication of the period(s) of use of the settlement site (see section 5.2.3.1).

House-sites

Establishing the nature of the house-sites is difficult, as the close proximity of the farmhouses to one another complicates the association of farmstead elements such as granaries and pits to individual house(-site)s. According to the excavator, no indications for prehistoric farmsteads were encountered (Ter Wal 2005b, 43). Three reconstructed granary-type outbuildings are situated 'within' the ground plans of houses. If this interpretation is correct, it would positively indicate at least several phases of use of one of the house-sites. As neither absolute dates nor cross-cutting features are available, it is not clear whether these outbuildings pre- or postdate the houses. Furthermore, if we assume house 3 to also have been three-aisled in construction, the close proximity to the ground plan of house 1 suggests that these two cannot have functioned contemporaneously. Outbuilding 5, for which a date of *c.* 1400-1120 cal BC on charcoal from a posthole is available, also overlaps with the ground plan of house 3.[34] In conclusion, various phases of use of the house-sites at Enspijk must be assumed, but their relative phasing is unknown. At best, the conclusion can be drawn that for Bronze Age farmers, the erection of outbuildings on former house-sites and construction of houses near former house-sites – or alternatively; the construction of houses on plots previously used for outbuilding and/or houses – was unproblematic.[35]

Settlement site

Despite the absence of clear-cut house-sites, at the level of the settlement site, diverse and extensive landscape ordering is visible. Various structures from the Enspijk excavation conform to a dominant system of NW-SE orientation. Houses 2 and 3, however, deviate slightly – to an identical degree –from this pattern, suggesting that both belong to a different phase of landscape structuring. House 1 conforms to the dominant orientation (albeit perpendicular), as do most of the fences and two (possibly three) of the four-post outbuildings. Perhaps these too belonged to a single phase of landscape structuring. Such phases, however, could span considerable periods of time. The rebuilding, up to five times, of identical types of fences in the north and south of the excavated area may illustrate the importance

33 *Cf.* Mook & Waterbolk 1985; Waterbolk 1970; Lanting & Van der Plicht 1993-1994; 2002; 2003.

34 UtC-13614: 3019 ± 41 BP; Ter Wal 2005b, 24; 32. From the same posthole, a top part of a barrel-shaped pot was recovered (table 8.1; *ibid.*).

35 *Cf.* sections 4.5.3 and 7.3.2.

that was given to upholding the orientation of the (previous) system of landscape structuring. It is, however, quite likely that in the southern cluster, fence lines belonging to both main phases of orientation have been preserved. This too can be informative on Bronze Age decision making: despite the fact that the orientation of the house(-site?)s changed, the fences were – conforming to the new system of orientation – still placed in the same zone of the landscape. A previous phase of landscape ordering was in this sense still respected. The function of these systems of fences remains unclear and the small size of the excavation does not allow to speculate whether they could have formed some kind of settlement site boundary.

Settlement and landscape
The settlement site of Enspijk was situated on an inactive fluvial system.[36] Both the vegetation horizon – which was preserved in the more lower-lying parts of the excavation – and stretches of fence continued across the main residual gully (Feiken 2005, 13). This indicates that this fluvial system was inactive and that its residual gully had already been filled-up. As a consequence, no water-filled channel was available for riverine contacts and drinking water had to be obtained through the digging of wells (although none were uncovered) or from elsewhere. The nearest active rivers during the Middle Bronze Age-B were the Hennisdijk and Est fluvial systems, located *c*. 6 km to the northeast and southeast of the Eigenblok macro-region respectively, but unmapped or misidentified downstream branches or crevasses of these systems may have provided fresh water even closer by (Berendsen & Stouthamer 2001, 199; 200; 205).

It is very well possible that the orientation of the (vegetation in, or alongside, the) inactive and covered residual channel has influenced the orientation of the Bronze Age settlement site. The clustering of fences in the southern part in particular, may be related to the former presence of the residual gully. However, it may equally well be that the morphology of the entire fluvial system's deposits (levees and residual gully, *i.e.* at a larger spatial scale), instead of the residual gully trajectory, was the structuring element. The excavation extents, however, are too confined to solve this.

4.3.4 The Eigenblok excavation

As stated in section 4.3.1, archaeological coring campaigns and two campaigns of test-trenches had demonstrated the high quality of two clusters of archaeological remains underneath the fields known locally as 'Eigenblok'. In the vicinity of these two sites on which the excavations initially focused, some areas showed slight discoloration on aerial photographs that were interpreted as possible barrow crop-marks. In addition, corings executed for the compilation of a detailed palaeogeographical map also yielded archaeological remains. It was decided that these locations were also to be investigated with test-trenches. Some of these test-trenched sites (sites 1 to 4, see fig. 4.7) were thereafter selected for more extensive excavation (Jongste 2002a, 20-25; Appendix II). All but site 3 yielded parts of Bronze Age house-sites.[37] These house-sites were established on the higher parts of a complex geological landscape. The Bronze Age occupation layer was formed in the top of a layer of silty to sandy clay (crevasse deposits) or heavy clay (floodbasin deposits), that had been deposited on top of older levee and crevasse deposits (Van Zijverden 2002a; 2004a; Appendix II).

Houses
A total of seven houses was reconstructed (see fig. 4.8). Most sites only yielded a single house, but on sites 2 and 6, two houses were reconstructed. The high densities of features on the various sites often complicated the identification and reconstruction of the houses.

The house from site 1 (fig. 4.8, no 1) could be reconstructed reasonably completely. The roof-bearing structure consists of two rows of regularly spaced posts. A slight bend in the rows of posts and a slightly larger span (distance between the two rows of posts) in the easternmost part of the house may indicate that the construction took place in two phases, but this is uncertain. In both short sides, entrances are reconstructed. The eastern entrance comprises a more closely set entrance portal, whereas the western entrance included a more widely set elaborate

36 For a discussion whether this fluvial system should be labelled Enspijk or Eigenblok, see Appendix II.
37 Jongste & Van Wijngaarden 2002; Jongste 2008; *supra*; Appendix II.

entrance portal. The latter type of entrance occurs uniquely in the Dutch river area and has also been encountered at Zijderveld and Wijk bij Duurstede.[38] More or less in the middle of the house, a large patch of (burned?) clay was visible. This has been interpreted as the remainder of a clay-lined floor, or possibly a hearth area (Hielkema, Prangsma & Jongste 2002, 88-89).

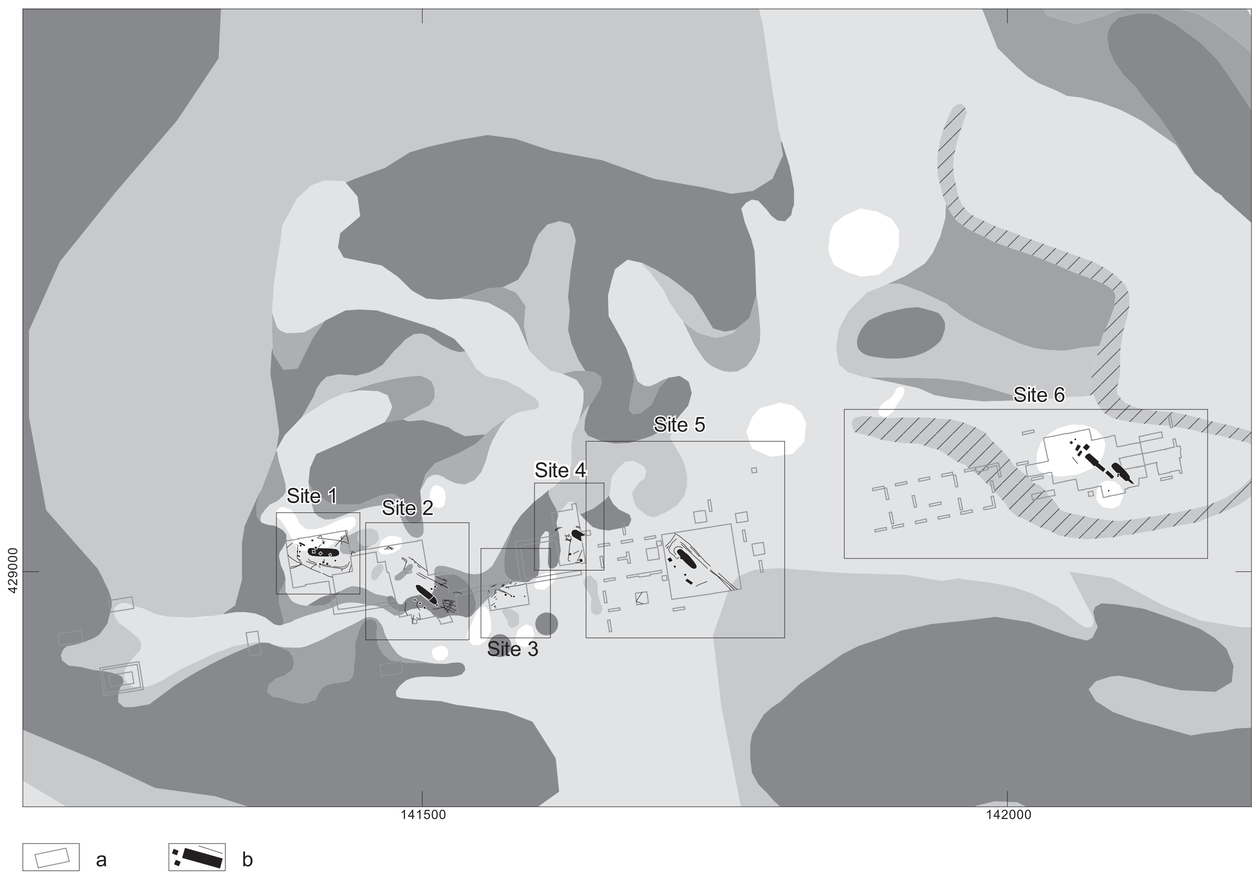

Fig. 4.7 Middle Bronze Age structures reconstructed at the Eigenblok excavation. Trenches and structures are plotted on a profile-type map (lighter shades represent higher, drier and more sandy to silty soils, darker shades represent more clayey to peaty, lower lying soils). The hatched area is the Eigenblok fluvial system's residual gully.

a: trenches, b: structures.

The two houses of house-site 2 overlap, have an identical orientation, and their ground plans share many structural properties (fig. 4.8, nos. 2 and 3). The degree of similarity is strong enough to assume that the people who constructed the second house, had detailed knowledge of the constructional details of the previous building (*cf.* Therkorn 1987a, 219). A complete, on-the-spot, yet slightly off-set rebuilding of a farmhouse by its residents may be assumed. Possibly, the second house (fig. 4.8, no 3) is the younger of the two (Hielkema, Prangsma & Jongste 2002, 104). The reconstructed southeast end of the younger house is disputable. The proposed radical change in span from the normal three meter to over five meter, implying a change from a three- to a single-aisled construction, seems unnecessary and is unparalleled. Most likely, both houses were not much longer than the eight trusses which can be easily identified. In the published plans, they form the northwestern-most part. Consequently, only the entrances in the northwest short side are considered reliable. As with the house on site 1, a single line of stakes indicates the wall for both house-phases.

38 Sections 4.2.3 and 4.5.3; Knippenberg & Jongste 2005; Appendix I; Hessing 1991; Appendix IV.

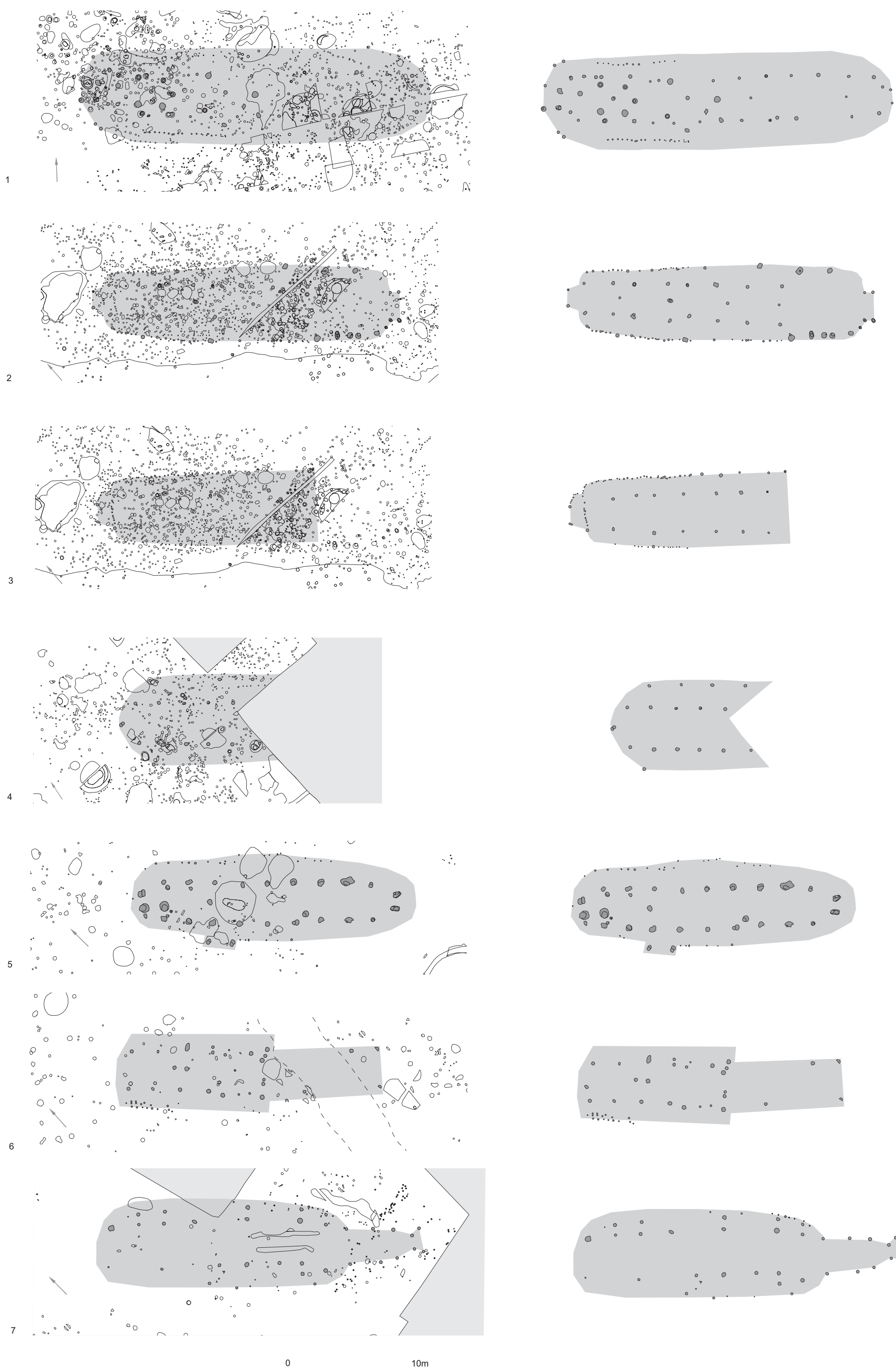

Fig. 4.8 Middle Bronze Age houses from the Eigenblok excavation (1 = house-site 1, 2-3 = house-site 2, 4 = house-site 4, 5 = house-site 5, 6-7 = house-site 6).

The house on site 4 could only be partially uncovered, as a recent drainage ditch cuts through it (fig. 4.8, no 4). This ground plan has been interpreted as a 'Blerick' type of house, because of the presence of sturdy outer posts which lack exact perpendicular placement to the roof-bearing posts.[39] There are, however, some problems with this interpretation. Firstly, the absence of a row of comparably deep posts on the southwest side should be accounted for. Secondly, the reconstructed overall width of nearly seven meters is on the extreme limit of the widths known for acceptable Dutch Bronze Age house plans (see section 5.2, esp. fig. 5.26). Possibly, these posts are part of another structure which, unfortunately, cannot be reconstructed in more detail. The inner rows of posts should nonetheless be interpreted as the roof-bearing structure of a Bronze Age farmhouse, but the association of the 'outer posts' is dismissed here. If the doubled posts placed centrally at the northwestern end indeed ever were part of the house, than the absence of an entrance portal in the short side should be noted.

Another house, again of a slightly different type, was uncovered at site 5 (fig. 4.8, no 5). The two rows of roof-bearing posts are placed at gradually increasing and decreasing distance from each other, giving the inner roof-bearing structure a curvilinear to cigar-like shape. Such an inner construction is also known from some houses at 'De Bogen' and Wijk bij Duurstede.[40] It shares another rather unique feature with the latter site: the occurrence of a possible entrance in the long side of the farmhouse (*cf.* Hessing 1991, 45 fig. 4, no 8). If the last, more closely set posts in the northwest short side are to be interpreted as an (repaired) entrance, the total number of entrances recognized amounts to three. Two extra posts next to the roof-bearing posts in the north-west part of the house are interpreted as repairs or as a consolidation of the latter (Hielkema, Prangsma & Jongste 2002, 132). A large patch of yellowish clay with a black core in the centre of the house near the entrance in the long side is thought to indicate the location of the hearth (Hielkema, Prangsma & Jongste 2002, 133).

The two houses of site 6 proved most difficult to recognize. After the main phase of Bronze Age occupation, the site was used for crop cultivation, to which the abundant ard-marks testify (Hielkema, Prangsma & Jongste 2002, 144; 156; Appendix II, esp. fig. II.16). The dense ard-scratches decreased the visibility of the archaeological features. Nonetheless, two possible houses were reconstructed (fig. 4.8, nos. 6 & 7). The first house (fig. 4.8, no 6) lacks the consistent pattern of two rows of roof-bearing posts that characterizes some of the other houses of Eigenblok. Moreover, post size and depths vary significantly (Hielkema, Prangsma & Jongste 2002, 151 fig. 3.36). Essentially, its validity as a Middle Bronze Age-B farmhouse should be questioned, although the finds-distribution plots seem to indicate a concentration on the location where house 1 is reconstructed (*cf.* fig. 6.36, B).[41] Based on these observations, house 1 is for now best interpreted as a tentative Bronze Age structure, possibly a house. The second house is also problematic (fig. 4.8, no 7). This house too was disturbed by the ard-marks, which is used by the excavator to explain the absence of posts where they were to be expected (P. Jongste, pers. comm., Feb. 2006). Even in that case, the structure appears irregular. If the curved ditch segment bears any relation to the house (*cf.* Zijderveld; Appendix I), then the easternmost reconstructed extension, should probably be disaggregated from the proposed house plan. Quite interesting are the two small linear ditches inside the house, which are interpreted as cart or wagon-tracks (Hielkema, Prangsma & Jongste 2002, 152).[42] Despite some doubts on the reconstruction of house 2, a Bronze Age house plan was presumably present at this location and it is considered a possible house plan in the remained of this study.

With several of the houses discussed above, the post stumps were preserved and were submitted for radiocarbon dating. A post from the older house of site 2 was dated to *c.* 1495-1395 cal BC, a post of the house on site 4 was dated to *c.* 1520-1425 cal BC, two posts of the house on site 5 were dated to *c.* 1495-1400 cal BC and a post from house 2 at site 6 was dated to *c.* 1495-1215 cal BC (Jongste 2002a, 35). In conclusion, possibly as early as the final decades of the 16th century BC, but certainly during the 15th century, Bronze Age farms were constructed at Eigenblok (see also Jongste 2008).

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39 Hielkema, Prangsma & Jongste 2002, 119, see Theunissen (1999, 120-121) for the type plan of Blerick.

40 Meijlink & Kranendonk 2002; section 4.4.3; Appendix III and Hessing 1991; section 4.5.3; Appendix IV respectively.

41 Hielkema, Prangsma & Jongste 2002, 148-149.

42 Possibly, such tracks were caused by pulling heavily (dung?) loaded wagons out of the farmhouse in humid conditions (*cf.* Von Magdstein 1857; Coeckelbergs 1903, 95; Erens & Prick 1982, 40).

House-sites

No evident farmsteads can be recognized in the Eigenblok house-sites. This is partially due to later disturbances on some sites, to high feature densities on others, but above all it is due to the limited extents of the excavations (fig. 4.9). With all of the Eigenblok houses, the excavation limits are reached within 11 m of the house (Hielkema, Prangsma & Jongste 2002; Appendix II).

At site 1, the shape and orientation of some stretches of fence suggest a relation to the farmhouse. In addition, four- and six-post outbuildings appear to cluster near the house. To assign both fences and outbuildings to the house-site of house 1 is problematic. Various outbuildings overlap with house 1, or each other, and several of the outbuildings overlap with the fences. Evidently, various phases of use must be reconstructed. Preserved wooden posts from two outbuildings and a stake from one of the fences were radiocarbon dated, but as the house is not dated, no implications on their association with house 1 can be made. A similar situation can be constructed for house-site 2. Here too, stretches of fence and clusters of four-post outbuildings seem to be related to the farmhouse(es). Unfortunately, most of these are undated. Therefore, the fences at these sites cannot be used as reliable indicators of prehistoric farmsteads (*cf.* section 6.4.3).

The house on site 4 appears to be 'surrounded' by a large number of pits, but due to the small extent of the excavation, it is not clear whether the observed clustering of the pits has any relation to the house or whether it is coincidental (*cf.* section 6.4.4). Site 5, with its low feature density, may be the best source to look for prehistoric structuring of the house environs. All structures present at Eigenblok site 5 seem to conform to a northwest-southeast system of orientation. If we assume that this shared orientation is an expression of an intention not to disrupt the pre-existing landscape structuring – or more explicitly: as an expression of contemporaneity – than the available radiocarbon dates for two outbuildings (dated to the 14th to 13th century BC, *i.e.* 10 to 143 years after the house) may indicate that such intentions were long-lived (*cf.* section 3.4.2). For site 6, analysis of the house-site structuring is hampered by the uncertain recognition of both houses, their close proximity and the overall low number of house-site elements reconstructable (Hielkema, Prangsma & Jongste 2002, 159). Nevertheless, as on site 5, the various elements which were recognized also seem to conform to an – albeit less rigidly adhered to – system of northwest-southeast orientation.

To conclude, although some structuring of house-sites discovered in the Eigenblok excavations may be argued for, they do not allow the reconstruction of clear-cut Bronze Age farmsteads. On most house-sites there is a dominant set of orientations discernible, to which often the house, the majority of the outbuildings and – if preserved – stretches of fence conform. However, the location of the various elements such as fences, outbuildings and possibly pits in relation to the house, differs significantly between the house-sites. Lastly, it should be noted that the plots on which the house-sites are situated, often showed intensive use (*i.e.* high feature density) from periods other than the more readily recognizable Middle Bronze Age house-site structures. Whether this occurred prior to, of after the Middle Bronze Age phase of occupation – or both – remains unknown, but this higher feature density in any case complicates the recognition of farmsteads.[43]

Settlement site

The high feature densities at most of the house-sites indicate that the recognized house-site structures are only part of the story. In the northwest part of site 2, for instance, a dense cluster of stake- and postholes was visible, in which no 'normal' structures could be recognized. Such clusters may, however, be just as much part of the Middle Bronze Age settled landscape as the houses and outbuildings proper. The fact that the nature of the constructions reflected does not allow reconstruction, should nonetheless be no grounds for wholesale dismissal. Such clusters – or the constituent structures responsible for their palimpsest outlook – may have been considered part and parcel of Bronze Age settlements. In most cases, however, the assumed time-span of the occupation, combined with a lack of stratigraphy and absolute dates, does not present evidence to postulate that such clusters were an integral part of a given Bronze Age house-site.

43 See Appendix II for Iron Age use of the sites.

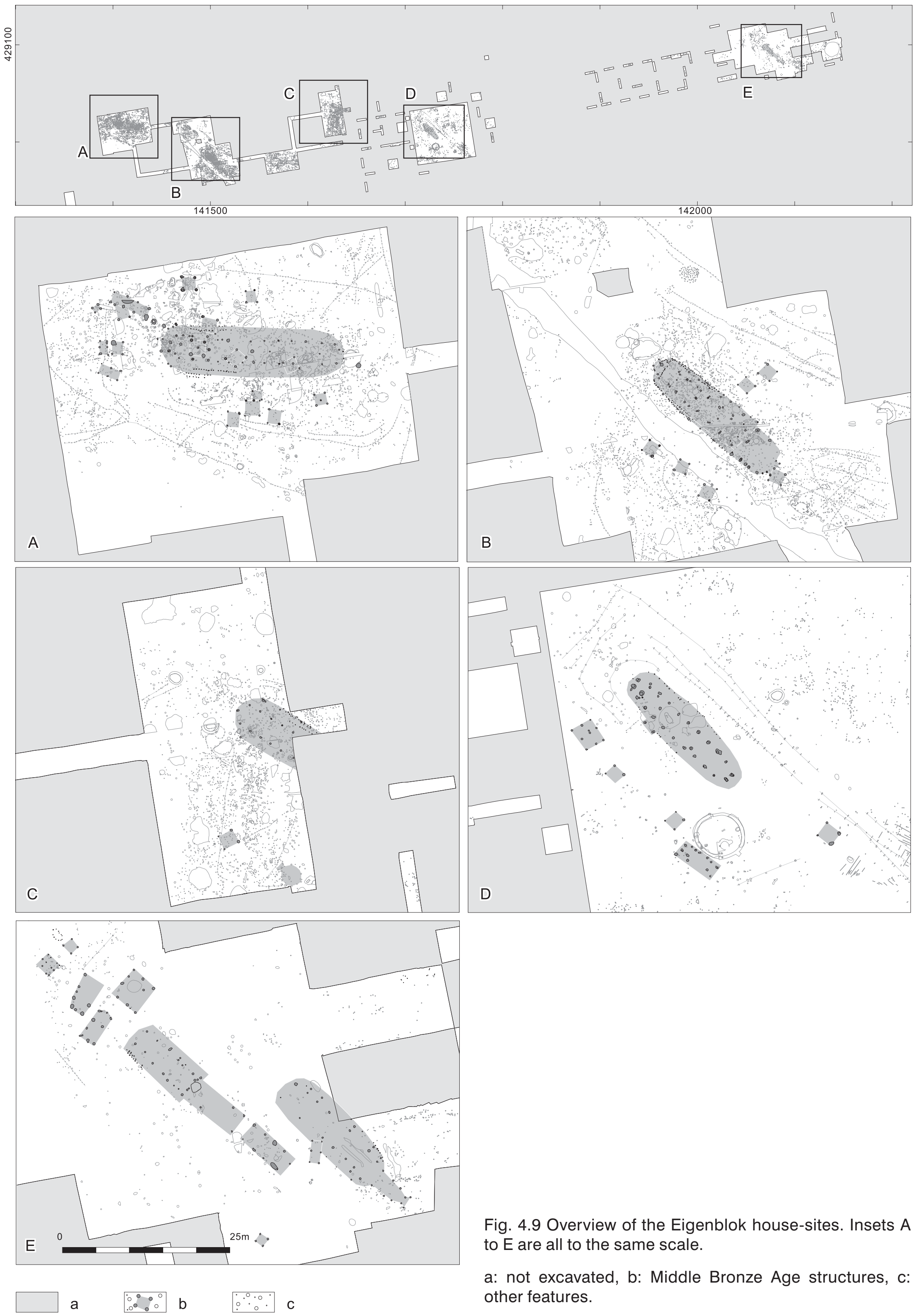

Fig. 4.9 Overview of the Eigenblok house-sites. Insets A to E are all to the same scale.

a: not excavated, b: Middle Bronze Age structures, c: other features.

Moreover, the areas between the house-sites are not completely devoid of human influence. At 40 to 60 m from the houses proper, fences and outbuildings can still be encountered. In the areas between sites 5 and 6, at *c.* 180 m from both, fences, ard-marks and cattle hoof imprints occur. As the areas between the sites have only been test-trenched, one cannot be sure whether these were never part of a house-site situated just outside the investigated areas. The physical-geographical research, in any case, has detected no evidence for such assumed house-sites. Furthermore, even if these were ever present, this does not conflict with the observation that the scale of the built-up landscape exceeds several hundreds of meters in size.

Perhaps this is also the way in which the Eigenblok house-sites should best be interpreted: as domestic clusters situated within, and conforming to – or at least respecting – a much wider system of landscape structuring. The shared dominant orientation of house-sites 2, 4, 5 and 6 can be used as a supporting argument for this. Although the orientation on house-site 1 deviates somewhat, there is no direct evidence to suggest it should date to another phase. Even more so, based on the radiocarbon evidence, all house(-site)s may have functioned contemporaneously during the start of the 15th century BC.[44]

It is not possible to determine whether several or all of the house-sites were once part of a larger settlement. No indications of structures joining or girding multiple house-sites were discovered. Here again, the limited extent of the excavation obscures much of the possible information on house-site interrelation.

Regardless of assumptions on contemporaneity, it is clear that in an area as small as 700 by 100 m (*i.e.* seven hectares), five house-sites were encountered. Based on the physical-geographical coring campaigns, several other possible house-sites and fields are to be found in the wider micro-region around these (Van Zijverden 2002a; 2004a; Appendix II).

Settlement and landscape

The occupants of the Eigenblok house-sites inhabited an undulating landscape of which the top layer consisted of crevasse (sandy to silty clay) and floodbasin deposits (clay) that covered a pre-existing fluvial landscape (Van Zijverden 2002a; 2004a; Appendix II). This older landscape had a comparable genesis and consisted too of floodbasin and crevasse deposits, but also of levee and residual channel deposits. Radiocarbon dates indicate that the fluvial system to which these older deposits belong, ceased its phase of activity at the end of the Middle Neolithic period (Berendsen & Stouthamer 2001, 199; 2005, 19; Appendix II). A period of fluvial stability followed, during which a vegetation horizon could form.

At this point, in several parts of this landscape, structures, fences and on one site a barrow was erected (Appendix II). When exactly the crevasse and floodbasin deposits that covered and eroded these older elements were formed, is unknown, but the residual crevasse gully belonging to this phases started to silt-up between 1920 and 1680 cal BC (Van Zijverden 2002a; 2004a; Appendix II). The fluvial system from which this crevasse originated is unknown, but as the residual crevasse channel is situated in the former Eigenblok fluvial system's main residual channel, it is likely that the crevasses of the responsible system breached into the Eigenblok main residual gully to the north or to the south of the site.

Based on the combined radiocarbon dates, it may be suggested that the formation of these deposits could have taken place at the start of the 17th century cal BC. The Middle Bronze Age-A ceramics from sites 1, 2 and 5 could represent reworked material from the older occupation phase, but the calibrated ranges of two radiocarbon dated posts could suggest a nearly instant (from *c.* 1690 cal BC onward) reclamation of the formerly utilized zones after the phase of crevasse formation (Jongste 2002a, 37-38; Appendix II). Yet in all fairness, it should be stressed that the majority of dated construction wood dates the main phase of construction activities to between the 15th and first quarter of the 13th century cal BC (Jongste 2008). Consequently, it is difficult to determine exactly how much time lapsed between the phase of crevasse formation and the Middle Bronze Age-B habitation on top of these crevasse splay deposits.

At most of the Eigenblok sites a strong correlation between relative height (micro-topography) and feature density could be observed.[45] The highest parts of the stacked crevasse landscape withnessed most construction

44 Jongste 2002a, 35-36; 2008; Appendix II.
45 Hielkema, Prangsma & Jongste 2002, 85; 97; 110; 115; Jongste 2002b, 591.

activities. In the lower lying areas in between, mostly cattle hoof imprints, fences and some areas of burned clay were encountered (Hielkema, Prangsma & Jongste 2002; Appendix II), indicating that these zones were principally used for activities other than habitation.

During the Middle Bronze Age-B occupation, the landscape gradually 'drowned' as a consequence of combined partial subsidence and groundwater table rise (fig. 4.10).[46] Calculations based on assumed settlement duration and thickness of the deposited sediments indicate that the rate of sedimentation was a factor 4 to 10 times faster than what is normally assumed for the central Dutch river area (Van Zijverden 2002a, 75, ref. to Berendsen 1982). No fluvial system that can be proven to have been active during the Middle Bronze Age-B is known from within the Eigenblok macro-region,[47] so the Bronze Age inhabitants presumably used the still relatively higher parts of the landscape – where the Eigenblok fluvial system's levee and channel deposits can be found in the subsoil – to access active river systems. Wells were recovered at sites 1 and 2 and possible drinking pools for cattle at sites 4 and 5 (Hielkema, Prangsma & Jongste 2002; Appendix II).

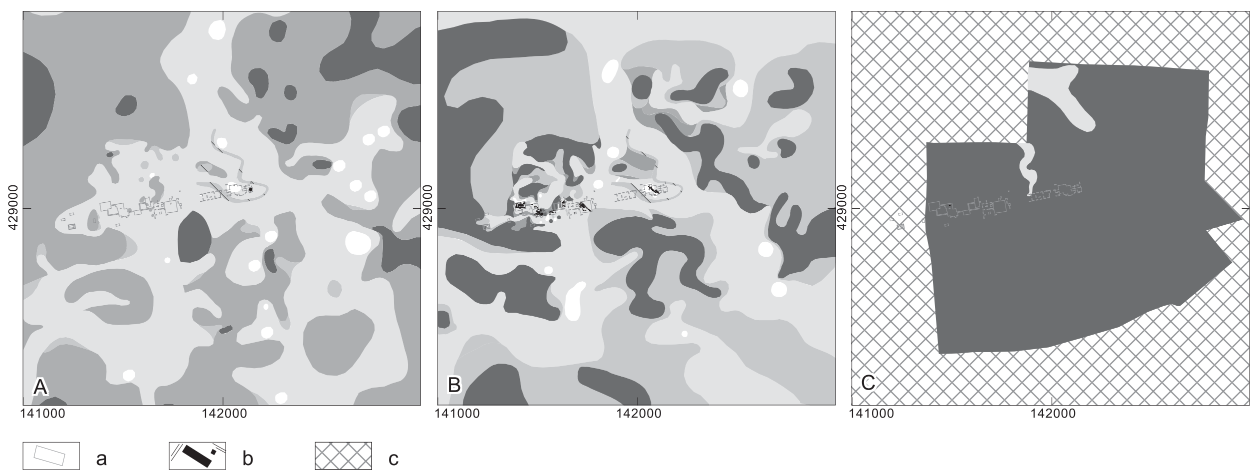

Fig. 4.10 Soil-type map and structures in the Eigenblok micro-region during the Late Neolithic to Middle Bronze Age-A (A), the Middle Bronze Age-B (B) and the Late Bronze Age to Early Iron Age (C). The darker shades indicate lower-lying, wetter areas of floodbasin deposits, the lighter shades indicate higher, dryer and siltier and more sandy deposits.

a: trenches, b: structures, c: no detailed information available.

Around the house-sites, predominantly wet vegetation types were to be found, of which predominantly alder, with some buckthorn (*Rhamnus cathartica*) and oak, were used for building purposes. Birch and ash trees may also have been present (Brinkkemper *et al*. 2002, 526). Charcoal analysis further indicates the presence of sloe, bird cherry (*Prunus padus*) and cranberry bush (*Viburnum opulus*; Brinkkemper *et al*. 2002, 520; 528).

Shortly before or during the period of 1400 to 1130 cal BC, again crevasse formation occurred from the depression at the location of the fossil Eigenblok fluvial system's residual gully (Brinkkemper *et al*. 2002, 443-444; Appendix II). The fluvial system causing this crevasse activity, is again unknown, but a number of new fluvial systems emerging to the east of the Eigenblok macro-region may have had some influence.[48] This phase of crevasse formation seems to have ended the main phase of occupation at most of the Eigenblok sites, but at sites 5 and 6 ard-marks bear witness to (re)use as agricultural fields (Jongste 2002b, 603; Appendix II). During the Late Bronze Age and Early Iron Age, continued subsidence, groundwater table rise and floodbasin sedimentation are thought to have

46 Van Zijverden 2002a, 70; Exaltus 2002a, 82; Jongste 2002b, 597; 603; Appendix II.
47 Van Zijverden 2002a, 75; Jongste 2002b, 602; Appendix II.
48 *E.g.* the Est, Bommel and Meteren fluvial systems; Berendsen & Stouthamer 2001, 194; 199; 220; 2005, 13, 20, 43; Appendix II.

decreased the size of the useable landscape of the Eigenblok micro-region (Van Zijverden 2002a; 2004b). Micro-morphological study indicated that the ploughing continued until the fields were dry for less than three months each year.[49]

4.3.6 Conclusions

The results of the two large-scale excavations in the Eigenblok macro-region, display a comparable image of the main elements of a Middle Bronze Age-B settlement site. In both excavations, multiple house-sites were recognized, that could overlap (Enspijk, Eigenblok site 2) or that were situated as much as 300 m apart. At both sites the investigations were confined to a predefined, elongated trajectory. Consequently, rather arbitrary and fragmentary parts of the cultural landscape have been excavated. This complicates discussions on settlement dynamics and densities.

At Enspijk, two or three houses and several outbuildings were recognized. The relations of various postholes, stake holes and some fences to the houses was unclear. In the orientation of the majority of the houses, fences and outbuildings, two phases of large scale (*c.* 200 m) landscape structuring could be discerned (*cf.* section 4.3.4; Appendix II). No vertical stratigraphy was present at Enspijk, suggesting that the physical landscape had altered little since the period to which the oldest recovered ceramics could be dated (possibly Late Neolithic, presumably Early Bronze Age). Two of the houses at Enspijk are much alike and well comparable to those from the Middle Bronze Age-B settlement site of Zijderveld (section 4.2; Appendix I). The possible presence of stall-partitioning – albeit disputable – is noteworthy.

The excavations at Eigenblok have yielded evidence for occupation that took place in a landscape with more geogentical differentiation (crevasses and floodbasin deposits on levee, floodbasin and older crevasse deposits). At two sites of the Eigenblok excavations, a vertical stratigraphy was discernible. The first phase could date somewhere between the final Middle Neolithic to the Middle Bronze Age-A , but conclusive evidence is lacking. The recovered finds (and structures) from this level are low in number and generally not diagnostic. After a phase of crevasse formation, the landscape showed significant variation in micro-topography. This is reflected in the concentration of areas with high feature density to the small elevations at the location where in the subsoil (stacked) crevasse deposits are found. On the highest parts of this undulating landscape, five Middle Bronze Age house-sites were erected. The houses form a heterogenic group, even without the houses from site 6. Both straight and curvilinear placement of roof-bearing posts and single-stake types of walls were current. Still, the houses fit well within the larger population of Middle Bronze Age houses from the river area.

Both at Enspijk and at Eigenblok, the information on the level of the house-site and the settlement site remains limited. The small scale of the excavations, reuse of particular plots (palimpsest character) and scarcity of absolute dates are the main reasons for this. Eigenblok site 5 is a noteworthy exception, as here a moderately low feature density combined with several radiocarbon dates allows one to postulate the presence of a structured house-site, situated in a system of fences, which may have existed for much longer than the 25-30 years generally assumed (see section 3.4.2).

The wide distribution and the arbitrary location of some of the trenches in respect to the natural landscape, have in some respects been beneficial. Neither at Enspijk, nor at Eigenblok, have the margins of the built-up environment of the settlement sites been reached. This indicates that Middle Bronze Age landscape structuring took place on scales beyond the 230 to 700 m stretches investigated at these sites.

4.4 De Bogen

4.4.1 Introduction

The state of knowledge on the later prehistoric occupation of the De Bogen macro-region was – as was the case in the adjacent Eigenblok macro-region (see section 4.3, Appendix II) – boosted by the archaeological fieldwork carried out in preparation of the Betuweroute freight railway construction between 1993 and 2002. Previously, only a small number of Neolithic and Bronze Age find-spots were known from the De Bogen macro-region. These finds

49 W. Van Zijverden, pers. comm., Feb. 2006; Exaltus 2002a.

were predominantly stone axes of unclear context and sherds recovered from excavations or during activities such as road construction.[50] The absence of Neolithic to Bronze Age finds discovered during the many (see Appendix III) fieldwalking campaigns undertaken in 1986 by the State Service for Archaeological Investigations (ROB, now RACM), is related to the fact that surface layers from these periods are at generally significant depth below current levels (*c.* 40-90 cm; *cf.* Jongste & Smits 1998, 9-10).

Consequently, during the initial phase of prospecting for sites in the planned Betuweroute trajectory, fieldwalking was supplemented by extensive and intensive coring campaigns.[51] The archaeological research was confined to a *c.* 200 m wide strip within which the railway was to be situated as well as to a larger area where the railway would link up to another one in the north (fig. 4.11). The curved shape of the railway trajectory in the latter location, has been used as the toponym for the excavations (the Dutch '*De Bogen*' translates as 'the bends') and is also used to designate the wider macro-region in this study.

Fig. 4.11 The location of the areas investigated due to the planned construction of the Betuweroute freight railway.
a: main Betuweroute railway trajectory, b: excavation trenches.

At several locations within the railway trajectory, archaeological remains indicating the possible presence of prehistoric settlement sites were documented during coring campaigns.[52] At a number of sites thus discovered earlier, test-trenches were dug to evaluate the quality, dating and extent of these remains.[53] Physical-geographical coring

50 See Hulst 1973, 28; Hulst & Van Klaveren 1975, 78; 1993, 159; 1994; De Jager 1996; Appendix III.
51 Asmussen & Exaltus 1993, 13; Asmussen 1994, 19-20; Appendix III.
52 See Asmussen & Exaltus 1993; Asmussen 1994; 1996; Appendix III.
53 Van der Roest 1997; Bulten & Smits 1998b; Jongste & Smits 1998; Spanjer 1998b; Verhelst 2003; Appendix III.

campaigns that accompanied the test-trenches allowed to better define the core areas of the settlement sites and resulted in the discovery of presumably new prehistoric settlement sites (Van Zijverden 1998; 2004b). Several of these were selected for excavation. In total, slightly over four hectares have been uncovered. Of these, 0.85 ha were uncovered in the investigation of a Middle Iron Age site called 'Lage Blok' (fig. 4.11; Milojkovic & Smits 2002; Appendix II), whereas the remaining excavation surface was concentrated in the bend of the Betuweroute trajectory. Here, several assumed prehistoric settlement site core areas and their surroundings have been investigated with smaller test-trenches and more extensively excavated areas (fig. 4.11, b). This resulted in the discovery of features and finds from the Late Neolithic to the Middle Iron Age (Schoneveld & Gehasse 2001; Meijlink & Kranendonk 2002). For the Late Neolithic up to Middle Bronze Age-A periods, domestic architecture (*e.g.* houses and outbuildings) has been claimed to have been recognized (Meijlink & Kranendonk 2002), but there are substantial problems with these claims (*infra*; Appendix III). For the Middle Bronze Age-B, several (possibly up to 11) prehistoric house-sites could be recognized. These are supplemented by outbuildings, wells, palisades and pits, as well as a remarkable funerary site (see below; Meijlink & Kranendonk 2002; Appendix II).

4.4.2 General remarks

All but the Lage Blok excavations of the De Bogen meso-region are situated on crevasse splay deposits.[54] Although the spatial extent of the (combined, superimposed) crevasse splay deposits can be mapped through detailed coring, the details of the dating and sequencing of the stacked crevasse splays often escape us. In any case it is clear that as many as five different phases of crevasse formation underlie some of the De Bogen sites (see fig. 2.9).[55] Furthermore, it is generally unclear where the fluvial system from which the crevasses originated should be situated.

What is clear, however, is that by *c.* 3520-3100 cal BC the youngest phase of crevasse formation (prior to the prehistoric activities) had ended.[56] By that time, an extensive (*c.* 156 ha) stacked crevasse landscape had formed. The areas where crevasse gullies from different phases overlapped each other were less prone to subsidence due to compaction and oxidation than the more clayey parts of the floodbasin, resulting in that over time an undulating landscape mosaic of both higher and lower parts emerged. The vegetation horizon that formed in lower as well on higher parts of the landscape, testifies to a prolonged period of reduced sedimentation (Van Zijverden 2002, 78; 2004b; Appendix III). Possibly, some time lapsed between the cessation of crevasse formation and the first human activities on top of these deposits, as the oldest finds embedded into this vegetation horizon dated to the late Single Grave culture phase.[57] It should be noted, however, that Middle Neolithic pottery can be rather non-diagnostic and is sometimes technologically so similar to Bronze Age pottery that it may not have been detected (*cf.* Bloo 2005). The presence of (Middle Neolithic) Vlaardingen culture period ceramics outside the De Bogen micro-region does in any case confirm human presence in the macro region.[58]

The De Bogen meso-region is furthermore remarkable for the long period of relatively stable fluvial conditions after the main Neolithic phase of landscape formation. During the entire Late Neolithic, Early Bronze Age and Middle Bronze Age-A periods, no new sediments were deposited on the highest parts of the stacked crevasse splay landscape.[59] Due to this *c.* 1500 yr period of geomorphogenetic tranquility, the excavated areas were prone to yield archaeological palimpsest situations. This indeed was the case at most, if not all, of the De Bogen sites.[60] This palimpsest nature has significantly influenced the excavation strategies and results (*infra*; Appendix III).

4.4.3 The De Bogen excavations

Because of the suspected palimpsest nature of much of the De Bogen micro-region, it was decided to use an initial phase of smaller test-trenches to evaluate whether any areas with less time-depth could be isolated (Meijlink 2002a, 29-30; Appendix III). As this was not the case, it was decided not to further investigate the finds-layer outside these

54 Ter Wal 2001, 26; Van Zijverden 2002b; 2004b.
55 Van Zijverden 2004b; Appendix III, fig. III.4.
56 Meijlink 2002a, 47; Van Zijverden 2002, 79; 2004b; Appendix III.
57 All Over Ornamented/Corded ware period, *c.* 2600-2400 cal BC; Jongste & Smits 1998, 28; 31; Appendix III.
58 Hulst 1973, 28; 1975, 81; Appendix III, fig. III.8.
59 Van Zijverden 2002a; 2004b; Appendix III.
60 Meijlink 2002a, 31; 14; 2002b, 764-765; Appendix III.

initial test-trenches (Meijlink 2002a, 31; 14; 2002b, 764-765). Consequently, almost 80 % of the finds-layer was removed without find recovery (Appendix III). Even for the parts where a somewhat more restricted time depth was assumed,[61] a palimpsest nature can be argued for (Appendix III, esp. table III.5).

The palimpsest character of De Bogen significantly complicates the interpretation of the uncovered remains. Firstly, the find categories that do not allow for direct typological dating such as botanical, zoological and much of the lithic remains can only be studied as mixed assemblages. This renders the study of chronological variation nearly impossible. Secondly, the interpretation of the features recovered is also affected. For the many features that did not yield any datable finds or dated samples, a date range spanning the Late Neolithic to Iron Age should be assumed. Furthermore, the processes of unintentional incorporation of older finds into younger features complicate the dating of features by their incorporated finds. The fact that in some houses dated to the Middle Bronze Age(-B) sherds from Bell Beakers were found, indicates that this is not just a theoretical possibility.[62]

Nonetheless, there is some information hidden in the otherwise predominantly obscuring nature of palimpsests. The fact that at the De Bogen sites the activities from earlier (Late Neolithic, Early Bronze Age and Middle Bronze Age-A) phases cannot generally be isolated from that of later Bronze Age activities, indicates that these activities – from the viewpoint of archaeological visibility – did not differ significantly. If, for example, the erection of Bell Beaker period houses had relied on digging down circular or rectangular foundation ditches for the walls,[63] such traces would clearly have stuck out between structures of later periods. Thus, by inference, one could argue that as far as this is archaeologically visible, the use of the site and the activities carried out there need not have essentially differed much.

In this study, however, it is assumed that from a quantitative perspective (*i.e.* the number and/or weight of the artefacts recovered), the older (Late Neolithic to Middle Bronze Age-A) phases of use of the De Bogen sites are outweighed by the younger (Middle Bronze Age-B) one(s).[64] The distribution of the radiocarbon dates for the various periods should possibly be interpreted along similar lines; here too most dates testify to Middle Bronze Age-B activities.[65] In the original publication, however, parts of the De Bogen sites are thought to completely predate the Middle Bronze Age-B (Bogen sites 28-1 and 31; 'Voetakker' and 'Boog C - Noord'), whereas in others, occupation from both the Middle Bronze Age-A and the Middle Bronze Age-B is reconstructed.[66] In this study, it is argued that no clear-cut arguments are available to assign an exclusive pre-Middle Bronze Age-B phase of use to any of the De Bogen sites.[67] The available evidence for human activities at the De Bogen sites during the earlier (Late Neolithic to Middle Bronze Age-A) phases will be outlined below.

Late Neolithic

For the Late Neolithic, three houses are identified at site 45.[68] Detailed analysis has, however, shown that not all features of the houses appear to have been (stratigraphically) contemporaneous, that datable finds or samples are absent, and that the houses show no consistent feature placement or depth and have been reconstructed in the area with the highest feature density (for a detailed discussion see Appendix III). This hampers the (solely typochronological) dating to such an extent that these three houses should be dismissed altogether. If ever a Late Neolithic structure stood on the spot, it cannot (yet) be known which postholes were or were not part of the ground plan. Of the three other structures tentatively dated to the Late Neolithic (30FH, 29STC and 29STA), only the latter shows a clear consistent two-aisled ground plan as may be expected for this period (fig. 4.12, B).[69] Unfortunately, datable finds or samples are lacking for all three structures.

61 Voetakker (site 28) and Boog - C Noord (site 31). At these sites the finds-layer was systematically investigated.
62 *Cf.* Hielkema, Brokke & Meijlink 2002, 149; 198; Appendix III.
63 Although in reality, they presumably did not: *cf.* Drenth & Hogestijn 1999; 2001; Arnoldussen & Fontijn 2006, 292-295.
64 See Appendix III, especially table III.4, columns g-i.
65 Meijlink 2002a, 44-47; Van Zijverden 2004b, fig. 7; Appendix III.
66 Van Zijverden 2002b, 89; Hielkema, Brokke & Meijlink 2002, esp. 266-267; Meijlink 2002b, esp. 758; 774; Schoneveld 2001, esp. 187.
67 See for a detailed discussion of the arguments Appendix III.
68 Hielkema, Brokke & Meijlink 2002, 220-224; Appendix III fig. III.10.
69 Hielkema, Brokke & Meijlink 2002, 150; 141-144; *cf.* Drenth & Hogestijn 1999; section 5.2.1; Appendix III, esp. fig. III.11.

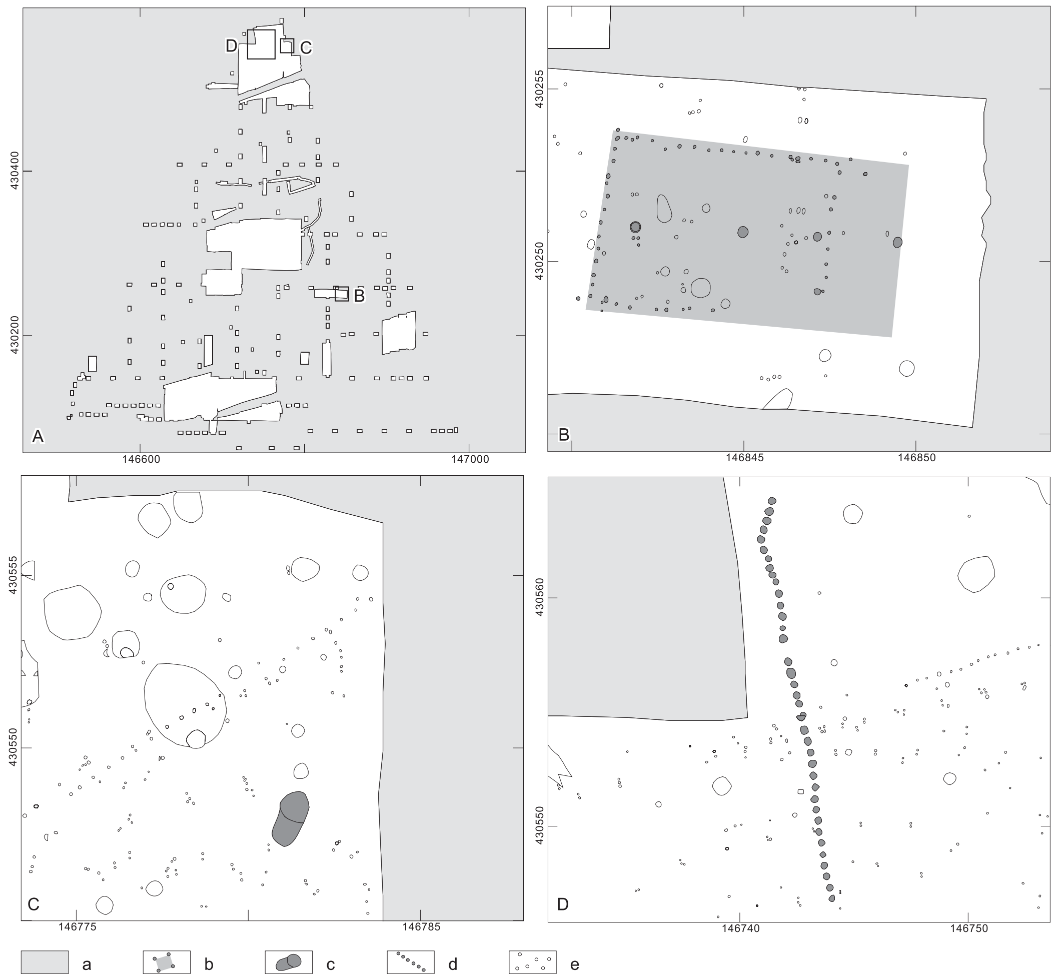

Fig. 4.12 Overview of possible Late Neolithic features at De Bogen sites 29 and 30. See inset A for locations (B to D not to same scale). a: not excavated, b: structures, c: wells, d: palisade, e: other features.

Some features, however, did yield radiocarbon samples dated to the Late Neolithic period (fig. 5.12). Several wells dug into the former crevasse gully at site 30 and a possible hearth at site 45 may thus be of Late Neolithic Age.[70] Furthermore, parts of a human foot – together with 19 Bell Beaker sherds and several animal bones – were recovered from a pit at site 45 that yielded charcoal datable to the Late Neolithic (fig. 4.21, C; Hielkema, Brokke & Meijlink 2002, 210; Appendix III). Of the other features yielding Late Neolithic ceramics, a palisade at site 30 deserves further mentioning. This palisade consisted of thick (*c.* 30 cm diameter) posts placed at short intervals (10-20 cm apart) and had a curvilinear NNW-SSE trajectory over a length of 18 meter (fig. 4.12, D). From three postholes of this palisade, one certain and four possible Bell Beaker sherds were recovered (Hielkema, Brokke & Meijlink 2002, 157). These features and radiocarbon dates, together with the quantities of Bell Beaker sherds from the various sites indicate the presence of Late Neolithic people on nearly all of the De Bogen sites.[71] The nature and duration of these activities – predominantly due to the palimpsest nature – cannot be assessed. It remains unclear whether the nearly 500 clear Bell Beaker sherds recovered (from *c.* 0.8 ha) allow the reconstruction of permanent settlement sites in the Late Neolithic.

70 Hielkema, Brokke & Meijlink 2002, 164; 203; Meijlink 2002a, 47; Appendix III.
71 See Appendix III, tables III.4 and III.5.

Early Bronze Age
The situation for the Early Bronze Age is comparable to that of the Late Neolithic period described above. Again, various attempts were made to reconstruct houses datable to the Early Bronze Age for several of the De Bogen sites.[72] The interpretation of these eight houses is, unfortunately, contestable. The claimed ground plans show a very large variation in size, shape, posthole dimension and posthole locations (Appendix III, figs III.13 and III.14). None of the ground plans has been reconstructed in an area with a feature density low enough to strengthen the interpretation of their association as a single building. Lastly, no direct or indirect radiocarbon dates are available for any of these eight claimed houses and only four features with a single possible Early Bronze Age sherd are available as *terminus post-quem* dates.[73] Accordingly, it is suggested here that their interpretation as Early Bronze Age houses should be refuted.

Yet – as with the previous phase – in the distribution of the ceramics and the outcomes of several radiocarbon dates, the presence of people on several of the De Bogen sites during the Early Bronze Age is well attested. Charred cereals from pits at site 31 and from a posthole of an outbuilding at site 30, as well as charcoal from postholes of a (younger) house at site 30 could all be dated to the Early Bronze Age.[74] Three sherds were furthermore dated by their organic residue to the Early Bronze Age (Ufkes & Bloo 2002, 344; Meijlink 2002a, 47). The interpretation of these remains is again difficult. In any case, the large(r) numbers of datable sherds recovered and the presence of cereals do suggest a domestic function for a number of the De Bogen sites (Meijlink 2002b, 771, *cf.* Appendix III, esp. table III.5).

The Middle Bronze Age-A
For the Middle Bronze Age-A, evidence of human use of the various De Bogen sites is again more restricted. Of the eight houses for which a Middle Bronze Age-A date has been suggested,[75] the interpretation of house structures in the first place should questioned for four of these (Appendix III). Either these have been reconstructed from dense posthole clutters, or they were too fragmentarily preserved to justify their interpretation (Appendix III, esp. fig. III.17,C-F). The other four seem to present veritable ground plans. Their dating is again uncertain and often relied on dated charcoal samples and/or incorporated 'Hilversum' ceramics from the posthole fills, both of which can only serve as *terminus post-quem* dates.[76] For others, the dating is based on typology, house-site location and/or ideas on when sites were no longer inhabitable due to gradual 'drowning' of the landscape.[77]

At this point, a comment on the reliability of the 'Hilversum' ceramics is needed. The available radiocarbon dates for *sensu stricto* Hilversum style decorated sherds (*i.e.* vertical or angular patterns between the pot shoulder and the rim, executed as paired nail impressions or cord-impressions, see table 5.1) correspond roughly to the calibrated date range assigned to the Middle Bronze Age-A (1800-1500 cal BC). During the ceramics analyses of the De Bogen excavation, less restrictive criteria were applied (Hilversum *sensu latu*),[78] implying that this chronological connotation need not always apply. Only a few 'true' Hilversum sherds were found in the various De Bogen excavations (Appendix III, table III.5, f).

Based on the arguments outlined above and the structural similarities of the reliable houses – for which a Middle Bronze Age-A date was suggested – to house plans of the Middle Bronze Age-B,[79] a Middle Bronze Age-B age is in this study suggested for houses 28-1AH, 30AH, 30GH and possibly also 45DH (Appendix III, fig. III.17).[80] Besides the true Hilversum-style decorated ceramics recovered, radiocarbon dates on cereals and charcoal also confirm human presence during the Middle Bronze Age-A (Meijlink 2002a, 47; Appendix III). One of these

72 Hielkema, Brokke & Meijlink 2002, 151-152; 175-179; 256-258; Appendix III, esp. figs. III.13 and III.14.
73 Hielkema, Brokke & Meijlink 2002, 152; 179; 282; Appendix III.
74 Schoneveld 2001, 187; Hielkema, Brokke & Meijlink 2002, 145; 159; 201; Meijlink 2002a, 47; Appendix III.
75 Hielkema, Brokke & Meijlink 2002, 145; 151; 180, 199-200; 249-255; Meijlink 2002b, 774.
76 Hielkema, Brokke & Meijlink 2002, 145; 180; Appendix III.
77 For a detailed discussion see Appendix III.
78 Ufkes & Bloo 2002, 320, *cf.* Ten Anscher 1990, 72; Theunissen 1999, 205.
79 *Infra* and Hielkema, Brokke & Meijlink 2002; Appendix III.
80 Hielkema, Brokke & Meijlink 2002a, 143-145; 150-151; 199-200; 249-253; Appendix III.

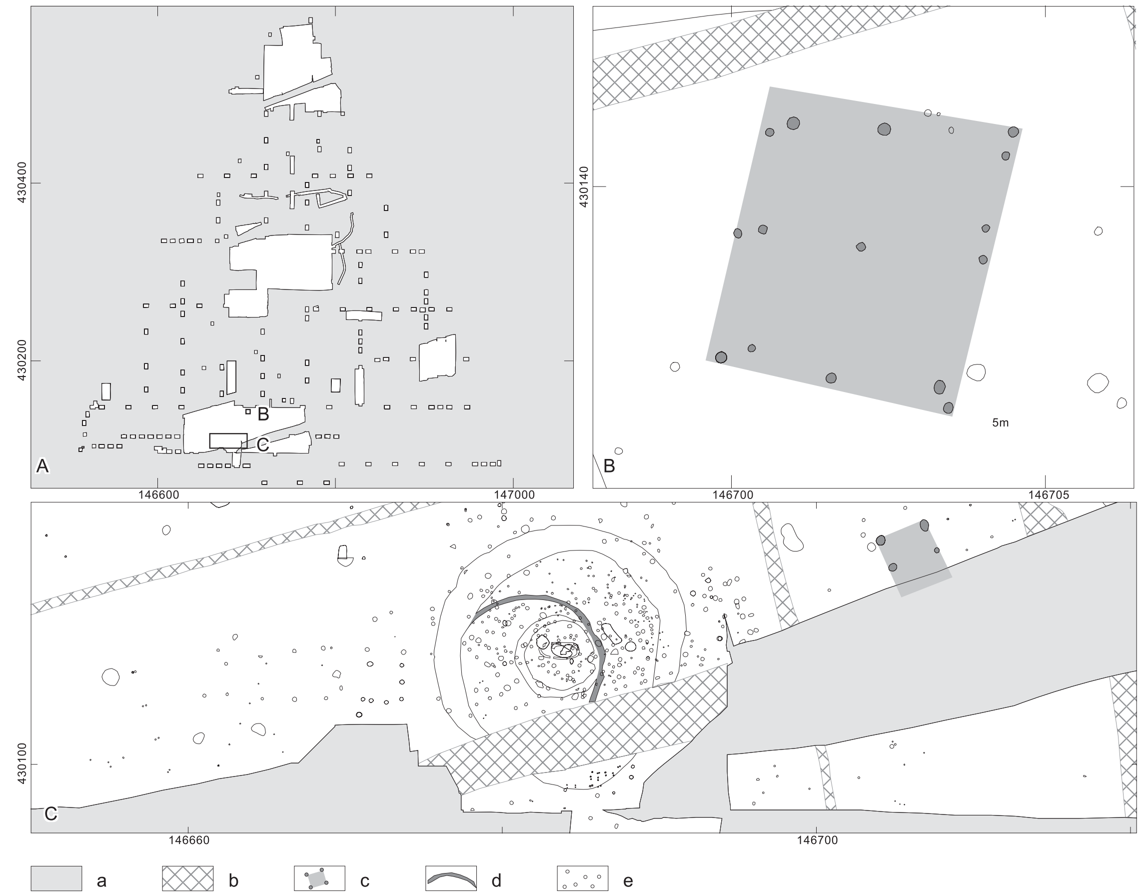

Fig. 4.13 Fifteen-post outbuilding (B) and ring ditch (C) possibly datable to the Middle Bronze Age-A at site 45. For the location see A (B and C not to same scale).

a: not excavated, b: recently disturbed, c: structures, d: features, e: other features.

samples originated from a posthole of a remarkable fifteen-post outbuilding at site 30 (fig. 4.13, B).[81] As comparable outbuildings are not known from later (Middle Bronze Age-B) settlements, the possibility that this is indeed a Middle Bronze Age-A structure should be kept open. Furthermore, wells at site 29 and 45 also yielded charcoal that could be dated to the Middle Bronze Age-A.[82] Of the features with 'true' Hilversum sherds in their fill, only a possible barrow ring ditch will be discussed here (fig. 4.13, C). This ditch is situated in the same location where the Late Neolithic bones of a human foot were buried (*supra*). Possibly, it presents the ring ditch of a grave whose central interment was disturbed by the ring ditch of a later interment on the same spot. Unfortunately, the dating relies predominantly on the *terminus post-quem* provided by the ceramics from its fill.[83]

The problem of the 'early' houses

In conclusion, it is remarkable that almost none of the structures (mostly houses) claimed to date to the Late Neolithic, Early Bronze Age or Middle Bronze Age-A at the various De Bogen excavations have been accepted in this study. The high feature density for the areas under discussion, lack of consistent dimensions, depth and placements of posts for houses of a given phase and lack of direct and indirect dates used to criticize their interpretation are, nonetheless,

81 Hielkema, Brokke & Meijlink 2002, 201; Meijlink 2002a, 47; Appendix III.
82 Hielkema, Brokke & Meijlink 2002, 187; 204-205; Meijlink 2002a, 47; Appendix III.
83 Hielkema, Brokke & Meijlink 2002, 213, *cf.* fig.. 4.21; Bourgeois & Fontijn 2008, appendix.

fair criteria (section 3.2.3, *cf.* Fokkens & Jansen 2002, 10). Whereas it may be considered the excavators' duty to bring 'possible' structures to the fore – and thus initiate and improve pattern recognition – the validity of the proposed reconstruction should also be assessed within the same publication. This calls for detailed comparison to (even if few) examples elsewhere and for an assessment of why multiple houses claimed to date to the same period look so remarkably different – as do various of the claimed 'early' De Bogen houses. Without such critical evaluation, to propose a series of 'possible' structures is more likely to obscure than to increase our knowledge on the prehistoric structures of the periods involved.[84]

However, to consider the human activities and the physical (domestic) structures involved to have been 'ephemeral' may be erroneous (*cf.* Arnoldussen & Fontijn 2006, 298; 307). The low visibility of Late Neolithic to Early Bronze Age houses can be interpreted in two ways: first, one could postulate that these need not (always) have relied on dug-down features (*e.g.* sleeper based constructions). The available evidence for Late Neolithic and Early Bronze Age structures elsewhere, however, renders this unlikely (section 5.2.1).[85] A second interpretation – already introduced above – could be that the fact that these earlier periods do *not* stand out even in areas with moderate to low feature density, may be taken to indicate that these need not have differed significantly in their landscape situation, structural properties and dimensions. Consequently, the evidence seems to suggest that Dutch late Neolithic to Early Bronze Age domestic structures may have been technically quite advanced, yet lack the regularity that characterizes later Bronze Age structures (section 5.2.3, *cf.* Arnoldussen & Fontijn 2006, 306). These may very well have functioned as large (byre)houses in ways comparable to those of the later Bronze Age. In all fairness, however, it should be stressed that Late Neolithic to Middle Bronze Age-A sites have not yet yielded clear-cut examples of the rectangular outbuildings commonly found on later Bronze Age sites,[86] and that the use – and social interpretation – of a two-aisled house can have been decidedly different from that of the three-aisled plans known from later on in the Bronze Age.

The Middle Bronze Age-B

The dismissal of the claimed Late Neolithic to Middle Bronze Age-A houses also makes redundant any discussion on the nature and the dynamics of the house-sites and the settlement site as a whole for these periods. For the Middle Bronze Age-B, fortunately, this is possible, as up to eleven possible Middle Bronze Age-B house-sites were recognized (fig. 4.14). The information they yield about the nature and dynamics of the Bronze Age house, the house-site and that of the wider settlement site is discussed below.

Houses

Of the more than 13 house(phase)s of presumable Middle Bronze Age-B houses at De Bogen, often few other features besides the two rows of roof-bearing posts have been preserved. Only for house 28-1AH have series of posts been interpreted as wall posts,[87] but as these lack consistent placement and diameter and are located in an area of high feature density, their association could be questioned. Two types of placement of the roof-bearing posts seem to have been current: with the first type, the rows of roof-bearing posts form reasonably straight lines, *i.e.* the distance between the two rows is constant.[88] With the second type, the distance between the two rows is wider in the central part of the house.[89] It is unclear whether this may represent a chronological, social or functional difference.

84 See Appendix V for a similar critical stance.
85 *Cf.* Louwe Kooijmans 1974, 167-339; Van Heeringen, Van der Velde & Van Amen 1998; Drenth & Hogestijn 1999; 2001; Deiters 2004; Van der Velde 2008.
86 *Cf.* Ten Anscher 1990; Arts & De Jong 2004; Van der Velde 2008; Bulten *in prep.*; Mooren & Van Nuenen *in prep.*, see also section 5.4.
87 Hielkema, Brokke & Meijlink 2002, 250; Appendix III, fig. III.17, B.
88 *E.g.* houses 28-1AH, 28-4CH, 29B2H, 29B3H, 30BH-30BH, 45AH and 45HH; Hielkema, Brokke & Meijlink 2002, 145-150; 172-174; 196-197; 249-253; 281; Appendix III.
89 *E.g.* 30AH, 30GH, 45CH and 45BH; Hielkema, Brokke & Meijlink 2002, 197-198; Appendix III.

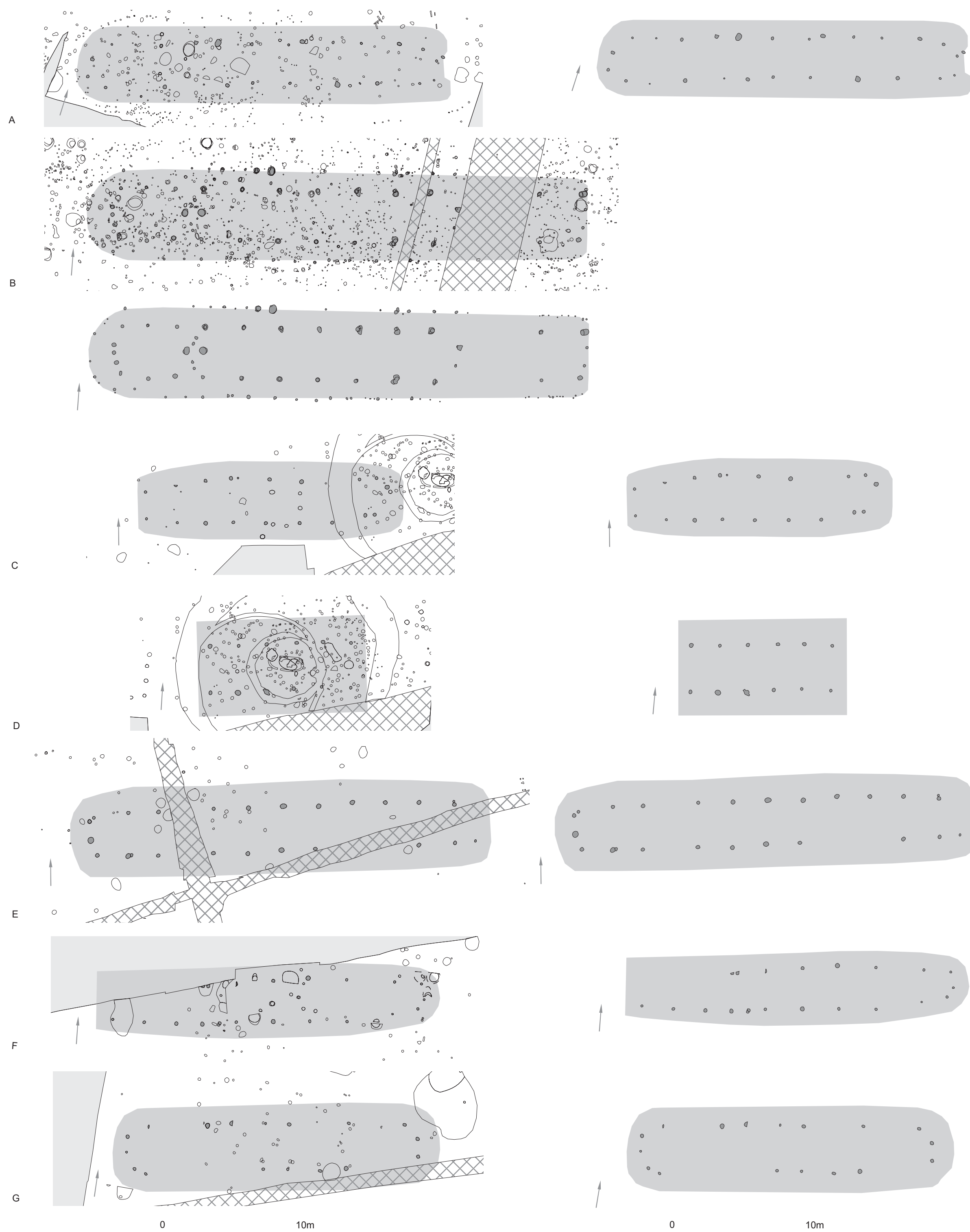

Fig. 4.14 Possible Middle Bronze Age-B houses from the various De Bogen sites. The differences between houses with constant (A, B, D, E,H, I, L-O) and varying (C, F, J, K) span are visible (A= 28-4CH, B = 28-1AH, C = 45BH, D= 45HH, E = 45AH, F= 45CH, G= 45DH, H= 29B2H, I= 29B3H, J= 30AH, K = 30GH, L = 30BH, M= 30CH, N=30DH and O = 30EH).

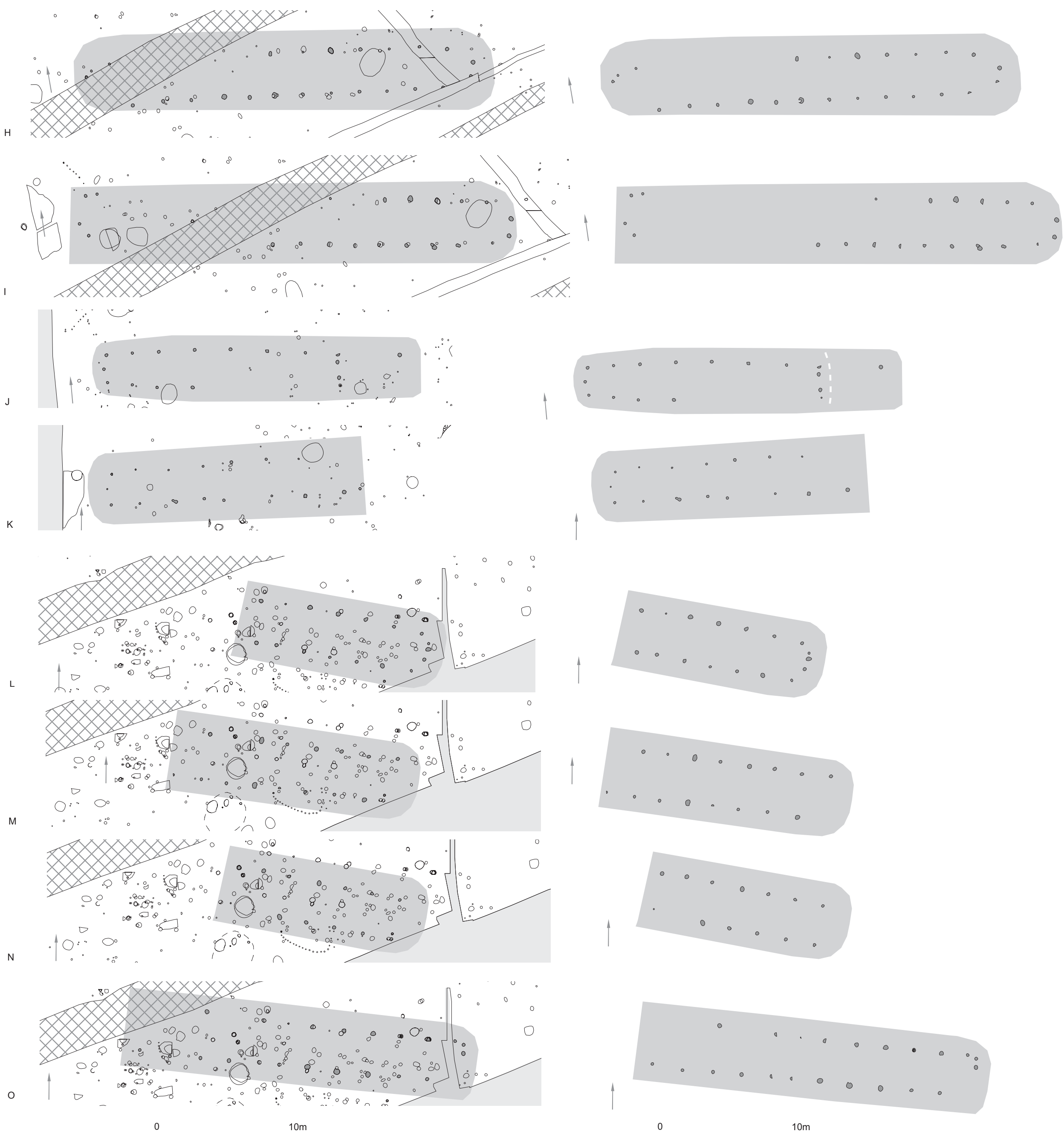

Fig. 4.14 (continued) Possible Middle Bronze Age-B houses from the various De Bogen sites. The differences between houses with constant (A, B, D, E,H, I, L-O) and varying (C, F, J, K) span are visible (A= 28-4CH, B = 28-1AH, C = 45BH, D= 45HH, E = 45AH, F= 45CH, G= 45DH, H= 29B2H, I= 29B3H, J= 30AH, K = 30GH, L = 30BH, M= 30CH, N=30DH and O = 30EH).

For the houses with straight lines of roof-bearing posts, radiocarbon dated samples from houses 29B3H, 30BH, 30EH – and possibly 45AH – proved to be of Middle Bronze Age-B (five samples) and Middle Bronze Age-A (one sample) age.[90] For the houses with varying span, radiocarbon dates from houses 30AH and 45BH are available. The date from house 30AH spans the Middle Bronze Age-A, whereas samples from 45BH date to both the Middle Bronze Age-A (one sample) and the Middle Bronze Age-B (two samples).[91] Whereas the possibility remains that some of these houses (esp. 30EH and 28-1AH) date to the Middle Bronze Age-A, the dominantly Middle Bronze Age-B *terminus post-quem* dates, their structural similarities and the direct dating of similar houses elsewhere suggest that both examples belong to the Middle Bronze Age-B.[92] With some of the houses, additional posts – that cannot evidently be interpreted as being part of an entrance portal – seem to have been placed in the middle of the central aisle of the house at the short sides.[93] Perhaps this represents a local variation on the also present – and in the river area more common – entrance portal in the short sides.[94]

Some of the presumably Middle Bronze Age-B houses from the De Bogen excavations have yielded evidence for a phased house construction, *i.e.* the extension of the house. The relatively long house 30EH (12 sets of roof-bearing posts (trusses?) reconstructed) shows a more narrow spacing between the sets of roof-bearing posts near the middle of the houses, which may suggest that one part of the house was added later (fig. 4.14, O; Hielkema, Brokke & Meijlink 2002, 149; Appendix III). A similar pattern is observable for the sets of roof-bearing posts of house 45CH, but additionally this house shows a slight bend in the orientation of the lines of the roof-bearing posts where both parts of the house linked up (fig. 4.14, F; Hielkema, Brokke & Meijlink 2002, 198; Appendix III). House 28-1AH was possibly extended in two directions. In the west, three more narrowly spaced sets of roof-bearing posts are interpreted as an extension and the adjacent deep posts located centrally may have served as (temporary) ridgepoles that allowed alteration of the roof-bearing structure (Hielkema, Brokke & Meijlink 2002a, 251; Appendix III). The fact that the spacing of the easternmost two sets of roof-bearing posts also disrupt the dimensional rhythm of those in the central part, and the fact that a possible entrance portal of an older house-phase can be reconstructed, also suggest that an eastward extension was once added (Hielkema, Brokke & Meijlink 2002a, 251; Appendix III). Although house extensions seem to be a predominantly north-eastern Netherlands phenomenon,[95] some examples from the river area are known.[96]

Another noteworthy observation is the fact that two houses yielded special deposits from their postholes. From the possible eastern entrance portal of the first phase of house 28-1AH, some burned fragments of a neonate piglet were recovered.[97] From the post-pipe of a roof-bearing post of house 45AH, a significant part of a broken loom-weight was recovered.[98] These two cases may be evidence for the otherwise scarce rituals during house construction and/or abandonment.[99]

A final remark should be made on structure 45HH (fig. 4.15; fig. 4.14, D). This structure consists of two rows of postholes at site 45 that in their regularity and dimensioning of placement, mimic that of the roof-bearing structures of several of the Middle Bronze Age-B houses present at the various De Bogen sites. The structure is situated within a large ring-ditch that may be related to one of the three Middle to Late Bronze interments (Hielkema, Brokke & Meijlink 2002, 227-236; Appendix III). In theory, this large ring ditch could be later than structure 45HH and could have disturbed two sets of its roof-bearing posts. It is clear, however, that no set of roof-bearing posts can reliably be reconstructed for structure 45HH outside the area bound by the large ring ditch. This suggests that the two structures – albeit unclear which one came first – respected each other spatially and were possibly part of the funerary rituals of a single interment.[100] Although post-built structures within the barrow perimeter were known

90 Hielkema, Brokke & Meijlink 2002, 146; 149; 173; Meijlink 2002a, 47.
91 Hielkema, Brokke & Meijlink 2002, 143-145; Meijlink 2002a, 47; Appendix III.
92 *Cf.* section 4.2, 4.3 and Appendices I and II.
93 *E.g.* 30AH, 30GH, possibly also 45AH and 45CH, fig. 4.14; Hielkema, Broke & Meijlink 2002, 145; 151; 197.
94 Yet see also Berkvens, Brandenburgh & Koot 2004, 59; 63; Tol & Schabbink 2004, 22.
95 See section 5.2.3.3, esp. figs. 5.22, *cf.* Kooi 1996; 2005.
96 Section 4.7; Appendix VI; Van Hoof & Jongste 2007.
97 Hielkema, Brokke & Meijlink, 252; Van Dijk *et al.* 2002, 584; Appendix III, esp. fig. III.22, e.
98 Hielkema, Brokke & Meijlink 2002, 197; Appendix III, esp. fig. III.24, e.
99 *Cf.* section 3.4.3; Hielkema, Brokke & Meijlink 2002, 155-156; section 8.2.3.5.
100 See also Meijlink 2008 and Bourgeois & Fontijn 2008 for a revised interpretation of the chronology of the funerary rituals at De Bogen site 45.

from other areas of the Netherlands,[101] these so called 'mortuary houses' were thus far absent from the river area and have never mimicked architectural traits of real houses to such an degree as is shown by building 45HH at De Bogen (*cf.* Ethelberg 2000, 106 fig. 4).

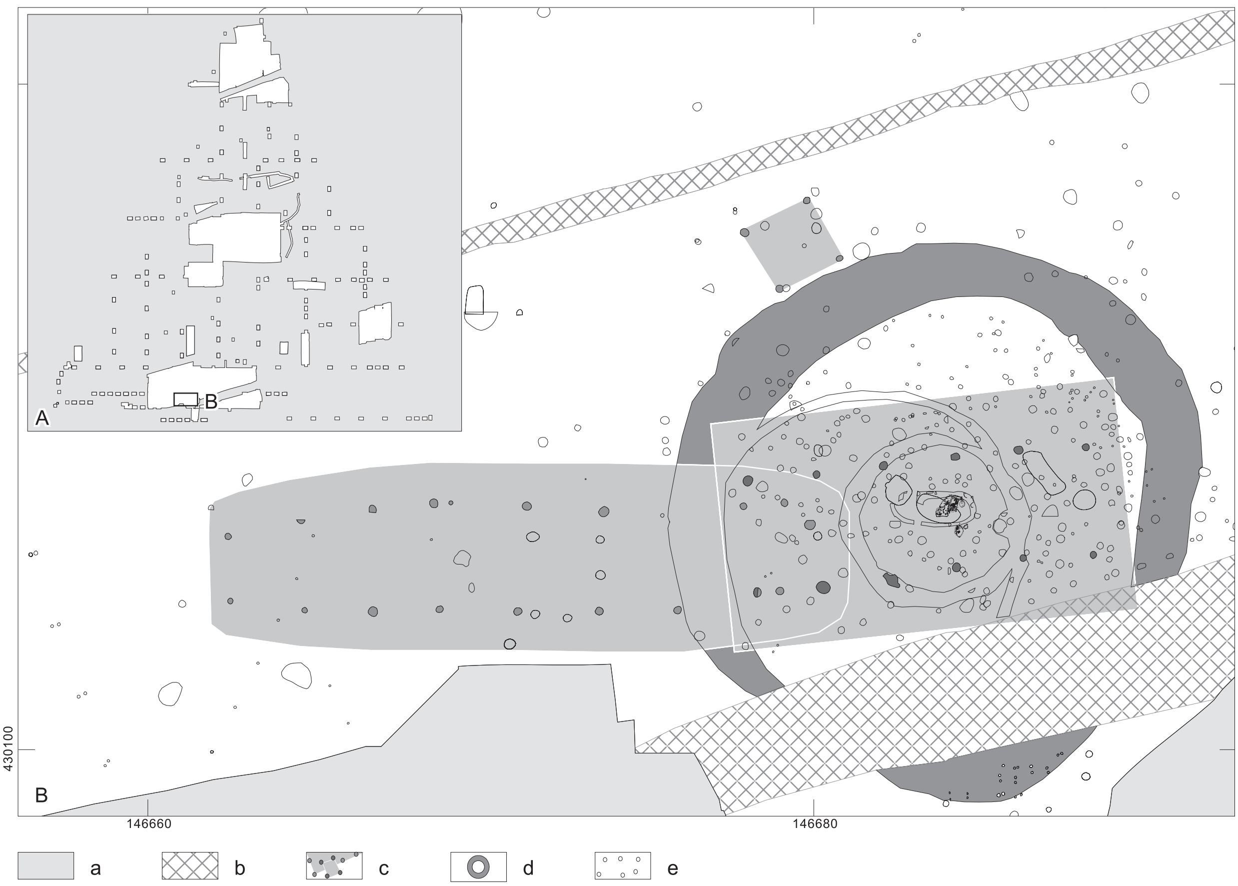

Fig. 4.15 The location of structures 45BH and 45HH (house 45BH light fill, house 45HH dark fill) in relation to the various graves and possible funerary features (see inset A for location).

a: not excavated, b: recent disturbances, c: structures, d: ringditch, e: other features.

House-sites

Despite the large number of presumable Middle Bronze Age-B houses uncovered, these can rarely be regarded as the central points of clear-cut structured house-sites (*i.e.* ´farmsteads'). This is even more striking as the Middle Bronze Age-B houses have also been recognized in areas of reasonably low feature density, *i.e.* in areas where individual house-site elements and their interrelations can best be observed. For other sites (see this chapter), some degree of house-site structuring was visible in the placement and rebuilding of outbuildings on the same spot near – and often with corresponding orientation to – the farmhouse (see sections 6.4.3 and 6.5). At De Bogen, this pattern is not as clear as at other sites.

With some house-sites, no outbuildings with a corresponding orientation could be reconstructed,[102] although outbuildings with a deviating orientation were frequently encountered (see fig. 4.16). On the house-site of house

101 Glasbergen 1954, 142-149; Verlinde 1987, 173-179; Kooi 1979, 130; Lohof 1991, 68; 122-125; 191-192; Busch 1996 and references therein. *Cf.* Hessing 1989, 340 no 58; Verlinde 2001, 171 and fig. 8.7, B.

102 *E.g.* at the house-sites of houses 30AH, 45AH, 45BH and 45GH.

Fig. 4.16 Overview of the main house-site structures at the various De Bogen sites for the Middle Bronze Age-B (Inset A shows the location, B = house-site 28-4CH, C = house-site 28-1AH, D = house-sites 45AH and 45BH, E = house-site 45GH, F = house-site 29BH and G = house-site 30AH, 30GH and 30BH-EH).

a: not excavated, b: houses and outbuildings, c: wells, d: fences of various types, e: palisades, f: other features.

28-4CH, however, a six post outbuilding with corresponding orientation was situated seven meters to the north of the house (fig. 4.16, B). Possibly, outbuilding and house were once perceived as belonging to the same farmstead, but additional archaeological indicators (fences, track ways *et cetera*) are absent. At house-site 29BH, four or more outbuildings with corresponding orientations were erected at 2 to 4 m from the farmhouses (fig. 4.16, F; fig. 4.17). They show a deliberate spatial avoidance of each other, indicating possible contemporaneity. Possibly, new outbuildings were added next to existing ones while complying with the pre-existing house-site structuring (they are placed on the same location to the south of the house and with corresponding orientation). An opposite pattern is observable at site 28-1, where five overlapping outbuildings share the orientation of the farmhouse located 5 m to the south. Here several – also overlapping – outbuildings that do not conform to the farmhouse orientation were also reconstructed. This could mean that functional locational continuity (*i.e.* preserving the specific function of a given place over time, here indicated by the rebuilding of similar structures – for which a similar agricultural (storage) function is assumed – on the same spot) was preferred over exact orientation. The variation observable in the orientation of the non-corresponding outbuildings at site 28-1 renders it unlikely that these all belonged to another, yet unrecognized, farmhouse at site 28-1. Presumably, the outbuildings of site 28-1 were repeatedly torn down and rebuilt on the nearly identical location, even if no relation to the nearby house could be argued for.

This rebuilding of house-site elements is not confined to outbuildings. House-site 29BH has demonstrated the presence of two house(phase)s; houses 29B2H and 29B3H.[103] The ground plans of these two houses are of highly comparable dimensioning and orientation, suggesting that those that built the second house had intricate knowledge on the constructional details of the previous house (fig. 4.17). Possibly, the (descendants of) occupants of the first house-phase (aided by a wider community) rebuilt what they perceived as the same house, with the same orientation on the same spot.[104]

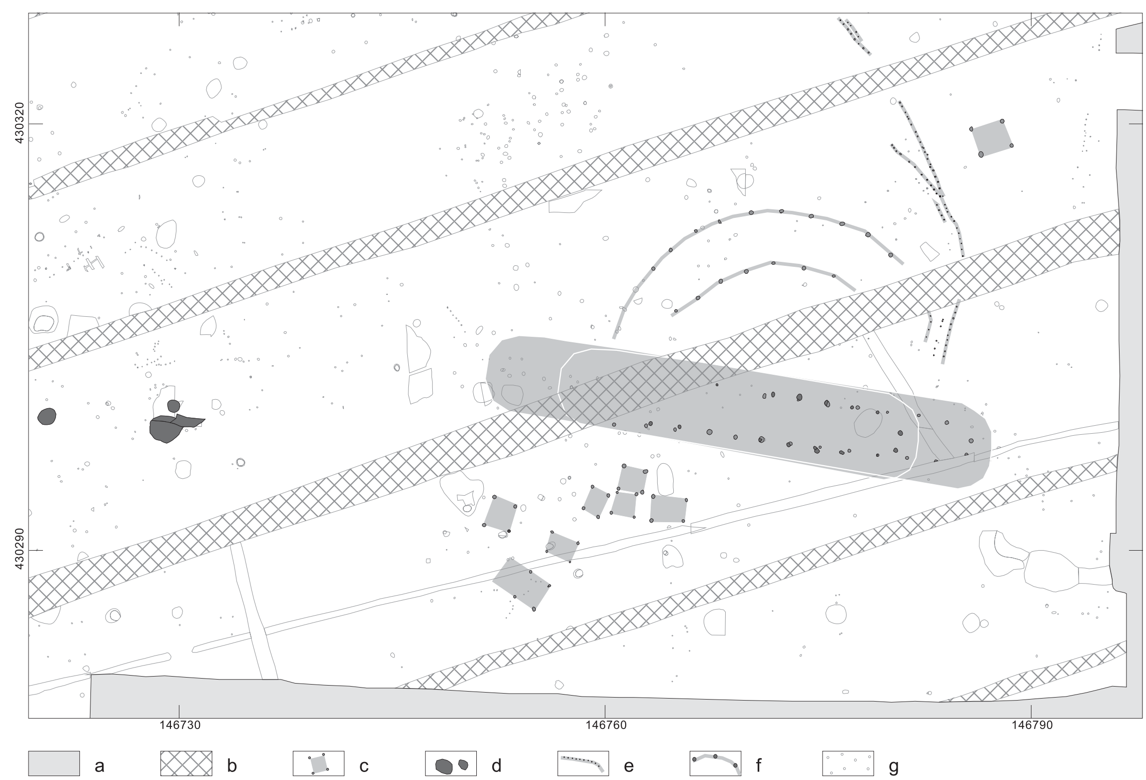

Fig. 4.17 Possible Middle Bronze Age-B structures in the vicinity of houses 29B2H and 29B3H.
a: not excavated, b: recent disturbances, c: houses and outbuildings, d: wells, e: fences of various types, f: palisades, g: other features.

103 Fig. 4.16, H-I; Hielkema, Brokke & Meijlink 2002b, 172-174; Appendix III.
104 *Cf.* section 3.2.3, esp. note 20.

This process can be followed even more clearly at house-site 30BH. Here, as many as four consecutive house-phases are discernible.[105] It is unlikely that this overbuilding is coincidental, as the structural properties such as dimensioning and orientation are very comparable for all four houses (*cf.* fig. 4.14, L-O). An overlay of the four ground plans, shows that the postholes nearly always overlap (Appendix III, fig. III.32). This again suggests that those rebuilding this house (three times), deliberately sought to replicate the previous house(s). Unfortunately, only the roof-bearing structure preserves archaeologically, which means that we can only use this as a proxy for the non-preserved features such as overall appearance, internal organisation and decoration.

Fences, (refuse)pits and other features or structures could have been part of the house-site of the various recognized Middle Bronze Age-B houses, but generally there is not enough data (*e.g.* diagnostic finds, absolute dates, spatial recurrence, low enough feature density) to relate these to any of the individual house-sites. It should furthermore be noted that fences have not been preserved at De Bogen in such great numbers as elsewhere in the river area.[106] Yet, the stretches of fence that have been preserved, show no obvious correspondence to the house(-site)s (fig. 4.19). Whereas at the other sites with fences referred to above a correspondence, even if crude, between the orientation of the systems of fences and those of the houses could be observed, for the De Bogen fences this cannot be claimed (*contra* Meijlink 2002b, 780). Possibly, fences were not used here to delineate prehistoric house-sites, or the systems of fences belong to a phase for which we have no(t recognized any) houses.

Furthermore, the array of (features of) structures commonly found in the vicinity of Bronze Age farmhouses can possibly be supplemented here by the otherwise rare occurrences of palisades. At house-site 29BH, two curved possible palisades were discovered to the north of houses 29B2H and 29B3H (fig. 6.17, f; Hielkema, Brokke & Meijlink 2002, 184-185). They consist of relatively thick posts (posthole diameter *c.* 25-30 cm) placed at a mean interval of 2 to 2,09 m (standard deviation 0,14-0,19 m). This interval is remarkably similar to the standard mean spacing applied to the roof-bearing posts of Middle Bronze Age-B houses in general.[107] Consequently, one could also argue whether house 29AH should not be considered a palisade, rather than a house.[108] In addition, one could wonder to what extent the erection of a house and the construction of these palisades was perceived of as not only technologically, but also conceptually related. Unfortunately, the dating of the two curved palisades north of houses 29B2H and 29B3H (fig. 4.17, f) is unclear. The fact that they – like the houses 29B2H and 29B3H – may have been rebuilt with a few meters in between and do not overlap the latter, may hint at contemporaneity, *i.e.* a Middle Bronze Age-B age. The function also remains enigmatic. It seems unlikely that it was meant to convey a similar image of impenetrability as was offered by the palisades in the north of site 29 (undated) and at site 31 (possibly Late Neolithic).[109] Perhaps these posts were interconnected above ground level to form a barrier to guide cattle in and out of the houses, but this is far from certain.

In conclusion, the house-sites at the various De Bogen excavations show only limited structuring of the house-site. The relatively low feature density at some of the house-sites indicates that this represents an archaeological reality rather than a problem related to recognizability. It shows, in any case, that outbuildings were not part and parcel of all Middle Bronze Age house-sites or, conversely, that corresponding orientation of house and nearby outbuilding(s) did not profoundly matter here. Both fences and outbuildings appear to be scattered over the settlement site and show – at least in their orientation, shape or location – no evident relation to the house-sites. Despite this, the Middle Bronze Age-B phases of occupation deserve ample scientific attention, not in the least because at De Bogen otherwise rare phenomena such as funerary sites and palisades can be studied in relation to the more common settlement site elements such as houses and outbuildings found nearby.

Settlement sites

Due to the fact that only a limited number of indirect absolute dates with a generally centuries wide calibrated range are available for the Middle Bronze Age-B house and outbuildings (Meijlink 2002a, 47), we cannot discuss

105 Houses 30BH to 30EH; see Appendix III, fig. III.32; Hielkema, Brokke & Meijlink 2002, 145-149.

106 *E.g.* at Zijderveld, Enspijk or Eigenblok; sections 4.2; 4.3; Appendices I and II.

107 Section 5.2.3.4, esp. fig. 5.27 and 5.28; Arnoldussen & Fontijn 2006, 297-298.

108 Hielkema, Brokke & Meijlink 2002, 171-172; Appendix III, esp. figs. III.26 and III.27, C.

109 Hielkema, Brokke & Meijlink 2002, 141; 157; 166-167; 184; Appendix III, figs. III.28 and III.31, B.

if, or which, house-sites could have been contemporaneous. Essentially, they could be consecutive as well as fully contemporaneous. In the latter case, there could have been as many as 11 house-sites within an area of *c.* 3,5 ha. Put otherwise: within the main excavated clusters house-sites are only a mean 46 m apart, whereas for the entire De Bogen cluster (28-31,45) a house-site at every 120 m may be an (under)estimate. Yet, from the rebuilt houses at site 29 and 30 it is clear that at least four consecutive house-phases should be accounted for. The areas of very high feature density such as 28-1, the north-west part of site 29 and parts of site 30 could furthermore obscure additional house-phases, but due to the long use-history of this site the validity of such inferences is limited.

In absence of better data, one could look at the spatial interrelation of the various house-sites (*e.g.* do they overlap? correspond in orientation?) to try and investigate whether they could have functioned contemporaneously or whether they were ever part of a single, recognisable settlement. To start with the latter, the various De Bogen excavations have yielded no clear-cut evidence that would allow the reconstruction of a settlement boundary. The spatially most extensive features such as the palisade and ditch system at site 29 do not allow a particular association with – or delineation of – any nearby or more distant house-site. To return to the aspect of orientation, it should be stressed that the various presumably Middle Bronze Age-B houses at De Bogen show a markedly more broad variation than those from other sites in the river area (fig. 4.18, *cf.* section 6.4.1 esp. fig. 6.15). Generally all houses are orientated west-east, but orientation can vary from WSW-ENE (*e.g.* house 28-1CH) to WNW-ESE (*e.g.* houses 30BH-30EH). The fact, however, that there is *some* correspondence of orientation, and that the orientation of the houses is along, as well as perpendicular to the height isolines of the crevasse splay deposits (fig. 4.18), indicates that factors other than the micro-topography of the subsoil steered the choice of farmhouse orientation.

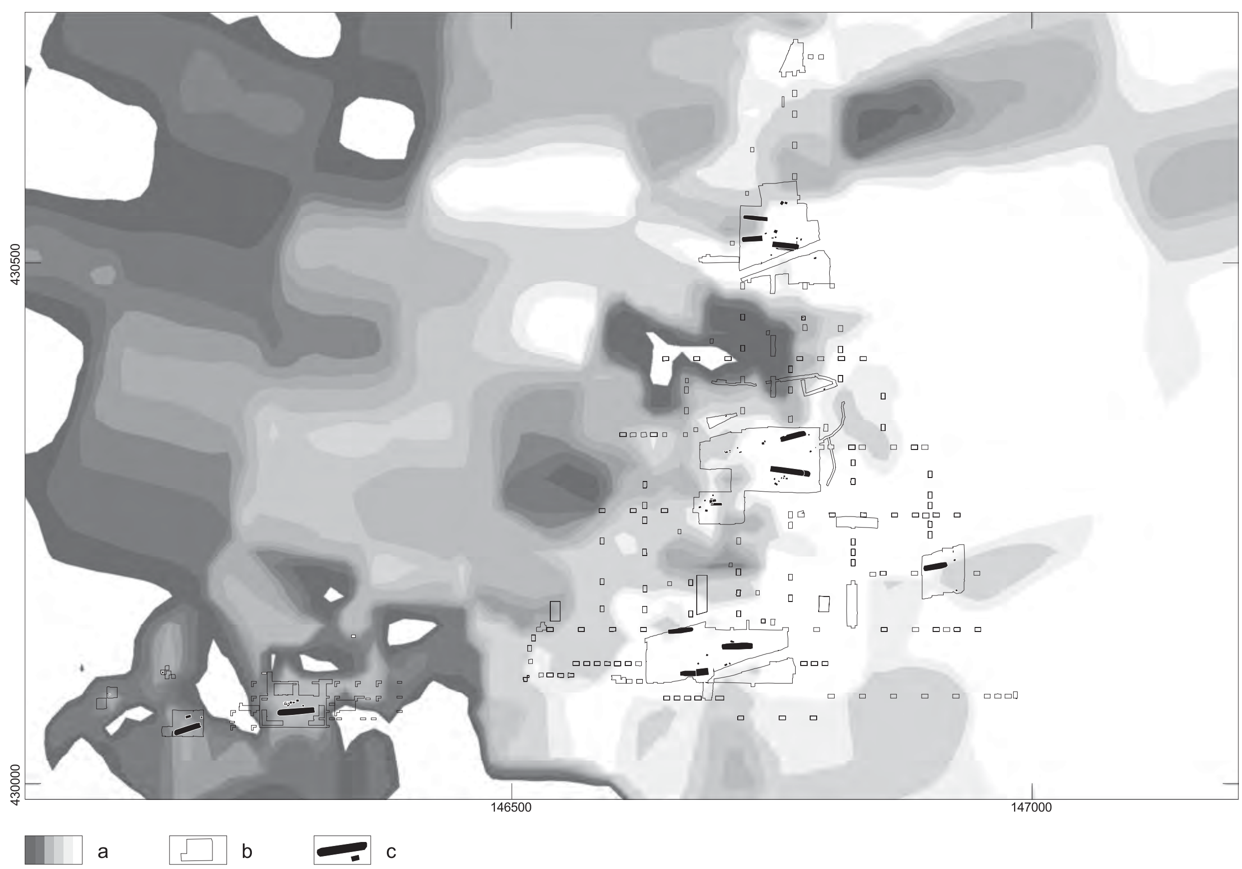

Fig. 4.18 Distribution of the certain and possible Middle Bronze Age(-B) house-sites in the De Bogen micro region plotted on the underlying crevasse splay altitude.

a: crevasse splay height (ranging from 0.3 m (dark fill) above to 2.7 m above (white fill) D.O.D., b: excavation trenches, c: structures.

The mosaic nature of the stacked crevasse splay morphology perhaps played a part in this lack of uniformity of orientation. The lower lying areas between the higher and settled parts may through their vegetation have obscured some of the possibilities of visually transferring or checking orientation. In addition, by their nature these areas of open water and marshes limited the distribution of extensive systems of fences or ditches which elsewhere may have aided in the transmission of the dominant axis of the cultural landscape across large areas.[110]

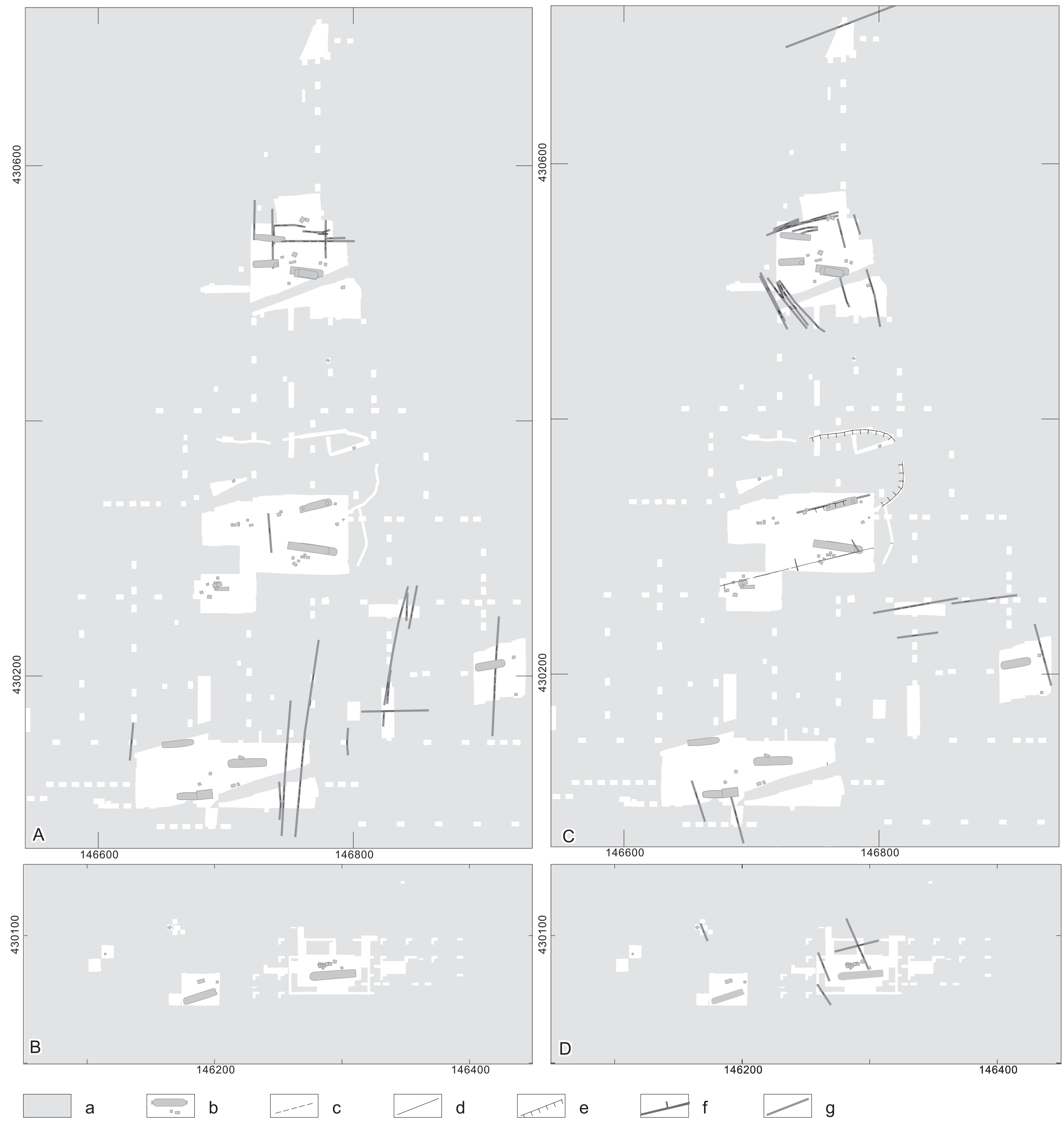

Fig. 4.19 Two possible phases of main axes of orientation of the cultural landscape in the De Bogen micro-region.

a: not excavated, b: houses and outbuildings, c: double-stake type fence, d: single-stake type fence, e: palisades, f: ditches, g: generalized indication of fences.

110 *E.g.* at Zijderveld and Enspijk *cf.* section 4.2-4.3.4; Appendices I and II.

This not to say that extensive built-up structures were never present at the De Bogen settlement site, nor that the nature of the Middle Bronze Age-B cultural landscape is fully unclear. For instance, in the eastern part of site 29, a fence of the double-stake type (see section 5.5) could be traced for over 100 m. Tentatively, two major axes (phases?) can be discerned for the systems of orientation indicated by the fences and ditches, of which neither can easily be dated (fig. 4.19, *cf.* Appendix III, fig. III.29), and neither one can be more evidently related to the location and orientation of the house-sites.

It is noteworthy that in both systems of orientation, single- and double-stake types of fences occur in similar shapes and locations, suggesting their interchangeability. There is, however, a difference in frequency of rebuilding. Fences of the second system (fig. 4.19, C and D) appear to have been rebuilt – up to a maximum of five phases – more often. This could suggest that rebuilding was a more common option in that period, or perhaps that this system of orientation was adhered to over a longer period of time. As direct dates for fences are absent, the dating and phasing of the systems of fences remains unclear, but the presence of rebuilt fences on the same location with the same orientation indicates that at least over a certain period of time it was considered important not to disrupt the pre-existing landscape structuring.

A few more phenomena have been discovered that could hint at comparable long-term views of the prehistoric landscapes in the De Bogen micro-region. The obvious observation that relatively many remains from older (Late Neolithic to Early Bronze Age) periods have been found intermingled with Middle Bronze Age remains could be related to comparable views on which plots were most suitable for domestic tasks or structures. This line of argument is, unfortunately, significantly weakened by the fact that due to the mosaic character and gradual drowning of the physical landscape within the De Bogen meso-region,[111] the landscape did not offer a uniform, equally suitable, settlement space. Put more strongly: the Middle Bronze Age communities could not *but* settle the previously used areas in the De Bogen micro-region. Through the absence of intercalating sediments, the resulting palimpsest situation even makes it impossible to evaluate to what extent the activities (*e.g.* subsistence strategies, settlement permanency) differed between the phases.

Despite this, there is some evidence that certain properties in the landscape could have been perceived in such similar ways as to leave an archaeologically comparable pattern. For instance, in the north-east part of site 30 a cluster of wells was uncovered (fig. 4.20). These wells are situated on the slope from the higher parts of the crevasse towards a larger depression in the floodbasin situated *c.* 30 m to the north-east of site 30 (*cf.* fig. 4.18). The oldest wells could be dated to the Late Neolithic, the youngest to the Middle Bronze Age-B. It will not be argued here that – the locations of – wells from the Late Neolithic were still visible in Middle Bronze Age periods, nor that oral history and social memory aided in the observed continuity of place, although both could have been true. It is far more likely that

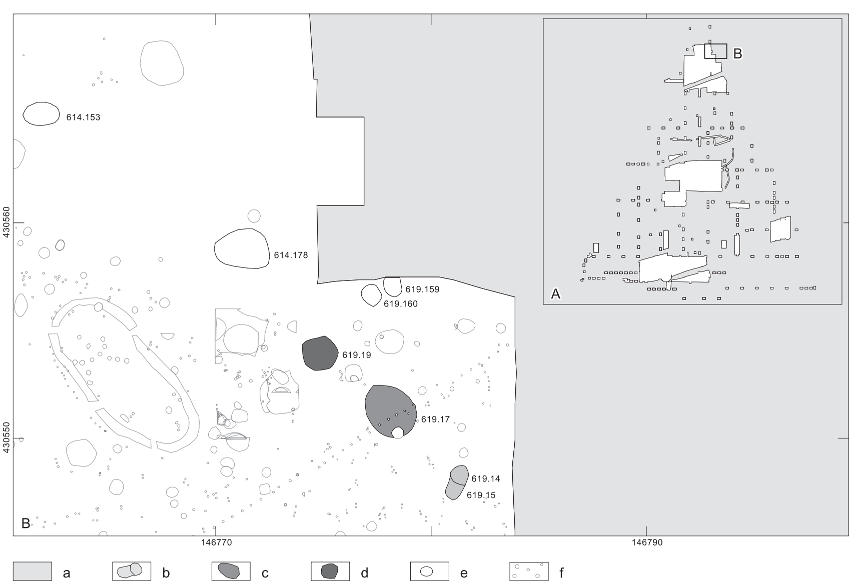

Fig. 4.20 Location, dating and feature numbers of the cluster of wells in the north-east part of site 30. For location see inset A.

a: not excavated, b: wells dated to the Late Neolithic, c: wells dated to the Late Neolithic to Early Bronze Age, d: wells dated to the Middle Bronze Ag, e: undated wells, f: other features.

111 Van Zijverden 2002b; Van Zijverden 2004b; Appendix III.

a comparably ability to ‘read’ the landscape – *e.g.* to see which locations were suitable for the construction of wells – steered the observed patterning. In this landscape reading, the vegetation rather than older occupation traces, may have played a significant role (*cf.* Fontijn, Jansen & Fokkens 2004, 30; 36).

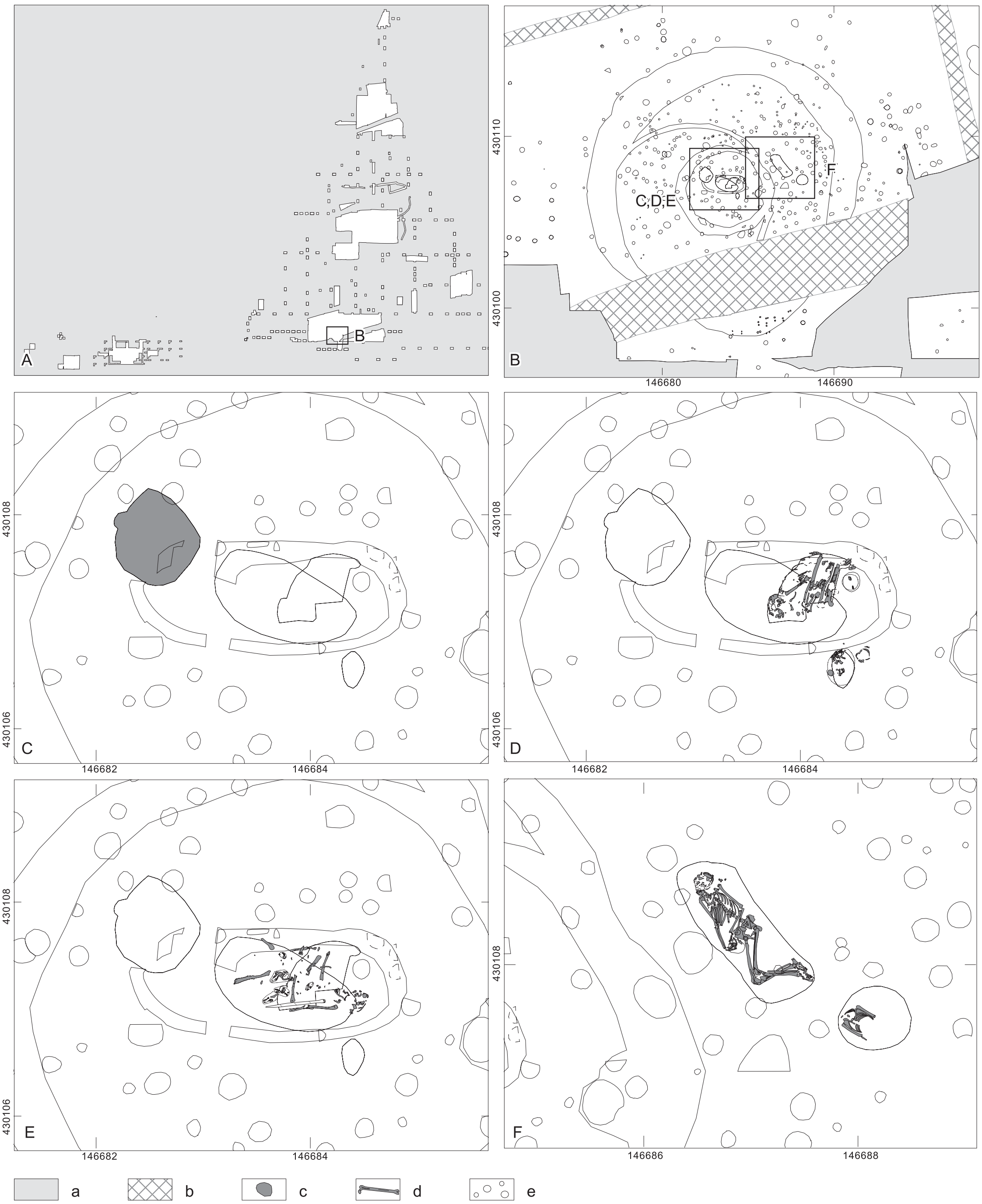

Fig 4.21 Interment of human bones on the barrow location at De Bogen site 45. See inset A and B for the location, C = Pit with foot-bones, presumably Late Neolithic, D = grave 1 (top) and 2, presumably Middle Bronze Age-A /B transition, E = grave 3, presumably end-MBA/ LBA, F = graves 5 and 6 (top), Iron Age).

a: not excavated, b: recently disturbed, c: possible funerary pit, d: human bones, e: other features.

A last example worth mentioning is the funerary location at site 45. Here, on the location of a slight elevation of the crevasse splay subsoil (*c*. 0.4 m; Van Zijverden 2002b, 85), bones of a human foot – together with other bones and Bell Beaker ceramics – were recovered from a pit that could be radiocarbon dated to the Late Neolithic (fig. 4.21, C).[112] Possibly at the time of the Middle Bronze Age-A/B transition, interment of an adult male in flexed position took place (fig. 4.21, D). Around the same time, possibly as a secondary interment, a baby was also buried *c*. 40 cm to the south of the flexed inhumation. [113] At the very end of the Middle Bronze Age-B or in the Late Bronze Age, another individual was buried on nearly the same location as the flexed inhumation (fig. 4.21, E).[114] The deceased was given a bronze rapier and possibly also bronze arrowheads and ornaments as grave gifts.[115] During the Iron Age, two more interments took place. The upper torso of a 9-12 year old child in a circular pit as well as a complete skeleton of a teenager were presumably interred during the Middle Iron Age (fig. 4.21, F).[116] The latter was holding two molars of a domestic cow in his hands (Hielkema, Brokke & Meijlink 2002, 211). If one incorporates the various possible funerary structures such as ring ditches and mortuary structures in the discussion, perhaps even more phases of funerary use should be accounted for, but this has been the subject of much discussion.[117] Rather, it should be stressed that this particular location was repeatedly used for – occupation and – funerary acts in the various periods. This observation, combined with the fact that at the time of the interment human activities (and for some periods occupation) is likely to have taken place quite nearby,[118] adds to the special nature of this part of the De Bogen settlement site (Meijlink 2002b, 768-770). By some means, a ritual or funerary association stuck to this place for centuries.

Settlement and landscape

Most of the De Bogen excavations were situated within the stacked crevasse splay deposits that formed the surface layer of the Late Neolithic to Middle or Late Bronze Age periods. It has been discussed above that perhaps some centuries lapsed between the Middle Neolithic cessation of crevasse activity and the first human presence. Yet from the Late Neolithic-B to the very end of the Middle Bronze Age-B (or late Bronze Age), the higher parts of the crevasse landscape appear to have been used intensively. No new sediments were deposited within the excavated areas between the Middle Neolithic and the end of the Middle Bronze Age (Van Zijverden 20024b; Appendix III). Nonetheless, several processes could have affected the outlook of the natural landscape during these periods. First of all, natural processes of vegetation succession and vegetation decay are reflected by the presence of a *c*. 20-50 cm thick vegetation horizon.[119] To what extent human presence interfered or had an impact on these processes is not fully clear, but the presence of species of the cultivated field weed (*Stellarietea mediae*) and meadow (*Molinio-Arrhenatheretea*) communities indicates the nearby presence of agricultural fields and meadows respectively (Hänninen & Van Haaster 2002, 715-716).

The undulating heights caused by the erratic overlapping – or not – of crevasse deposits posed a diverse natural landscape. In the lower parts, some areas of open water and marshy parts with alder carrs and willows will have been present (Hänninen & Van Haaster 2002; Van Beurden 2008). On the higher parts, an open vegetation of oak, hazel, birch, elm and sloe – possibly mixed with agricultural fields – could be encountered (*ibid*.). Although the distribution of these vegetation types need not have altered significantly over the various periods, it is quite well possible that the processes of gradual drowning and floodbasin sedimentation caused some shifting of the vegetation

112 Hielkema, Brokke & Meijlink 2002, 210; Robb 2002b; Appendix III.
113 Hielkema, Brokke & Meijlink 2002, 209; Robb 2002b; Appendix III.
114 Hielkema, Brokke & Meijlink 2002, 210; Robb 2002b; Appendix III, also Meijlink 2008 and Bourgeois & Fontijn 2008 for a revised interpretation of the chronology of the funerary rituals at De Bogen site 45.
115 Hielkema & Butler 2002. Bourgeois & Fontijn (2008, appendix) convincingly argue for a Late Bronze Age date for this sword based on typology and associated finds.
116 Meijlink 2002a, 47; Hielkema, Brokke & Meijlink 2002, 210-211; Robb 2002b.
117 *Cf.* Hielkema, Brokke & Meijlink 2002, 206-236; Lohof 2003; Lanting & Van der Plicht 2003, 198-201; Meijlink 2008; Bourgeois & Fontijn 2007.
118 Hielkema, Brokke & Meijlink 2002; Appendix III; *cf.* Arnoldussen & Bourgeois 2006; Bourgeois & Fontijn 2008.
119 Van Zijverden in Jongste & Smits 1998, 54-55; Van Zijverden 2002b; Van Beurden 2008.

zones.[120] This process could furthermore be intensified by the changes in relative (to mean water tables) height differences developing as a consequence of differential subsidence due to oxidation and compaction. However, as the various De Bogen excavations predominantly targeted the higher (and more intensively used) parts of the crevasse splay deposits, floodbasin sedimentation or marshland expansion is rarely attested within the excavation extents.[121]

At the time of the Middle Bronze Age-B habitation, a downstream connection of the Erichem fluvial system will have provided an active fluvial system as close by as within 2 km from the De Bogen house-sites.[122] The former crevasse residual gullies had fully silted-up, as is indicated by features that cross-cut their fills (Hielkema, Brokke & Meijlink 2002, 191; 270; 275). Nonetheless, in some parts the orientation of the (different vegetation on top of) the residual crevasse gully may have influenced the orientation of outbuildings (Hielkema, Brokke & Meijlink 2002, 270, *cf.* 272). Yet at site 45, a three meter wide residual crevasse gully – that did not seemed to have influenced the orientation of any of the houses or outbuildings nearby – could be followed for over 116 m, suggesting that the importance of such features is perhaps best not overrated.[123]

In this study, it is assumed that near the end of the Middle Bronze Age-B or the start of the Late Bronze Age, a new period of intensified fluvial activity took place (Van Zijverden 2004b). This may have involved more, or more extensive floodbasin deposition within the De Bogen meso-region. In any case, between the end of the Middle Bronze Age-B and the Middle Iron Age, new crevasse deposits covered various of the De Bogen sites.[124] This increased sedimentation may be related to the significant changes in the fluvial drainage structure within the wider De Bogen macro-region at that time.[125]

4.4.4 Conclusions

To sum it up, the excavations of the various De Bogen sites have uncovered large parts of a varied crevasse splay landscape that was in use by people from the Late Neolithic onward. Due to the palimpsest character of the site, it was not possible to analyze in detail the nature, extent and duration of the activities carried out here during the Late Neolithic. The houses claimed to have been recognized for this period cannot be accepted, so that it remains likely – yet unproven – that one or more house-sites from the Late Neolithic were once present within the De Bogen micro-region.

For the Early Bronze Age and Middle Bronze Age-A, a similar situation exists. For this period too, the distribution and numbers of the more easily recognizable ceramics are nearly the sole media to asses the nature of the human presence at De Bogen. For both periods, the larger number of diagnostic remains combined with several radiocarbon dated samples and the presence of features such as possible wells, allow better substantiation of the interpretation of the remains as a possible settlement site. The recognition of houses is difficult for both periods and the previously claimed house structures should be discarded.

It is not until the Middle Bronze Age-B that – by their more recognizable houses – a discussion of the number, distribution, properties and dynamics of prehistoric house-sites is possible. Despite the large (9 to 11) numbers of house-sites and houses (13-16) recognized, information on the dating and properties of these house-sites is limited. This is caused by a number of factors, of which poor feature preservation (due to later erosion), absence of direct dates (due to poor organic preservation), incidentally high feature density and prehistoric decisions are paramount. Nonetheless, it is clear that as many as 11 house-sites may have functioned contemporaneously. The different elements such as fences, pits, wells and outbuildings, do not show a consistent clustering near farmhouses or corresponding orientation, which complicates assigning them to a given house-site. Nonetheless, two tentative systems of landscape orientation could be proposed that show how the structuring of the cultural landscape surpasses the spatial level of individual house-sites. Two house-sites show a deliberate desire to prolong the occupation of a given house-site as is evidenced by the near-identical rebuilding of houses as many as up to three times. From other

120 *Cf.* Van Zijverden 2002b, 80; 87; Van Zijverden 2004b; Exaltus 2002b, 101; Appendix III.
121 But see Meijlink 2002a, 37; 40; Van Zijverden 2002b, 69; 81 and for a discussion of its dating Appendix III.
122 See fig. 2.16, E’, Van Zijverden 2004b; Berendsen & Stouthamer 2001, 199; 238; Appendix III.
123 But note the correspondence of this residual gully to the fences of orientation system 2 (fig. 4.19; C-D).
124 Meijlink 2002a, 34-35; Van Zijverden 2002b, 87-88; 2002c, 40; Appendix III, esp. fig. III.36.
125 Van Zijverden 2004b; section 7.4.2; Appendix III; *cf.* Jongste & Van Zijverden 2007.

patterns as well, such as the repeated replacement of wells, fences and outbuildings (and on a larger time scale; interments) at specific locations, an importance in maintaining the set landscape structuring can be inferred.

Presumably as a consequence of an important change in the fluvial architecture of the macro-region near the Late Bronze Age and during the Early Iron Age, occupation shifts to outside the excavated areas, but this need not have implied large distances. The areas covered by new crevasse splay deposits or floodbasin deposits are reused as meadows, while the former higher parts of the crevasses could be unaffected and permit interment on an older barrow site and possibly also still support occupation. The ensuing Middle Iron Age habitation in the macro-region – best documented by occupation of a site 1,5 km to the east of the main Bronze Age occupation cluster at De Bogen (Appendix III)– left too few traces at the other De Bogen sites to be able to asses the nature of these activities.

4.5 Wijk bij Duurstede

4.5.1 Introduction

The town of Wijk bij Duurstede is archaeologically best known for the results of the investigations of its Early Mediaeval predecessor '*Dorestad*' (Van Es & Hessing 1994; Appendix IV). Yet, this was not the first time that parts of the Wijk bij Duurstede area were densely populated. At *c.* 600 meters to the southwest of the Early Mediaeval village, an area now known as the residential area '*De Horden'* saw repeated occupation during the Roman period, Early Iron Age and – most relevant to this study – the Bronze Age. Another 700 meters to the north of De Horden, a residential area now known as '*De Geer*' also yielded occupation traces datable to the Bronze Age, and from the Middle Iron Age onwards. The excavations in which these traces were uncovered were necessitated by an extensive campaign of town planning and the creation of new industrial- and residential areas around the town of Wijk bij Duurstede from the 1960's onward (Van Es 1969, 184; fig. 4.22).

As many as fourteen Bronze Age house-sites have been uncovered in the excavation campaigns at De Horden and De Geer which were executed between 1977 and 1994. Although some finds datable to the Early Bronze Age and Middle Bronze Age-A were discovered at De Horden, the recognized house-sites seem to date to the Middle Bronze Age-B. Although this assumed age is predominantly based on the typochronology of Bronze Age buildings (see below; Hessing 1991; *cf.* Bourgeois & Arnoldussen 2006), four radiocarbon dated charcoal samples – of which two can be related to Bronze Age houses – point towards occupation in the Middle Bronze Age-B.[126] Presumably, the two house-sites at De Geer also date to the Middle Bronze Age-B.

4.5.2 General remarks

Due to its northerly location within the wider Rhine-Meuse delta, the part of the river area in which the Wijk bij Duurstede macro-region is situated provided a different fluvial palaeo-landscape in the Bronze Age compared to the other macro-regions discussed in this chapter. In such a northerly position within the Rhine-Meuse delta, Pleistocene deposits can be found at relatively shallow depths. This allows rivers with a normal gradient and bed-load to develop a meandering or sometimes even braided fluvial style (Chapter 2; Appendix IV). The areas of meander cut-off, with their higher point bars and lower lying swales, could have provided – and during the Bronze Age in the Wijk bij Duurstede area certainly did – an extensive, well drained and fertile settlement site location.

Unfortunately, knowledge on the Early and Middle Holocene fluvial development of the Wijk bij Duurstede macro-region is somewhat limited. Although the overall drainage structure is understood relatively well,[127] absolute dates for the individual channel's phases of activity are often lacking and several unmapped – and undated – fluvial systems are known (Appendix IV, esp. fig. IV.5). The presence of people in the Wijk bij Duurstede macro-region during the (Middle) Neolithic is evidenced by a number of artefacts from a test-pit in the east of the De Horden excavations (Hessing & Steenbeek 1990, 15-16; Appendix IV). Presumably, these remains were reworked from an older fluvial system into the Werkhoven fluvial system's levee deposits. Undated features dug into the Werkhoven fluvial system's levee deposits at a level well below that of Bronze Age features at the site De Geer, may also hint at

126 Hessing 1991, 51, for a discussion of the sample contexts see Appendix IV.

127 *Cf.* Stouthamer 2001, 133-137; Berendsen & Stouthamer 2001, 71-74; Cohen 2003, 40-48; Appendix IV.

Neolithic activities while the fluvial system was still active (Appendix IV). The latter fluvial system was presumably active between *c.* 2880-2500 and 2460-2040 cal BC, when by avulsion its successor, the Houten fluvial system, started its phase of activity.[128] Near the end of this period, two prolonged phases of reduced sedimentation can be inferred from the presence of vegetation horizons in the floodbasin to the south of the excavations at De Horden (Steenbeek 1990, 67; Hessing & Steenbeek 1990, 25).

During one or both of these phases, some human activities could have taken place at De Horden, but the finds are inconclusive.[129] After yet another phase of increased sedimentation in the floodbasin to the south of De Horden, a new vegetation horizon dating (prior) to the Early Bronze Age or Middle Bronze Age-A formed (Steenbeek 1990, 131; Appendix IV). Embedded into this layer, finds of Barbed Wire-stamp decorated pottery, potbeaker- and Hilversum-style decorated sherds and some flint artefacts possibly datable to the Early Bronze Age and/or Middle Bronze Age-A were found in the west part of the De Horden excavations.[130] In addition, a stray radiocarbon date at De Horden suggests human presence during the Early Bronze Age or Middle Bronze Age-A (Appendix IV).

Presumably during or after the end of the Middle Bronze Age-A, more extensive sedimentation by the Houten fluvial system occurred in the floodbasin to the south of the De Horden excavations and on top of the Werkhoven levee deposits (Steenbeek 1990, 67; 131; Hessing & Steenbeek 1990, 25 fig. 12). The vegetation horizon that again formed in the top of these deposits can be correlated to the surface level of the Middle Bronze Age-B occupation that took place on top of it (*infra*; Appendix IV).

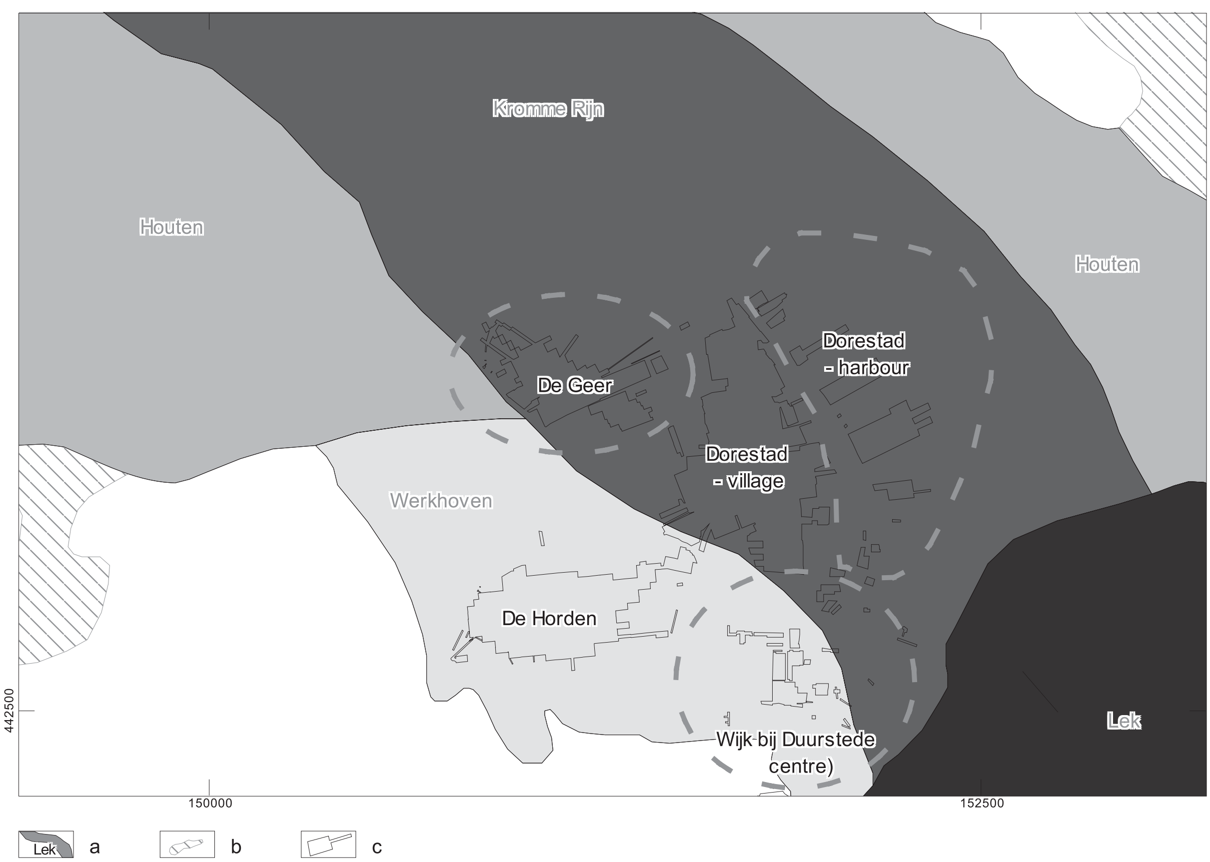

Fig. 4.22 Location of the Wijk bij Duurstede excavations in relation to the underlying fluvial systems (after Stouthamer 2001, 153 fig.5.3a).

a: fluvial system, b: zone with crevasse deposits, c: generalized excavation extents.

128 Berendsen & Stouthamer 2001, 242; Stouthamer 201, 134; Van Zijverden 2004a; Appendix IV.
129 Hessing & Steenbeek 1990, 16; Letterlé 1985, 335; Appendix IV.
130 Letterlé 1985; Hessing & Steenbeek 1990, 17; Appendix IV.

In conclusion, the number of find-spots of pre-Bronze Age remains is comparatively limited for the Wijk bij Duurstede macro-region. This may in part be related to the location of the various excavation campaigns around and in Wijk bij Duurstede in relation to the underlying fluvial systems (fig. 4.22). The excavations are all situated on top of the Werkhoven, Houten and Kromme Rijn fluvial systems, of which the oldest is not thought to start prior to the Late Neolithic-A (*supra*). Yet, the few Middle Neolithic finds indicate that human presence is to be expected for these periods. Within the excavated areas, these are however very likely to have been reworked intensively by the later fluvial systems. This reworking also greatly decreases – or even completely destroys – the archaeological visibility of such remains in coring campaigns. Future archaeological research aimed at these periods may, however, successfully document traces of human activities on yet ill-mapped Neolithic and older fluvial systems (and on river dunes) in locations where they have not been subsequently reworked.

4.5.3 The Wijk bij Duurstede excavations

At the sites of De Horden and De Geer, a total of 10 to 14 Bronze Age house-sites have been uncovered. These were situated on the point-bar deposits of a fossil fluvial system (the Werkhoven fluvial system), and possibly also on the levee or crevasse deposits of the Houten fluvial system (see Van Zijverden 2004a; Appendix IV). The feature preservation at these sites was moderate to poor, which means that more shallow traces, such as stakes holes indicating the location and direction of fences, could not be identified. The preservation of organic remains was also moderate. Due to the calcareous nature of the deposits, animal bones have been preserved in some numbers.[131] The number of plant-remains recovered for the Bronze Age is, however, very limited.[132]

The De Horden excavation shows relatively clean Bronze Age levels. This is in part caused by the proximity of the site to active fluvial systems, whose overbank deposits helped to create a vertical stratigraphy.[133] Consequently, the Bronze Age traces can be studied in relative isolation. This facilitates the identification of Bronze Age structures such as houses and outbuildings. In addition, the extent of the excavation should be stressed. At De Horden, a total area of 14 ha was uncovered, of which 7.3 ha was investigated with specific attention to the Bronze Age levels (Hessing 1985, 18-19; Appendix IV). From this latter area, most Bronze Age house-sites originated. Only a single possible house-site (De Horden house-site 11) was discovered during the first years of the excavations at De Horden, when no systematic attention was paid to the Bronze Age levels. Neither at De Geer, was there any systematic research into the Bronze Age levels (Van Es *et al*. 1992, 44; Appendix IV). Nonetheless, two Bronze Age house-sites were uncovered. Here, however, feature density was much higher and the recognition of Bronze Age structures difficult. The house-sites are best identifiable by their surrounding ditches. Outbuildings proved hard to reconstruct with sufficient validity from the posthole clutters.

Unfortunately, the prehistoric remains of both sites have not seen full publication yet, but some preliminary reports exist.[134] Consequently, distribution analyses of the finds-categories across the different sites have not been published and hence cannot be compared to the – if published – plans. Similarly, a detailed discussion of the finds from features grouped into structures was consequently also not (yet) possible in this study. Therefore, the data presented below are rather descriptive and biased towards spatial aspects of the sites. Despite these drawbacks, the extensive areas excavated and the relatively short (assumed) time-span for the Middle Bronze Age-B occupation at the sites De Horden and De Geer provide a valuable insight into the nature of the Middle Bronze occupation of this part of the Dutch central river area.

Houses

The Middle Bronze Age-B farmhouses from De Horden and De Geer are one the one hand very comparable, yet on the other hand their diversity is striking (fig. 4.23). Their uniformity is based on the observation that all houses share a three-aisled roof-bearing structure that was based on two longitudinal rows of roof-bearing posts. The roof-bearing structure often comprises 10 (n=1), 11 (n=4) or 12 (n=1) pairs of roof-bearing posts placed at a mean distance of 2.2 m

131 See Laarman 1996, 379 table. 6.1; Appendix IV.
132 But see Letterlé 1985, 333; Hessing 1991, 44; Appendix IV.
133 Steenbeek 1990; Hessing & Steenbeek 1990; Van Zijverden 2004a; Appendix IV.
134 For overviews see Hessing 1994; Van Es 1994, for detailed references to the preliminary publications see Appendix IV.

apart. Houses 1, 6 and 9 at De Horden form the smaller end of the spectrum (eight or nine sets of roof-bearing posts, lengths between 20.6-23 m), while houses 2a, 2b, 3 and 5 (12 to 14 sets of roof-bearing posts, lengths between 25-32 m) present the longest houses.

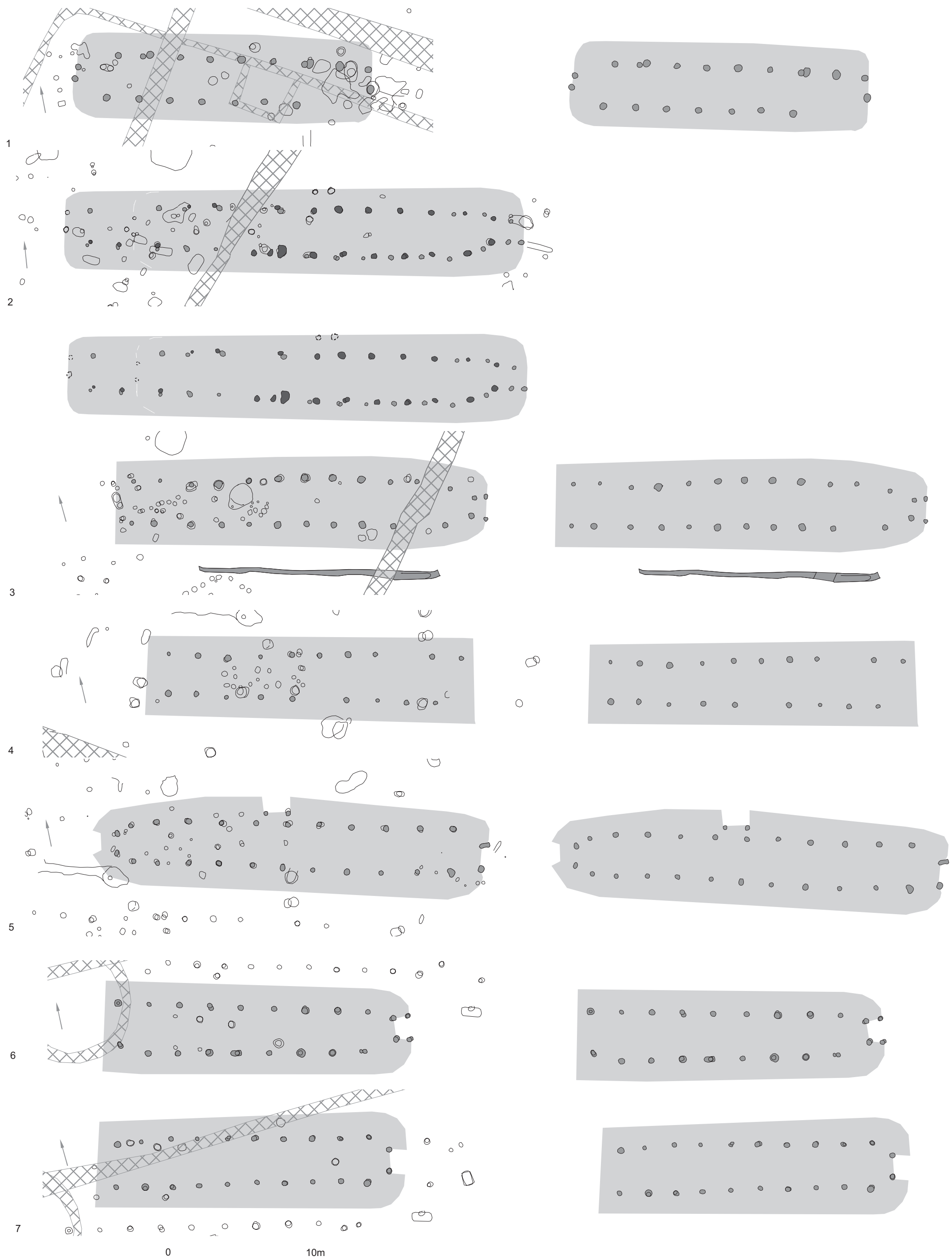

Fig. 4.23 Presumable Middle Bronze Age-B houses from the excavations De Horden (1-12) and De Geer (13-14) To the left the houses are shown on the all-feature plan, whereas to the right they are shown in isolation.

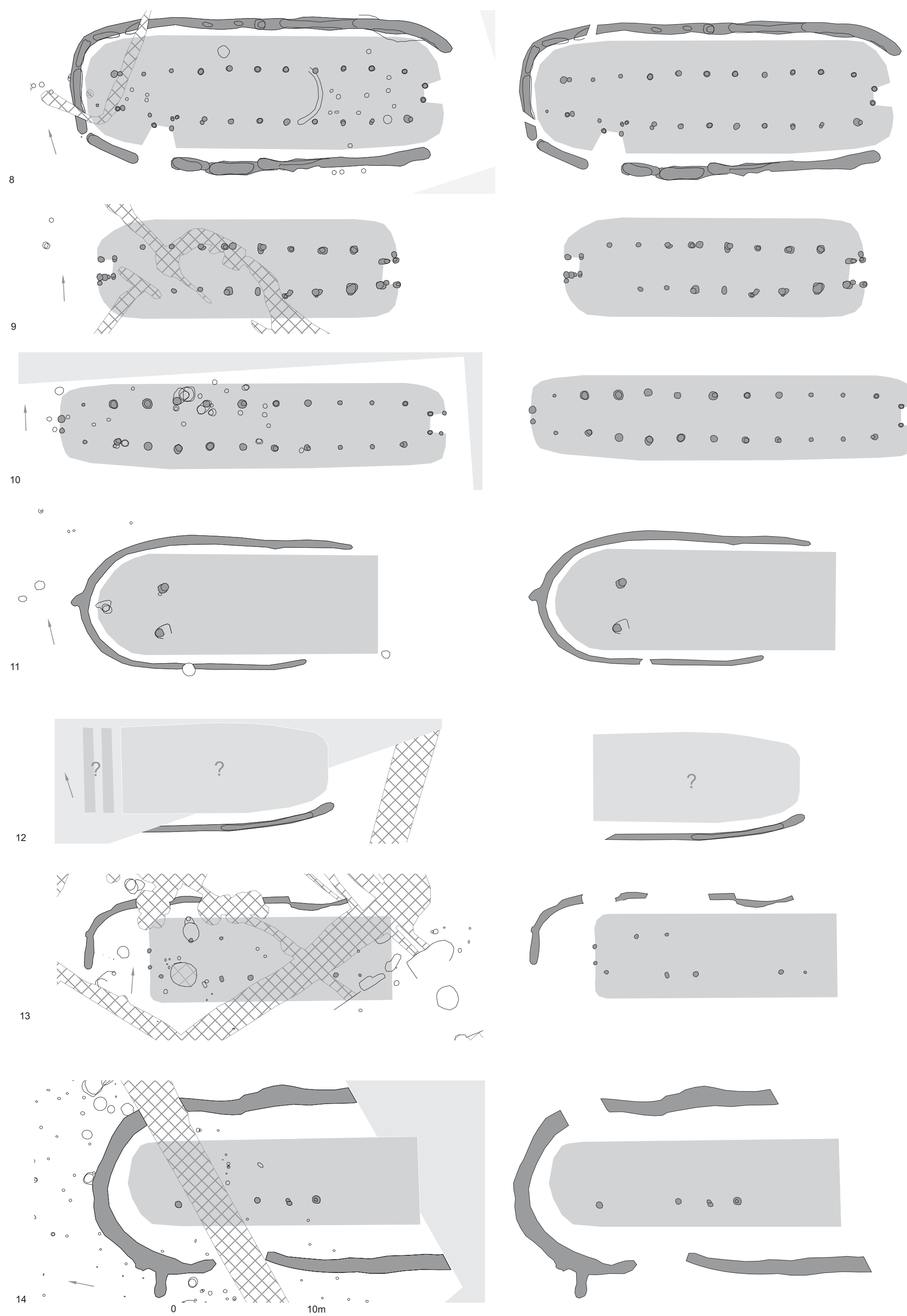

Fig. 4.23 (continued) Presumable Middle Bronze Age-B houses from the excavations De Horden (1-12) and De Geer (13-14) To the left the houses are shown on the all-feature plan, whereas to the right they are shown in isolation.

Most houses display a more or less constant distance between the paired roof-bearing posts (*i.e.* a constant span) of *c.* 3.15 m. Only house eight at De Horden has an exceptionally wide (*c.* 3.95 m) span. The span of houses 3, 10 and 11 at De Horden decreases near the short sides. This results in a somewhat 'cigar-shaped' ground plan for the roof-bearing structure (*cf.* fig. 5.14, type A2). This configuration of the roof-bearing structure is also known from other Middle Bronze Age sites in the Dutch river area and the coastal area.[135]

Besides the difference in the numbers of sets of roof-bearing posts already introduced above, the houses display a rather diverse set of entrance options. For ten houses, an entrance in the eastern short side had been preserved. This could either be a single set of roof-bearing posts with a more narrow span (*i.e.* an entrance portal, n= 6) or an elaborate entrance (two or sets of posts with a more narrow span, n= 5). Some houses may also have had an entrance in the western short side (*e.g.* fig. 4.23, nos. 1, 2, 5, 9, 10 and 13), but those of houses 1, 2a/b and 10 at De Horden have a span and/or placing that renders it questionable whether they were ever entrances. Noteworthy is the presence of indications for entrances in the long sides of the houses (fig. 4.23, nos. 2, 5,8 and 14). Whereas this possibility remains rather tentative for houses 5 and 2, the openings in the ditch-system that surround house 8 of De Horden and house 1 of De Geer, confirms the presence and possibility of entrances in the long sides.

The limited feature preservation does not allow to positively identify the techniques used for the wall construction. No traces of wall ditches, post or wattle-and-daub constructions or wall posts have been found. This may be explained by the fact that shallow traces of the wall-construction only penetrated down to into the darker vegetation horizon, which had to be stripped mechanically before features became visible. In any case, no traces of a wattle-and-daub wall could be recognized. This still leaves open the option that other means of wall-construction (*e.g.* sleeper based or sod walls) could have been used.

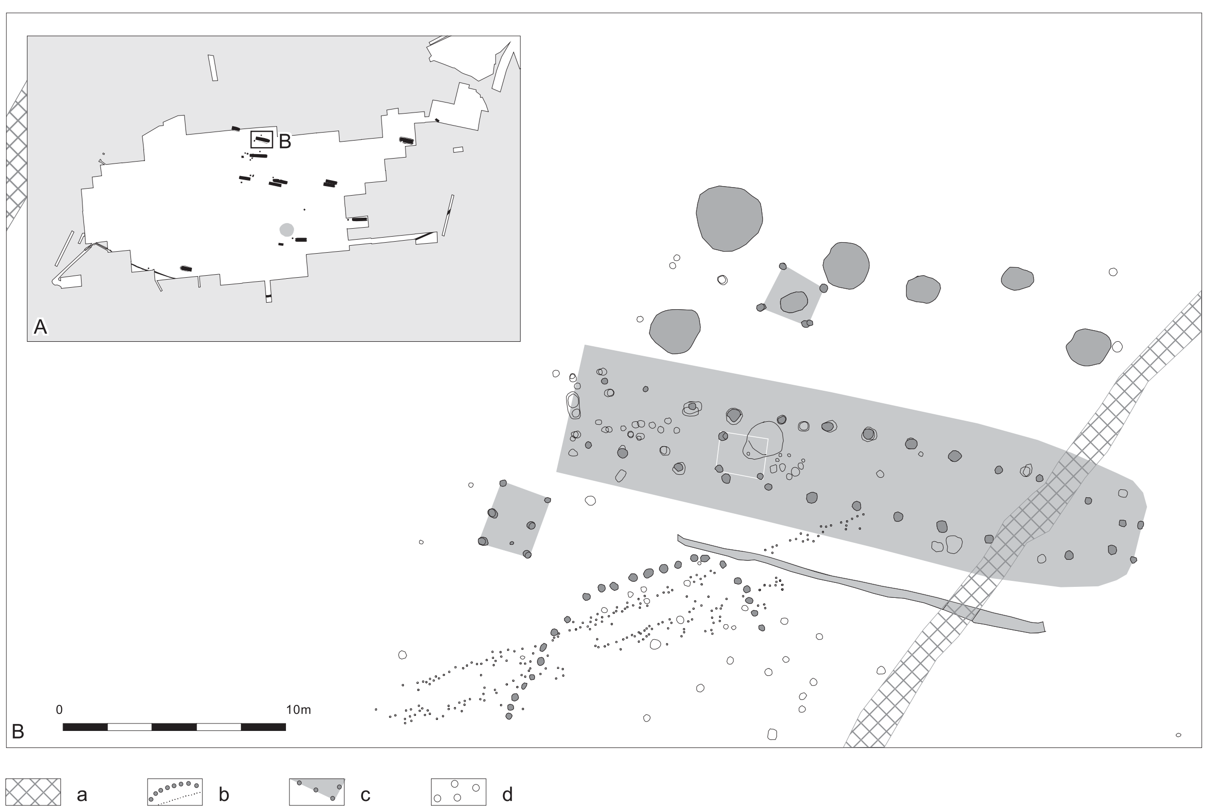

Fig. 4.24 Undated palisade and structures at the location of house-site three at De Horden.
a: post-Bronze age and Roman period ditches, b: palisade and (post-Bronze Age) fences, c: Bronze Age structures, d: other features (not necessarily Bronze Age).

135 River area: *e.g.* Eigenblok house; fig. 4.8, no 5; De Bogen; fig. 4.14, J-M. Coastal area: Woltering 2000, 35; 40.

Fig. 4.25 Location of the house-sites with and without ditches on top of the sand-depth map (after Steenbeek & Hessing 1990, 15 fig. 5; Van Zijverden 2004a).

a: excavation extents, b: sand-depth (light: 3-4 m above D.O.D., medium: 3-2 m, darker: below 1 m), c: Bronze Age houses and structures, d: Bronze Age houses with ditches.

As no traces of walls proper had been preserved, the width of the farms remains unclear. A maximum width of *c.* 7-9 m may be inferred from the ditch found with house 3 (fig. 4.24) and the ditches that surround the houses 8 and 11 at De Horden, but this is more than a meter above the mean for Bronze Age houses from the river area where the walls have been preserved (see section 5.2.3.4, esp. fig. 5.26, B). There are several plausible – possibly combined – assumed functions for the ditches around the farmhouse ground plans. These could have drained the location of the house in general, could have served as eaves drip-gullies that protected the wall from excess water and – when initially dug – could have provided material for the construction of the walls. As the Bronze Age surface level primarily consisted of sandy deposits (Hessing 1985, 18), the removal of clayey sediments for plastering seems improbable. A combined function of the first two options seems most probable. Unfortunately, it is difficult to estimate how far the roof extended down and how wide it stretched, as this was controlled by now unknown parameters such as roof-pitch and height of the highest point of the roof. Using acceptable estimates,[136] it seems quite probable that the ditches served as eaves drip-gullies (*cf.* section 4.2, esp. fig. 4.2). At the house-sites of De Geer, the ditches are situated too far from the roof-bearing posts to have functioned as eaves drip-gullies (section 5.6; Appendix IV). Here, a drainage function must have prevailed.

Nonetheless, the drainage functions of such ditches should perhaps not be overly downplayed. First of all, the presence of eaves drip-gullies was by no means an integral property of the Bronze Age houses, as seven house-sites functioned without these. Secondly, most of the house-sites with ditches were situated on the highest parts of the micro-topography (fig. 4.25). If we account for a gradual increase in the floodbasin water level during this period, the ditches could represent a final measure to maintain ‘dry feet’ after already having sought out the highest grounds.[137]

House-sites

The interpretation of the house-site structuring of the Wijk bij Duurstede Bronze Age house-sites is hampered by two important aspects. First, the limited feature preservation did not allow for shallow traces such as fences and shallow ditches to have been preserved. Such features, however, could have been helpful in defining the extent of Bronze Age house-sites. Secondly, some houses-sites are situated as close-by to other house-sites as 20-35 m. This, combined with the first point, complicates the identification of which elements (pits, outbuildings *et cetera*) were once part of which house-site.

Generally, four- and six-post outbuildings are the most common house-site elements for the Wijk bij Duurstede house-sites (fig. 4.26). Only for houses 6 and 8 at De Horden and 2 at De Geer could no possibly contemporaneous outbuilding of this type by identified within close distance (< 30 m). Usually, only one or two outbuildings are encountered in the vicinity of the farmhouse, but around farmhouses 1 and 4 as many as three to four (respectively) outbuildings could have coexisted (table 4.1). No stringently preferred location of the outbuildings in relation to the houses may be inferred, although most are situated near the western part of the house-site. They are either set to the

136 Assuming a 45-50º roof pitch (*cf.* Huijts 1992, 53) and a wall-height of 1.05-1.5 m at 1.5 m from the roof-bearing posts (*cf.* IJzereef 1981, 66; Van Heeringen 1987).
137 Hessing & Steenbeek 1990, 17; *cf.* Steenbeek 1990, 121-122.

north and/or southern long side of the farmhouses or more or less in line with the western short side. Only at house-site 1 do outbuildings occur near the eastern half of the farmhouse (see fig. 4.26, B).

On house-site 2, as many as five outbuildings were encountered, but this house-site comprises two house-phases (fig. 4.27, C).[138] House-site 1 of De Geer deserves special mentioning (fig. 4.26, L). Here, the system of ditches that surrounded the house-site has a small protrusion that seems to define a location where granary-type

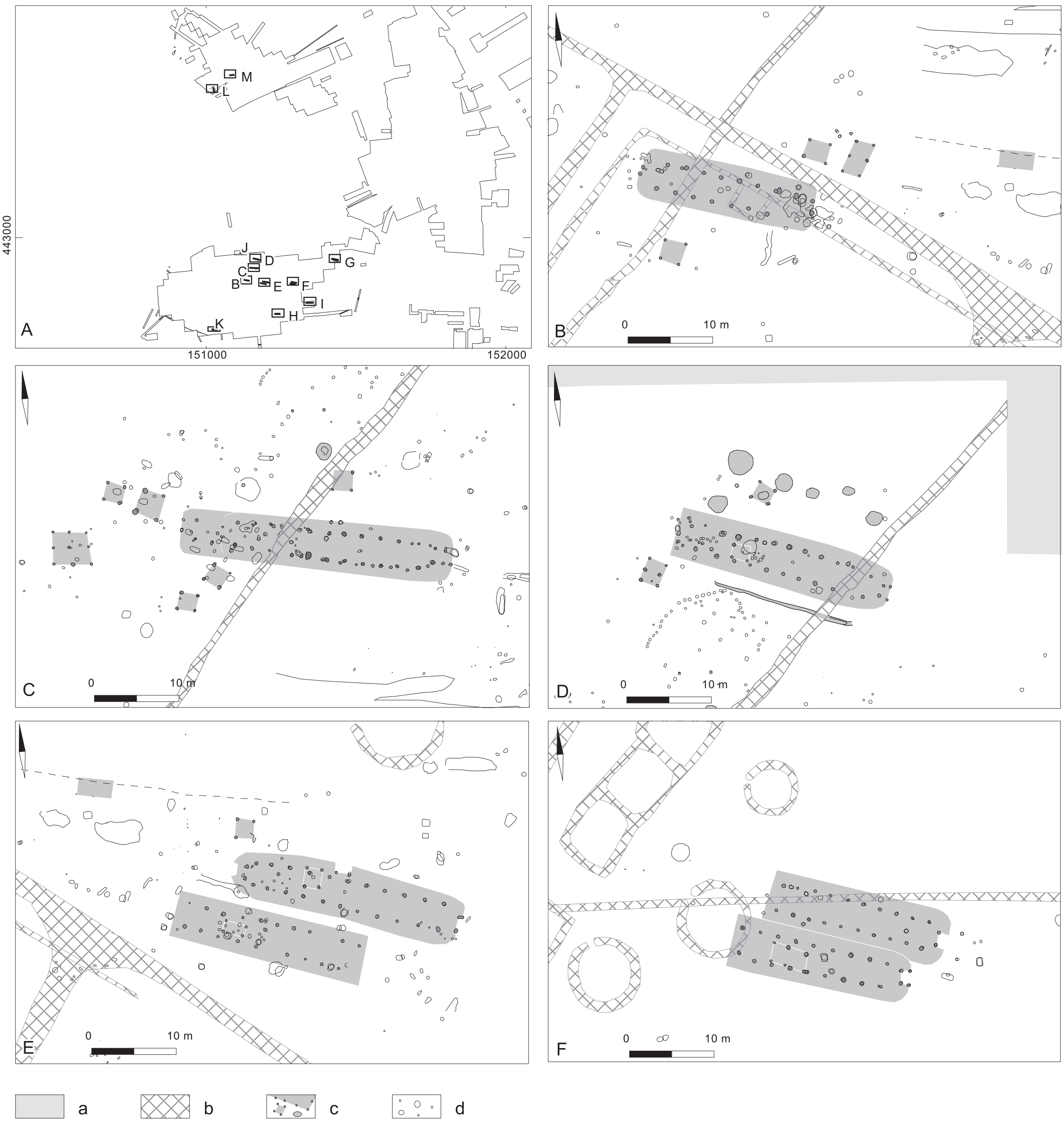

Fig. 4.26 Overview of the Wijk bij Duurstede Bronze Age house-sites (B: Horden 1, C: Horden 2a;b, D: Horden 3, E: Horden 5; 4, F: Horden 6; 7, G: Horden 8, I: Horden 9, J: Horden 11, K: Horden 12, L: De Geer 1, M: De Geer 2).

a: not excavated, b: post-Bronze Age and Roman period ditches, c: Bronze Age structures and features, d: other features (not necessarily Bronze Age).

138 See Appendix IV, esp. fig. IV.13.

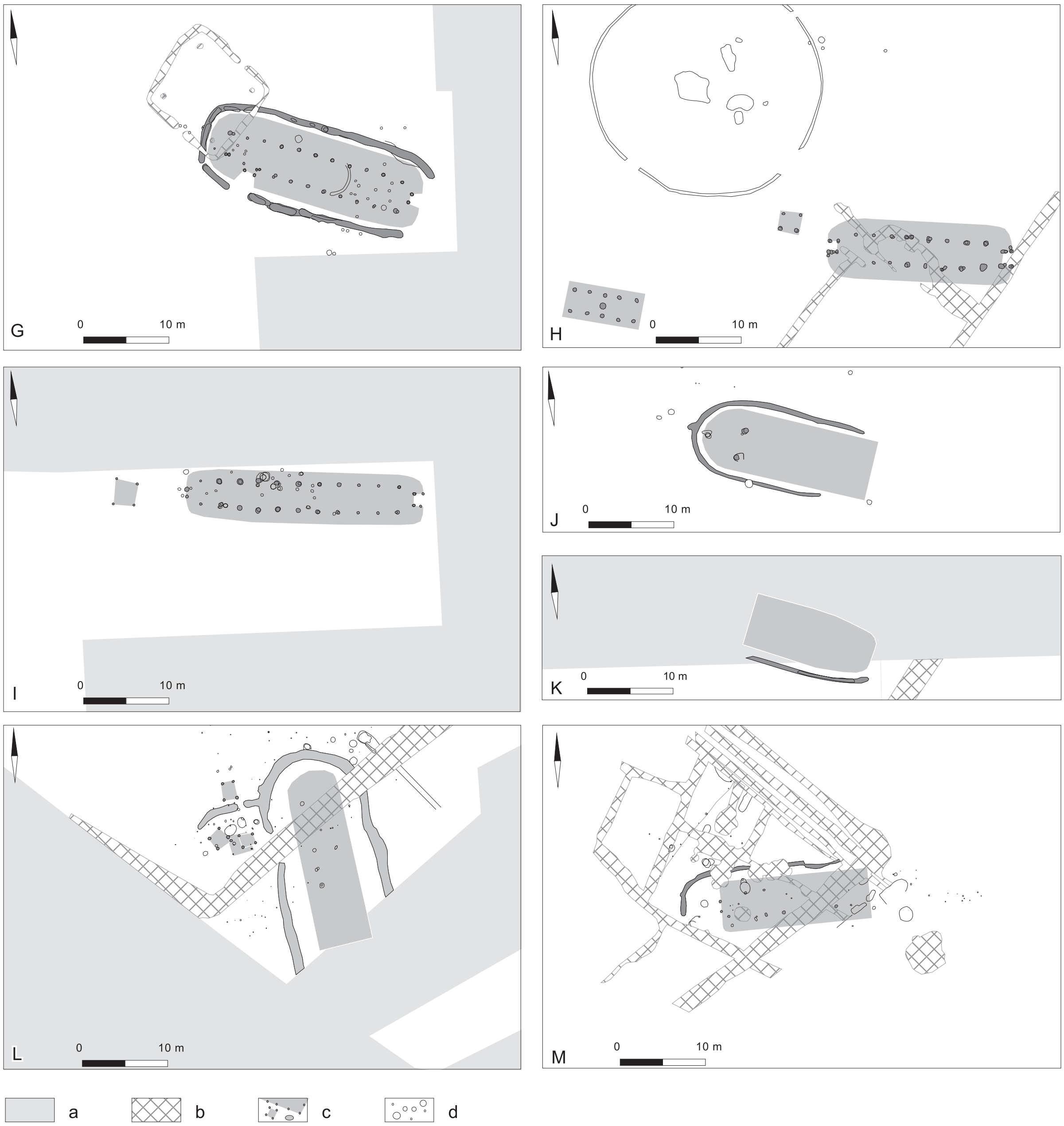

Fig. 4.26 (continued) Overview of the Wijk bij Duurstede Bronze Age house-sites (B: Horden 1, C: Horden 2a;b, D: Horden 3, E: Horden 5; 4, F: Horden 6; 7, G: Horden 8, I: Horden 9, J: Horden 11, K: Horden 12, L: De Geer 1, M: De Geer 2).

a: not excavated, b: post-Bronze Age and Roman period ditches, c: Bronze Age structures and features, d: other features (not necessarily Bronze Age).

outbuildings were frequently rebuilt. Although the individual outbuildings cannot be isolated with much certainty, the ditch-system seems to embody the perception that house and outbuildings ‘go together’. They presumably were conceptually, but in this case also physically, interrelated with the Bronze Age farmhouse (*cf.* section 6.4.2, fig. 6.18). If these interpretations are correct, this house-site is one of the few where the association of outbuildings to farmhouses is not predominantly built on their spatial proximity and conforming orientation, but additionally reinforced by a shared physical structure; their drainage system.

house-site	minimum	maximum
De Horden 1	3	4
De Horden 2	3	5
De Horden 3	1	2
De Horden 4	2	3
De Horden 5	1	1
De Horden 6	-	-
De Horden 7	1	1
De Horden 8	-	-
De Horden 9	1	2
De Horden 10	1	1
De Horden 11	n.a.	n.a.
De Horden 12	n.a.	n.a.
De Geer 1	1	4
De Geer 2	n.a.	n.a.

Table 4.1 Minimum and maximum estimates for numbers of outbuildings on Wijk bij Duurstede Bronze Age house-sites.

House-site 2 is not the only house-site where two house-phases could be identified, but only at this house-site did the houses overlap so perfectly that only a single house appears to be suggested. House-sites 4/5 and 6/7 also display two house-phases, but here the second house-phase is located several meters more to the north or south. In particular the second house-phases on house-sites 2 and 6/7 are structurally very similar to their respective predecessors. This could indicate that those (re)building the second phase had intricate knowledge of the structural properties of the previous house.[139] The occupants of the preceding house may thus very well have been among these builders. The fact that the houses of house-sites 2 and 6/7 are in details quite different – and assuming that these were contemporaneously occupied – could enforce this assumption and outline a particular importance of expressing an individual 'household' traditionality.[140]

Besides the farmhouse and the outbuildings, pits may also have been perceived as 'belonging' to a particular house-site. Directly to the north of house 3, a grouping of five larger pits was discovered (fig. 4.26, D; Hessing 1991, 44).

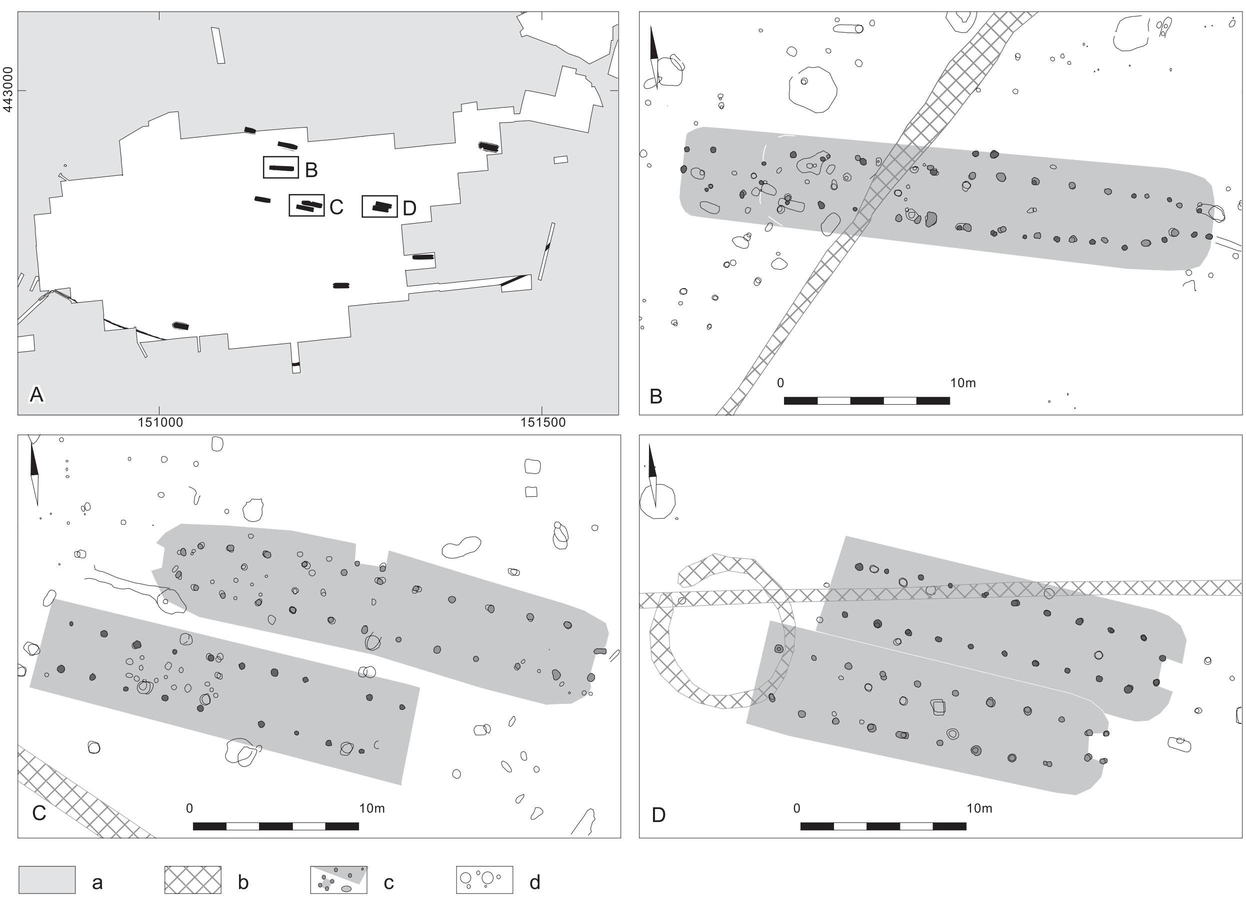

Fig. 4.27 Multiple house-phases at house-sites 2 (B), 4/5 (C) and 6/7 (D) of Wijk bij Duurstede - De Horden. House phases 2a, 4 and 7 indicated by dark grey features, house-phases 2b, 5 and 6 with grey features. For location see inset A.

a: not excavated, b: post-Bronze Age and Roman period ditches, c: Bronze Age structures, d: other features (not necessarily Bronze Age).

139 See Appendix IV, esp. fig. IV.13 and fig. IV.17.
140 *Cf.* section 3.2.3, esp. note 20.

The fact that these pits were only found in such large numbers directly north of this house and the fact that their distribution does not extend beyond the length of the house, supports the idea that these pits were once part of this house-site. The pits had relatively clean in-fills and contained few finds (*op. cit.*). Therefore, an interpretation as refuse pits seems unlikely, but alternatives cannot be argued for. Another large pit in between houses two and three at De Horden contained some sherds and burned grains of barley, but for this pit the original function as well as the assignment of it to house-site 2 is debatable (Hessing 1991, 42-43; Appendix IV, fig. IV.12).

House-site 9 shows two rather infrequent phenomena for Bronze Age house-sites; a ten-post outbuilding and a funerary monument (fig. 4.28, B-C). Outbuildings of types other than four-, six- and nine-post 'granary' types are rarely documented on Bronze Age house-sites.[141] Often, the larger outbuildings tentatively interpreted as 'barns' or 'sheds' form a diverse group of rarely reliable reconstructions (see section 5.3). The spacing of the posts is comparable to that of Bronze Age houses, yet the span is slightly smaller (*c.* 2.5 m, *cf.* fig. 5.27, B). Nonetheless, it is very well possible that this configuration of posts indicates a three-aisled structure, *i.e.* with at wall outside the documented postholes. Some Bronze Age ceramics and burned bone were recovered from (the vicinity?) of this outbuilding (Hessing 1985, fig. 14), but its function remains speculative.

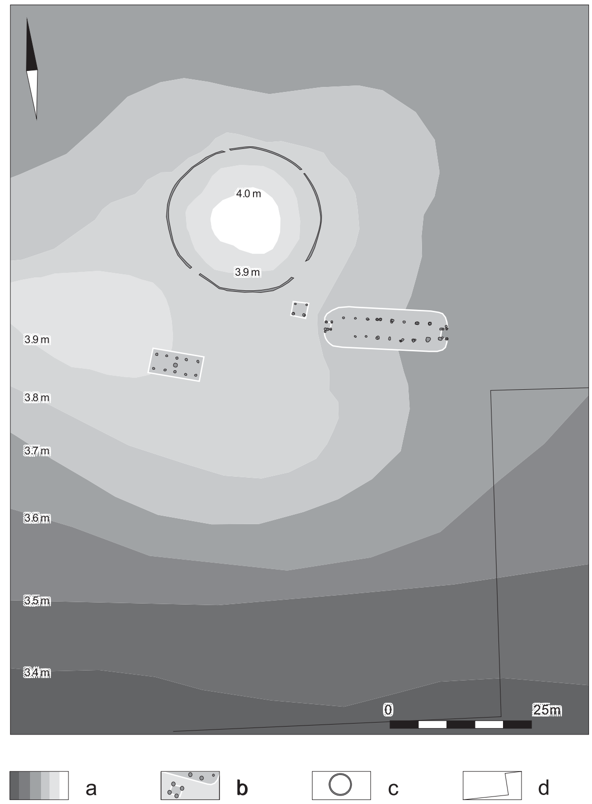

Fig. 4.28 House-site nine at Wijk bij Duurstede – De Horden with height map of the overlying deposits (after Hessing 1985, Map II).

a: height contours in m above D.O.D, b: Bronze Age structures, c: possible Bronze Age funerary monument, d: excavation extents.

The funerary monument could be the preserved relict of a Bronze Age barrow. Yet, as no associated interment was discovered for the funerary monument at De Horden house-site 9, the term barrow or grave will be avoided. A section across the monument shows slight indications for the former presence of a mound body (Hessing 1989, 308-309 fig. 9). In any case, the 26 m diameter ditch was positioned as to gird the already highest part of the micro-topographic landscape (fig. 4.28; Hessing 1985, map II). This choice of a small elevation in the micro-topographical landscape for a funerary monument was also observed at Meteren - De Bogen.[142] From the lowermost part of the vegetation horizon within the circular ditch, some Bronze Age sherds were recovered (Hessing 1985, 30 fig. 14; Hessing 1989, 308, note 19). If we overstep the possibility of bioturbation, these provide a weak but tantalizing indication for a Bronze Age date for the monument. As Bronze Age funerary monuments usually appear to be constructed in separate (*i.e.* non domestic) zones of the landscape,[143] the funerary monuments at Meteren - De Bogen and Wijk bij Duurstede - De Horden seem to suggest that this need not have applied to all regions of the Low Countries. Unfortunately, the lack of dating evidence does not allow to assess whether house-site 9 was contemporaneous to the monument. Whatever the phasing of house and monument was, it seems probable that relicts from the first will have been visible when the second structure was built. This – again, like at Meteren - De Bogen (see section 4.4.3; esp. fig. 4.15) – at least indicates that the (earlier) presence of the former did not obstruct the erection of the latter. Put more simply, houses could be part of the (life-/construction-) history of plots on which funerary monuments were to be erected or *vice versa*.

141 *Cf.* section 5.4, esp. fig. 5.39.
142 See section 4.4.3; Van Zijverden 2002b, 84; Appendix III.
143 *Cf.* section 8.2.3.3; Bourgeois & Arnoldussen 2006; Bourgeois & Fontijn 2008.

Having touched upon the life- or construction histories of particular plots, another observation needs to be made. A number of four- or six-post 'granary-type' outbuildings could be identified that overlapped with the ground plans of houses 3, 4, 5 and 6 at De Horden (fig. 4.29). If we assume that granaries need not have been torn down or replaced when the farmhouse of a given house-site was rebuilt, the outbuilding within house 6 could have belonged to house-phase 7 – whose orientation it better matches – which could be taken to be the younger one of the two. This is all rather speculative and essentially the phasing of these two could be either way (*cf.* house-site 4/5; fig. 4.27, C), or the outbuildings could all pre- or post-date the occupation phases. Despite these insecurities in the phasing, their frequent occurrence and corresponding orientation to nearby farmhouses does however seem to suggest a structural relation between the two (*cf.* section 4.3.3, esp. fig. 4.5).

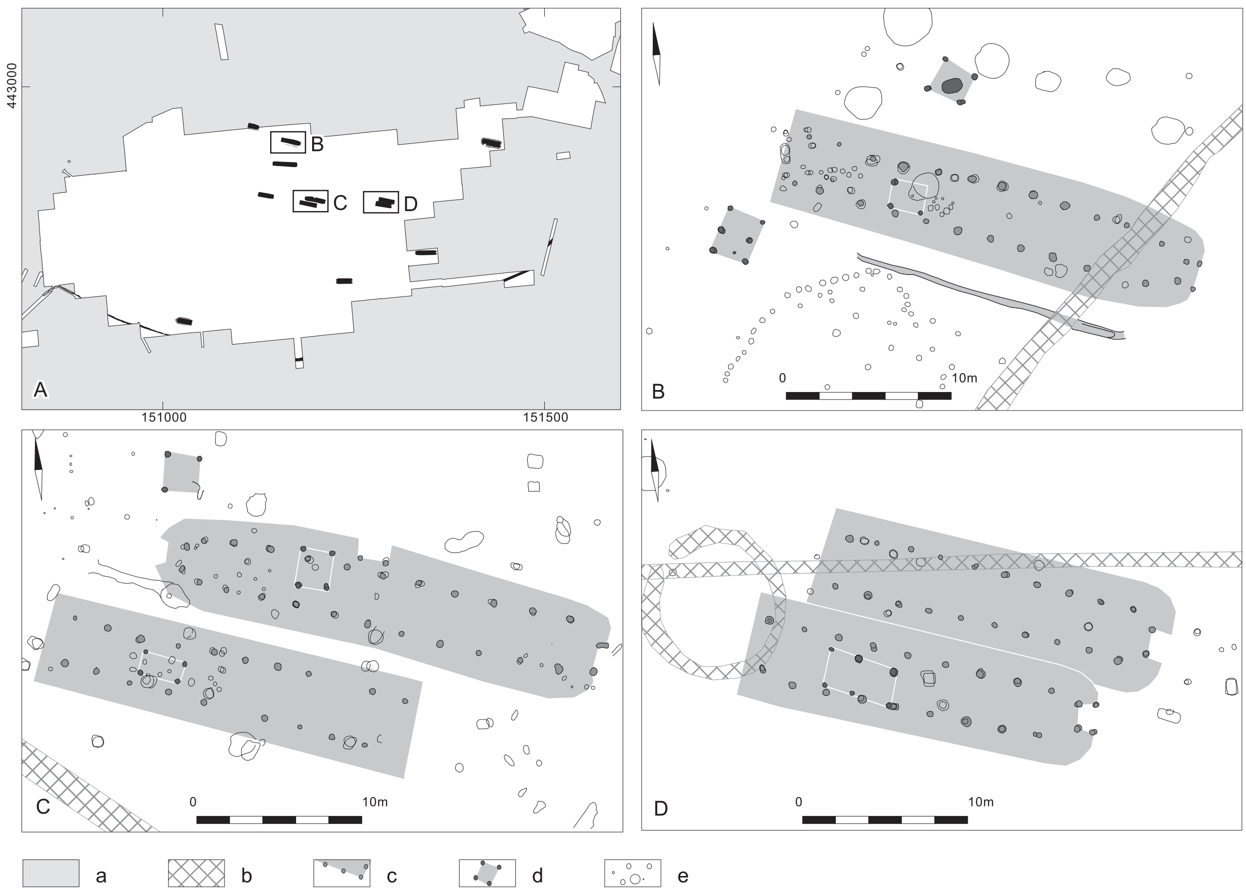

Fig. 4.29 Ground plans of outbuildings overlapping with those of houses 3 (B), 4; 5 (C) and 6 (D) at Wijk bij Duurstede – De Horden. For location see inset A.

a: post-Bronze Age and Roman period ditches, b: Bronze Age houses, c: Bronze Age houses, d: possible Bronze Age outbuildings, e: other features (not necessarily Bronze Age).

Settlement site

While accounting for the second house-phases at house-sites 2, 4/5 and 6/7, no house-sites have been overbuilt by other Middle Bronze Age(-B) houses, which leaves open the option that as many as ten house-sites could have been occupied simultaneously at De Horden. In all fairness however, it should also be stressed that the – low numbers and weak associations of the available – radiocarbon dated samples do also not effectively speak against sequential ('wandering') occupation. The two house-sites of the De Geer could in theory have belonged to the same settlement site, but due to the large distance in between (> 500 m), this will not be assumed here.

At other sites, the corresponding orientation of the houses has been used as a crude indication of contemporaneity, based on the assumption that in this orientation a conformation to a pre-existing or organically growing cultural landscape is reflected.[144] For the house-sites at Wijk bij Duurstede, this can hardly be argued for. No other structures that could be interpreted as man-made parts of the cultural landscape (*e.g.* fences, drove ways, tracks or palisades) that conform in orientation to the house(sites) are known. In the case of Wijk bij Duurstede, views on what the 'proper' orientation of the houses was, could easily have been shared communally or replicated over time. Such views cannot – for this site – be proven to have applied to settlement site elements other than the houses and the(ir) outbuildings.

Despite this paucity of the preserved built-up part of the cultural landscape, the two house-sites at De Geer show a slightly diverging system of house(-site) orientation. This could suggest that either the two orientation systems of the cultural landscape were never linked (or that linking with divergence was unproblematic), or in other words; these were separate settlement sites. Alternatively, occupation could have been simultaneous and the change in orientation was a deliberate choice to express a local (neighbourhood, kinship or other) identity (*cf.* fig. 6.30). A final option may be that enough time lapsed between the occupation at De Horden and at De Geer to allow for the system of orientation to be restructured.

The fact that for both sites the observed house-site orientations seem to run – in parts – at angles to the micro-topography of the landscape, indicates that the latter need not have determined this system of orientation.[145] Yet, landscape morphology may have shaped another important element of the De Horden settlement site.

To the south of the house-sites of De Horden, a 1.6 to 4.6 m wide ditch can be reconstructed as having run towards the south of the settlement site for a length of over *c.* 730 m (fig. 4.30). The trajectory of the ditch seems to mimics that of a swale (or residual?) gully located *c.* 200-260 m to the south of it. In parts, stretches of single-stake type fence flanked the ditch. Unfortunately, the dating of the ditch is unclear. A pre-Iron Age date can be argued for, based on its stratigraphic position (Van Es *et al.* 1980, 51; Hessing 1985, 21), but this leaves open an Early- to Middle Bronze Age-B date. Should, however, this ditch be contemporaneous to the phase(s) of Middle Bronze Age-B occupation, it is the single Bronze Age site in the river area where a possible settlement site boundary is indicated. If so, the scale (the recovered fragment is already *c.* 730 m long) and location (avoiding yet including house-sites 12 and 10) could reflect a communal effort. Even if the motives for constructing this ditch were purely practical, it could have stood as a monument to this achievement after completion (*cf.* section 5.5).

Settlement and landscape

The Middle Bronze Age-B occupation at De Horden took place on a geogenetically different landscape than the other settlement sites described in this chapter. Here, occupation took place on an erosion remnant of the channel-bed deposits of a meandering system; the Werkhoven fluvial system. This fluvial system had ceased its phase of activity just prior to the Early Bronze Age (Stouthamer 2001, 124; Appendix IV). The Houten fluvial system, located as close by as *c.* 500 m to the north of De Horden, took over as the main drainage channel from that period (*ibid.*). The former swales and residual gully of the Werkhoven fluvial system may have remained water-logged for some centuries.[146] Its mineral-rich and well-draining point bars, combined with the close proximity to floodbasins for grazing and an active river channel for fishing, fresh water and (supra-local) communication, provided an ideal settlement site location for Bronze Age mixed-farmers. As no wells have been documented, some or all of the above sources of fresh water could have been used for drinking water. Cattle could easily be led into the southern floodbasin to drink.

On top of the fossil Werkhoven channel-bed deposits, a vegetation horizon formed (Hessing & Steenbeek 1990; Appendix IV). This indicates a phase of reduced sedimentation during which vegetation could flourish. Palynological studies indicated the presence of some birch, ash, elm and oak trees on the highest parts of the landscape, whereas in the floodbasin to the south of the Werkhoven channel-bed deposits a vegetation consisting of zones of sedges, grasses and willow trees combined with shallow pools existed.[147]

144 *Cf.* section 4.2, esp. fig. 4.1; section 4.3.4, fig. 4.5; section 7.3.3, fig. 7.9.
145 *Cf.* fig. 4.25; Hessing & Steenbeek 1990, 15 fig. 5.
146 Hessing 1989, 306; Berendsen & Stouthamer 2001, 242; Appendix IV.
147 Steenbeek, Roeleveld & Bohcke 1990; Steenbeek 1990, fig. 2.2.4; Van Beurden 2008; Appendix IV.

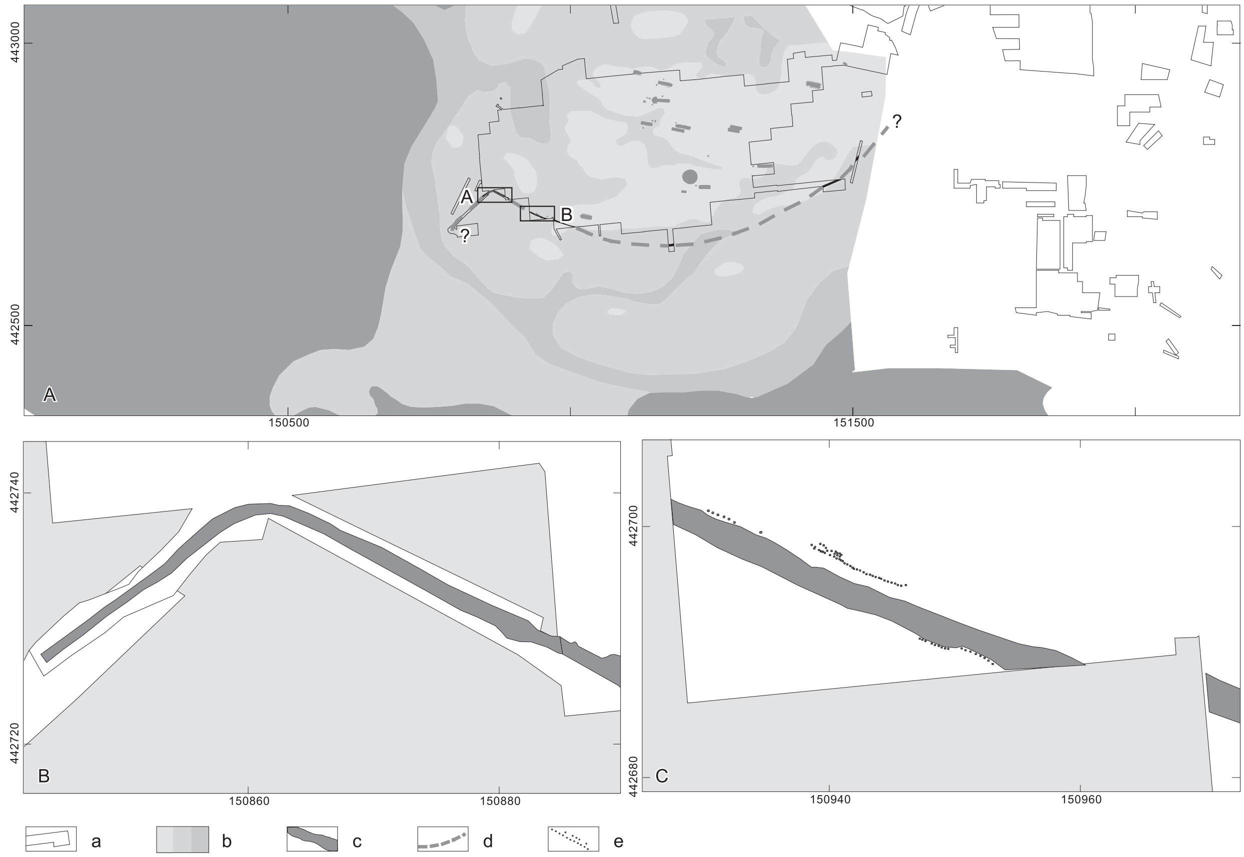

Fig 4.30 Possible settlement site boundary ditch at Wijk bij Duurstede - De Horden on top of the sand-depth map (A: after Steenbeek & Hessing 1990, 15 fig. 5; Van Zijverden 2004a) and detailed view of the fences and ditch (B, C).

a: excavation extents, b: sand-depth (light: 3-4 m above D.O.D., medium: 3-2 m, darker: below 1 m), c: ditch, d: ditch reconstructed, e: stakes.

Possibly, the emergence of the Kromme Rijn fluvial system near the end of the Middle Bronze Age-B – or the start of the Late Bronze Age – ended the Middle Bronze Age-B phase of occupation (Berendsen & Stouthamer 2001, 212; Appendix IV). More frequent flooding of the settlement site and a gradual rise in the groundwater table may have been the first problems, but eventually even the highest part of the De Horden landscape were fully covered by (up to 1 m thick) crevasse deposits (Steenbeek 1990, 92; 188; Appendix IV).

4.5.4 Conclusions

The scale of the excavations at Wijk bij Duurstede provide us with a valuable insight into the density of Middle Bronze Age-B occupation on a fossil meander belt. In areas where systematic attention was paid to prehistoric occupation, house-sites proved to be located at ca. 60 m to 200 m interval. The feature preservation allowed only reconstruction of the ground plans of houses and outbuildings, but these could be studied in relative clarity. No houses or outbuildings had to be reconstructed from dense posthole clutters, which adds to the validity of the reconstructions proposed. The houses are of comparable, yet nearly always slightly different types. With their eaves-drip gullies and elaborate entrances, they fit well within the group of Middle Bronze Age-B house plans from other parts of the river area.

The relative clarity of the Bronze Age feature plan shows that usually, a limited number of outbuildings accompanied the houses. These outbuildings show no clear-cut preferred position in relation to their nearest farmhouse (but they are generally situated west of the house), yet nearly always conform to it in orientation. At several house-sites, the ground plans of four- and six-post outbuildings overlapped with those of the houses, suggesting that it was unproblematic to change the function of a particular plot in settlement space from housing to storage (if that indeed ever was the function of these outbuildings; section 5.4) or *vice versa*. At three house-sites the main farmhouse was rebuilt. In two instances the second house-phase was so well comparable to that of the preceding phase that it may be assumed that the occupants of the first phase were involved in constructing the second.

Remarkable is the occurrence of relatively scarce settlement site elements such as ten-post outbuildings, palisades and a funerary monument. Although for these phenomena no direct dating evidence is available, they could very well date to the Middle Bronze Age occupation phase. Special attention needs to be paid to an extensive (> 730 m long) ditch that may have delimited the settlement site area towards the floodbasin area in the south. Not only is this ditch the single best example of a possible Bronze Age settlement site boundary, but it also once more demonstrates the vastness of the (built-up) part of the Bronze Age cultural landscape.

4.6 Lienden

4.6.1 Introduction

Bronze Age settlement sites in the Lienden macro-region have only recently (1996-2000), through the construction of the Betuweroute freight railway, been discovered and studied in detail (Schoneveld & Kranendonk 2002).[148] Detailed coring campaigns accompanying the archaeological fieldwork allowed the mapping of the core and periphery areas of settlement sites dated to the Late Neolithic/Early Bronze Age (fig. 4.31, A) and Middle Bronze Age (fig. 4.31, B).[149] Unfortunately, the older Late Neolithic/Early Bronze Age level was uncovered in small, unpublished trenches and the information available for this period can only allow for sketchy interpretations.[150] Parts of two concentrations of finds and features at the Middle Bronze Age level were more extensively excavated.[151] Directly east of these sites, a Middle Iron Age and Roman period site was also excavated (Sier & Koot 2001).

4.6.2 General remarks

As only small surfaces have been excavated to the depth of the lowermost vegetation horizon, datable to the Late Neolithic to Early Bronze Age periods, evidence for human activities during these periods is scarce. Although the ceramics recovered from these levels are diagnostic enough to indicate human presence between *c.* 2300 and 1600 cal BC, their small numbers and context (no associated features) do not allow any functional interpretation.[152] Similarly, assessment of the degree of permanency of the human presence or the palaeo-environmental setting for these periods is impossible.[153]

These pre-Middle Bronze Age-B period finds are embedded into the 15-20 cm thick vegetation horizon which has formed in the top of a *c.* 1 m thick layer of crevasse and/or levee deposits.[154] This preference for usage of the crevasse and/or levee deposits also applies to later periods. Unfortunately, as absolute dates from the Westerveld channel – responsible for depositing these crevasse deposits – are absent, it is impossible to determine whether the Westerveld channel was still active during these periods. As anastomosing rivers often form extensive crevasses at their 'puberty' and 'death' (section 2.4.4) and at Lienden a second phase – supporting the Middle Bronze Age vegetation horizon – of crevasse formation by the Westerveld channel is known, it is tempting to assume that the initial phase of crevasse formation was related to the initial centuries of sedimentation by the Westerveld channel. Thus, one can reasonably assume that the main channel of the Westerveld was active during – parts of? – the Late Neolithic to Middle Bronze Age-A periods.

148 See Appendix V for a more detailed history of the archaeological research.
149 Based on Van Dinter (2002, 49 fig. 2.11) and Van Zijverden 2005.
150 Trenches are mentioned by Kranendonk & De Voogd (2002, 18) but not published in full (but see Schoneveld 2002b, 251; Appendix V.
151 Schoneveld & Kranendonk 2002. This amounts to *c.* 0.5 ha at two sites; total Middle Bronze Age level uncovered *c.* 0.75 ha.
152 The ceramic assemblage comprised Veluwe-type Bell beakers, 'Barbed Wire'-stamp decorated pots and potbeaker vessel fragments (Sier & Drenth 1999, 14; 17; Siemons & Sier 1999b, 23-24, 79-80; Ufkes 2002a, 99).
153 Although it was provisionally labelled a possible house-site after the campaign of test-trenches (Sier & Drenth 1999, 23; Appendix V).
154 Van Zijverden in Siemons & Sier 1999b; Van Zijverden in Sier & Drenth 1999.

Clear evidence for human activities during the first part of the Middle Bronze Age(-A) is absent from the Lienden region. It is tempting to correlate this absence to a period of much increased activity by the Westerveld system, as is evidenced by the extensive crevasse deposits that underlie the Middle Bronze Age-B remains discussed below (Van Zijverden 2005; Appendix V).

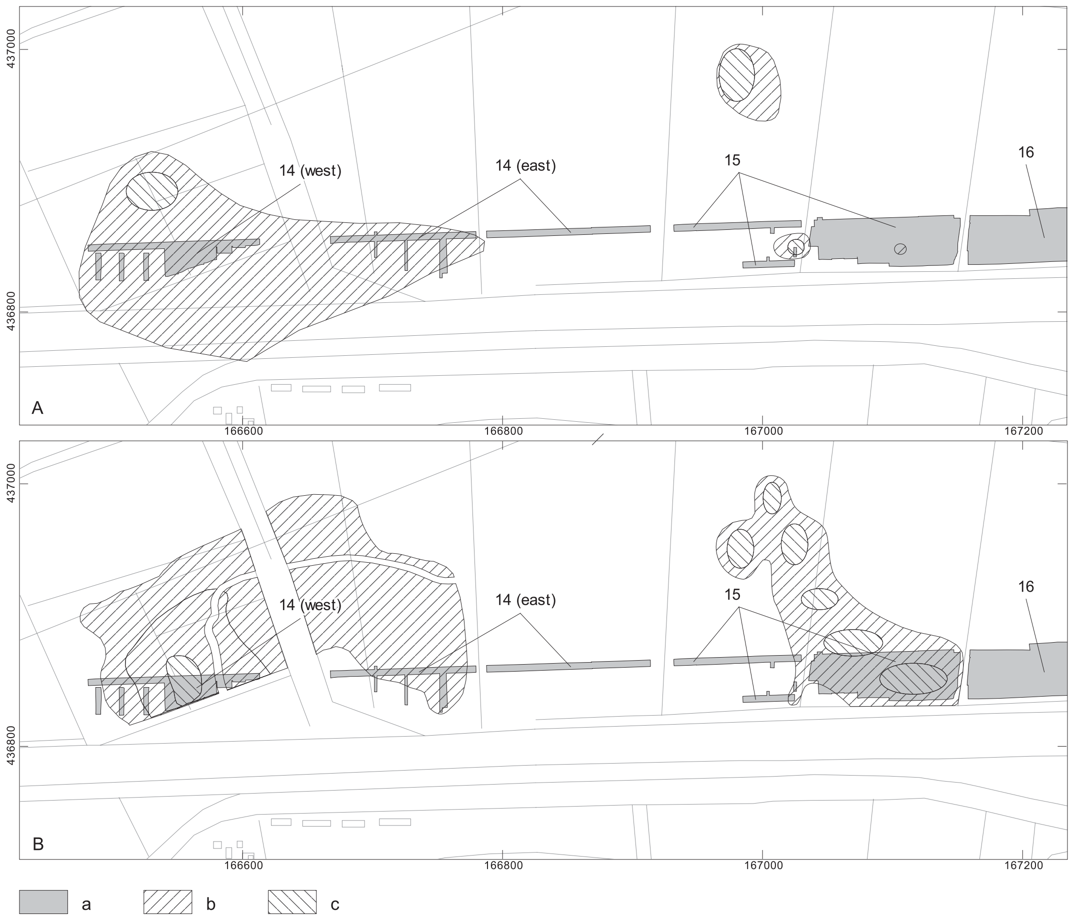

Fig. 4.31 Excavated area with sitelabels as well as the core areas and peripheries of sites as established by coring for the Early Bronze Age (top) and Middle Bronze Age (bottom) at Lienden - Kesteren.

a: excavated area, b: site peripheries, c: core areas.

4.6.3 The Lienden excavation

The two main excavated Bronze Age clusters are known as site 14 (west) and site 15 (fig. 4.32, B-C). As the excavation extents were limited by both funding and the railroad trajectory, both sites represent incomplete parts of larger settlement sites. Although a finds-layer (*i.e.* the – remaining part of the – vegetation horizon wherein archaeological material was present) was preserved in parts, feature preservation was moderate. Less deep features such as hearths, hoof imprints, ard marks or stake-fences were not observed. [155] Moreover, younger period crevasse activity has eroded various parts of the Middle Bronze Age-B surface, obscuring the layout and dimensions of individual buildings.[156]

155 Compare Appendix V, figs. V.21 and V.22 with V.16 and V.18. Why none of the more shallow (*e.g.* ard-marks) or smaller (*e.g.* stakes of fences) types of features have been found underneath areas with a preserved finds-layer is unknown. Possibly, such features were incorporated into the *c.* 20 cm thick finds-layer (also called 'throdden-layer'; Kranendonk & De Voogd 2002, 19-20) and thus rendered invisible, or this may be the results of otherwise poor visibility or of too deep excavation levels (De Voogd & Schoneveld 2002, 57).
156 De Voogd & Schoneveld 2002, 57; Appendix V, fig. V.8.

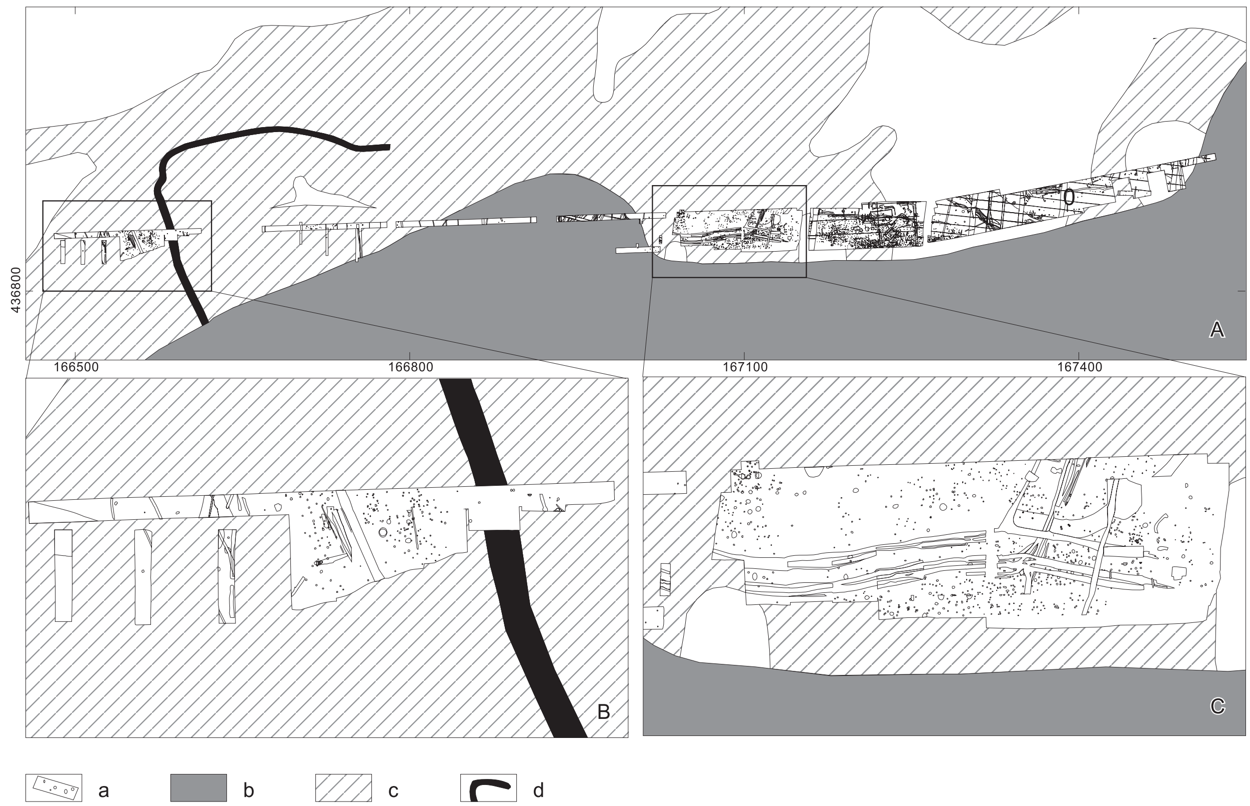

Fig. 4.32 All feature overview of the Lienden excavations (A) and clusters 14-West (B) and 15 (C).
a: trenches, b: Westerveld levee deposits, c: Westerveld crevasse deposits, d: residual crevasse gully.

Houses

Due to the relatively high feature density and later erosion, houses proved difficult to reconstruct. Of the various claimed houses and larger structures, in this study only two are interpreted as domestic structures with any certainty (houses D and P; fig. 4.33, see Appendix V). Another large three-aisled structure (structure 'C') may be an outbuilding or, possibly, a third house plan.[157]

House D from site 14 west is poorly preserved. In the northwest half, only four posts can be assigned to the roof-bearing structure of the house, whereas in the south-eastern part 17 posts could be assigned. The regular placement of outer and inner posts in the south-eastern part points towards a portal or 'half' portal roof-bearing construction (see section 5.2.3.2, esp. table 5.5). Five posts are situated more or less in the centre of the structure, and may have served as ridge poles or supports for an attic (De Voogd & Schoneveld 2002, 59). Suspected erosion of the north-western part and general mediocre conservation also hampers discussion on functional interpretation of parts of the structure, and the finds-distribution (especially in the north-western part) need not be representative of past activities (Appendix V, fig. V.21, B).

House P at site 15 could only be partially uncovered, but reveals a very regular portal roof-bearing construction (fig. 4.33, right). As with house 14D, no information on the internal structure or use of the house is known. The roof-bearing structure of both houses is remarkable, as normally in the river area this is based on trusses. Portal or 'half' portal constructions are often found in the house plans of Bronze Age farms from the Pleistocene soils of the Netherlands.[158] The entrance 'portal', however, perhaps represents a 'wetland' trait, as it is found in

157 See appendix V, fig. V.17 no 2 for a plan of structure 'C'.
158 *Cf.* Huijts 1992; Theunissen 1999, 192-193, section 5.2.3.3, esp. table 5.6.

Bronze Age houses in the central river area as well as on the West-Frisian creek ridges (*cf.* table 5.6). None of the houses show any obvious sign of repairs or major structural modifications.

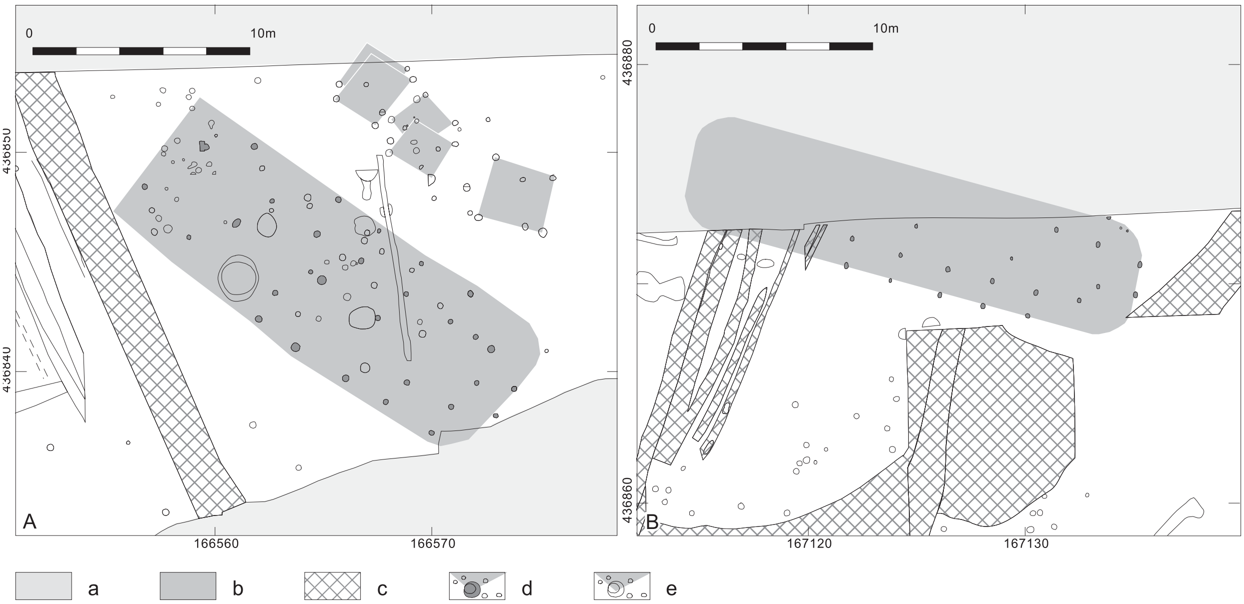

Fig. 4.33 Middle Bronze Age houses (D, left and P, right) from Lienden site 14 west (left) and 15.
a: not excavated, b: structures, c: later erosion, d: reliable structures, e: hypothetical structures.

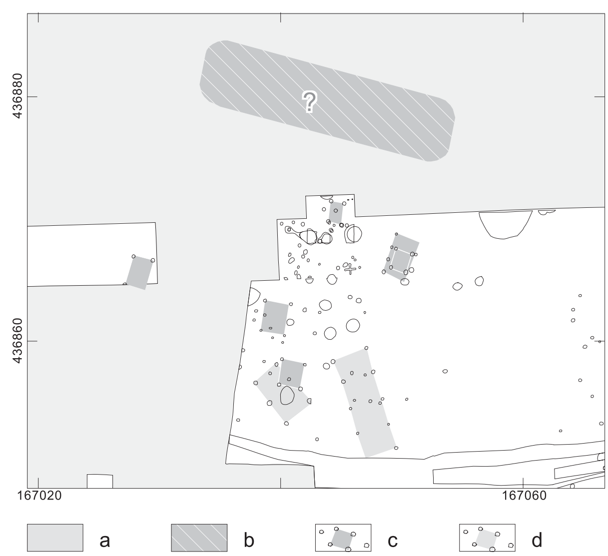

Fig. 4.34 Hypothetical house-site at site 15.
a: not excavated, b: hypothetical farmhouse, c: outbuildings possibly belonging to hypothetical house-site, d: outbuildings presumably not belonging to hypothetical house-site.

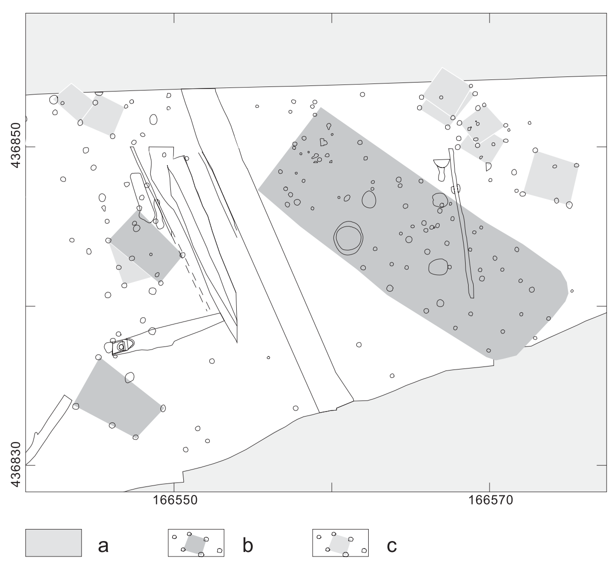

Fig. 4.35 House D at site 14 and environs.
a: not excavated, b: structure recognised by excavators, c: hypothetical outbuildings.

The regularity and dimensions of the ground plan of the southern parts of structure C on site 15 are comparable to that of Middle Bronze Age-B houses, but only five sets of roof-bearing posts can be identified. This structure may represent a barn- or shed-type outbuilding, although a domestic function cannot be entirely excluded. The orientation deviates remarkably from that of nearby granary-type outbuildings and houses at this site. This may imply a change in the landscape structuring of the site, without being able to tell whether this structure preceded or followed the occupancy of house P.

House-sites

Farmsteads are hard to reconstruct from the often dense and eroded swarms of postholes. Of the possible farmstead constituent elements, pits and granary-type outbuildings have been reconstructed in some numbers, whereas fences, wells and other elements are lacking. It is remarkable that no granary-type outbuildings are found near house P at site 15, as these are often found close to Bronze Age farmhouses. The four- and six post outbuildings appear to be reasonably evenly distributed across the excavated surface of site 15.

However, in the north-western corner, a group of five or six four-post outbuildings share a common orientation, which is reasonably perpendicular to that of house P (fig. 4.34). Some confirmation of the importance of this orientation – and permanence of placement – can perhaps be found in the replacement on the same spot of a granary-type outbuilding, which retained its orientation after being rebuilt. These outbuilding may hint at a second, possibly even contemporaneous agricultural unit (household?) on site 15, situated just north of the excavated area. Although we can never be sure whether a prehistoric farmhouse (or farmstead?) was ever erected there, both the finds-distribution within the site and the density of archaeological remains in the corings executed outside the excavated area hint at a concentration directly north of the northwest corner of site 15.

Although some of the smaller and larger outbuildings share the orientation of house P at site 15, no clear house-site can be discerned. The deviating orientation and the overlap between some other structures is evidence for use of the site in a phase when the orientation expressed by house P and various outbuildings was no longer adhered to.

Around house D at site 14, no elements can be grouped into a clear farmstead. Two ancillary structures recognized by the excavators (B' and C) conform in orientation to that of house D and may have been part of a single farmstead. Directly northeast of house D, a barn was reconstructed (E), but this structure has a very irregular ground plan (De Voogd & Schoneveld 2002, 61). This cluster could also be interpreted as the remainder of a series of four-post granary-type outbuildings, of which some were rebuilt in the same area. However, as these outbuildings are solely hypothetical (see Appendix V), their value in reconstructing prehistoric farmsteads is limited. Moreover, the small size of the excavated area complicates farmstead recognition.

Settlement site

For the Middle Bronze Age occupation of Lienden, two evident (around houses D and P) and a single possible house-site (structure C) can be indicated. For various reasons, it proved impossible to assess which features and structures were once part of a farmstead. Nonetheless, the orientation of various ancillary structures, presumably barns and storage structures (*cf.* Schoneveld 2002b, 258; 260), suggests the presence of a deliberate structuring of the settlement site(s). Estimating the number of Bronze Age house-sites possibly represented in the features within the excavated area is complicated. If the concentrations of archaeological remains as defined by the coring campaigns are considered good correlates for house-sites (*cf.* section 6.5) and used here, the presence of three house-sites seems likely.[159] Unfortunately, the area between sites 14 and 15 was only investigated with test-trenches, making it hard to interpret the features uncovered there. The presence of pairs or even small clusters of postholes indicates that at least some structures were erected here, but no detailed comments on their structure, function or dating can be made.

159 Section 6.5, esp. fig. 6.36, but see finds-distribution around house P; Appendix V, fig. V.21 and V.22.

Dating or phasing the habitation of these occupation phases is virtually impossible. Although a considerable number (n = 10, see Appendix V) of radiocarbon dates are available, they have no reliable relation to any of the three possible house(-site)s and furthermore all cluster around 3220 radiocarbon years BP. The claim that the features and artefacts recovered point at a short (*c.* 100 year) period of occupation (Schoneveld 2002b, 258), is unsubstantiated and does not take the 2σ calibration intervals of the radiocarbon dates into account. Several phases of use (of different nature?) can be expected to have been present, most likely somewhere during, or spanning the period *c.* 1700-1400 cal BC.[160]

Assessing the relation between the, if contemporary, occupants of the houses at site 14 and 15 is equally hard. It is however suggestive that the general layout of the houses (four longitudinal rows of roof-bearing posts and an entrance portal) and to a lesser extent the orientation, hint at a similar, or comparable building tradition. As this is a relatively rare type of Bronze Age farmhouse for the Dutch river area (section 5.2.3.3, table 5.6), it may be taken to represent the building tradition of a distinct social group, even if transgressing generations.

Settlement and landscape

The Middle Bronze Age occupants of the settlement site of Lienden lived next to a presumably still active, yet stable watercourse called the Westerveld fluvial system (Van Zijverden 2005; Appendix V). During the occupation, a residual crevasse gully that crosscuts site 14-west (fig. 4.32, d), started to silt-up, as is indicated by the presence of a vegetation horizon with some artefacts and phosphate discolorations that had formed in the residual channel (Van Dinter 2002, 45). This may indicate that, despite a nearby active fluvial system, conditions for habitation were relatively stable on the crevasse splay deposits during the Middle Bronze Age-B (Van Zijverden 2005; Appendix V). Some fishing may occurred in the active watercourse or the floodbasins, but due to methodological and taphonomic distortion, the subsistence relevance of the 109 fish remains recovered cannot be assessed (Buitenhuis 2002).

The area between the higher parts of site 14 and site 15 was not subjected to the same (amount of) Bronze Age activities. The test-trenches show that here crevasse and/or levee deposits were deposited on top of floodbasin deposits and – in a small area to the south – on channel-bed deposits. [161] This presumably remained a lower lying floodbasin area during the Middle Bronze Age-B, which may explain the paucity of features and finds (Van Dinter 2002, 48; Van Zijverden 2005).

Over time, the relatively higher crevasse deposits subsided due to shrinkage. The western part of site 14 as well as the entire area of site 15 was once again covered with floodbasin deposits. The system depositing these sediments is the Echteld system, the start of whose sedimentation phase is dated to around 1220-790 cal BC (Berendsen & Stouthamer 2001, 198; Appendix V). This implies that during the better part of the Middle Bronze Age-B, the conditions for human occupation were favourable, perhaps save for incidental flooding. Palaeobotanical research demonstrated that the environment was open, with locally wet meadows and incidental hazel and blackthorn groves (Schoneveld 2002b, 255). On the higher parts of the landscape, barley and emmer were grown (*ibid.*).

4.6.4 Conclusions

The excavations at Lienden have resulted in the investigation of two concentrations within a much larger area that was used for habitation during the Middle Bronze Age(-B). The occupied parts of the landscape consist of the levee deposits and their directly adjacent crevasse splays. It is assumed, but cannot be proven, that the Westerveld channel formed a stable yet active river channel. At a deeper, stratigraphically separated level, finds and single features datable to the Late Neolithic to Early or Middle Bronze Age-A periods were found. Only a few (n = 5) sherds that can be dated to periods preceding the Middle Bronze Age were found in the Middle Bronze Age finds-layer, implying that the occupation of this level took place during the Middle Bronze Age exclusively. Cross-cutting structures, posthole density and radiocarbon dates suggest at least two occupation phases of unknown frequency or duration between *c.* 1700-1400 cal BC. No clear farmsteads could be reconstructed, but some structuring of the house environs is nonetheless suggested by a preferred orientation for outbuildings across the site.

160 See Appendix V, esp. fig. V.19.
161 Siemons & Sier 1999b, 13; Sier & Drenth 1999, 12-13 and Van Zijverden in Sier & Drenth 1999, 31-32 respectively.

4.7 Dodewaard

4.7.1 Introduction

The area around the village of Dodewaard is relatively well researched archaeologically.[162] Both soil mapping campaigns and test-trenching prior to the Betuweroute railway construction, provided insights into the patterning of archaeological remains in the physical landscape (Appendix VI). Unfortunately, only one location is more extensively (*c.* 0.4 ha) excavated (Appendix VI, fig. VI.1, no 157). This excavation provides the majority of the information on Bronze Age settlement sites in the Dodewaard macro-region and is discussed in more detail below.

4.7.2 General remarks

For the period prior to the Bronze Age, some more general remarks can be made. It is remarkable that nearly all Dodewaard sites are situated on complex, stacked, crevasse splay deposits (*cf.* fig. 4.38). The exact morphology of these deposits is still poorly known (Van Zijverden 2003b). The results of the campaign of test-trenches, however, offer some insights into the degree of compartmentalization that occurs in the long term in such landscapes. The finds from the Middle and Late Neolithic, as well as those from the Bronze Age, are usually embedded in the top of crevasse deposits and in the lowest part of the floodbasin deposits directly covering these. Although this may imply a – continued – preference for such locations between these periods, it is remarkable to see that – if studied by time period – distinct clusters appear. Sites with Middle and Late Neolithic remains, yet no Bronze Age finds (Appendix VI, fig. VI.4, no 34) are matched by sites with Late Neolithic remains exclusively (Appendix VI, fig. VI.5, nos. 23-24) and multi-period sites. The distances between two such very distinct locations can be as small as a few hundreds of meters. The relevance becomes apparent when establishing site occupation histories.

Had it not been for the test-trenches yielding Barbed Wire-stamp decorated and Hilversum-style decorated ceramics on site 18 – at only 50 m distance from the excavation of site no 157 – it would have been tempting to assume a hiatus between the Late Neolithic and Middle Bronze Age activities on site no 157.[163] In essence, the Dodewaard excavation environs present an erratic mosaic palimpsest of prehistoric activities. Whereas the morphology of the initial crevasse splay may have presented a more continuous, yet still locally variable physical landscape, each following phase of crevasse formation will have – through erosion and deposition – altered it and increased the degree of micro-topographic variation. Human activities in the places untouched by these processes of erosion or sedimentation led to palimpsest situations, whereas human activities in places that saw deposition have – depending on what happened afterwards – a potential to lead to archaeological sites with a short time-depth (*cf.* section 2.7.3). The Dodewaard data illustrates that such compartmentalisation of the landscape occurs – in parts – at such small scales as within 50 m distance.

4.7.3 The Dodewaard excavation

The Dodewaard excavation (fig. 4.36; Theunissen & Hulst 1999a) represents a moderately arbitrary sample from a much larger settlement site dating from the Late Neolithic to the (end of the) Bronze Age. The extent of the settlement site was known through soil-mapping campaigns supervised by Havinga (1969). The State Service for Archaeological Investigations (RACM, formerly known as ROB) was already in possession of Havinga's results prior to the planned construction of the provincial road in 1967, and an excavation could be undertaken there in advance of construction works. The road determined the width of the excavation; therefore it was not possible to uncover partial house plans or house-sites in full.

Neolithic activities on site 157 appear to be ill-represented. Fragments of Middle Neolithic flint artefacts were recovered from the finds-layer, but never in features. The Late Neolithic ceramics predominantly stem from the finds-layer, a semi-circular depression that may represent a tree-throw hole, a single pit and an unknown elongated feature.[164] The elongated feature may represent a residual crevasse gully. Charcoal from the pit with Late Neolithic sherds was radiocarbon dated and supports the association between the feature, the charcoal and the proposed

162 See detailed research history in Appendix VI.
163 See Appendix VI, fig. VI.7, no 18.
164 Theunissen & Hulst 1999a, 139; 153-154; Appendix VI, fig. VI.4.

date.[165] The overall weight of the Late Neolithic ceramics recovered from the finds-layer, however does suggest that many more activities took place on the site during the Late Neolithic (Theunissen & Hulst 1999a, 150), but that these activities are not represented by features containing diagnostic material. Unfortunately, there is no overview available of which features contained pottery and from which periods. Save for the distribution plot per excavation unit as published by Theunissen & Hulst (1999a, 149 fig. 4.21a), no distribution analysis on the features level has been published. It is assumed that most features date to the Middle Bronze Age.

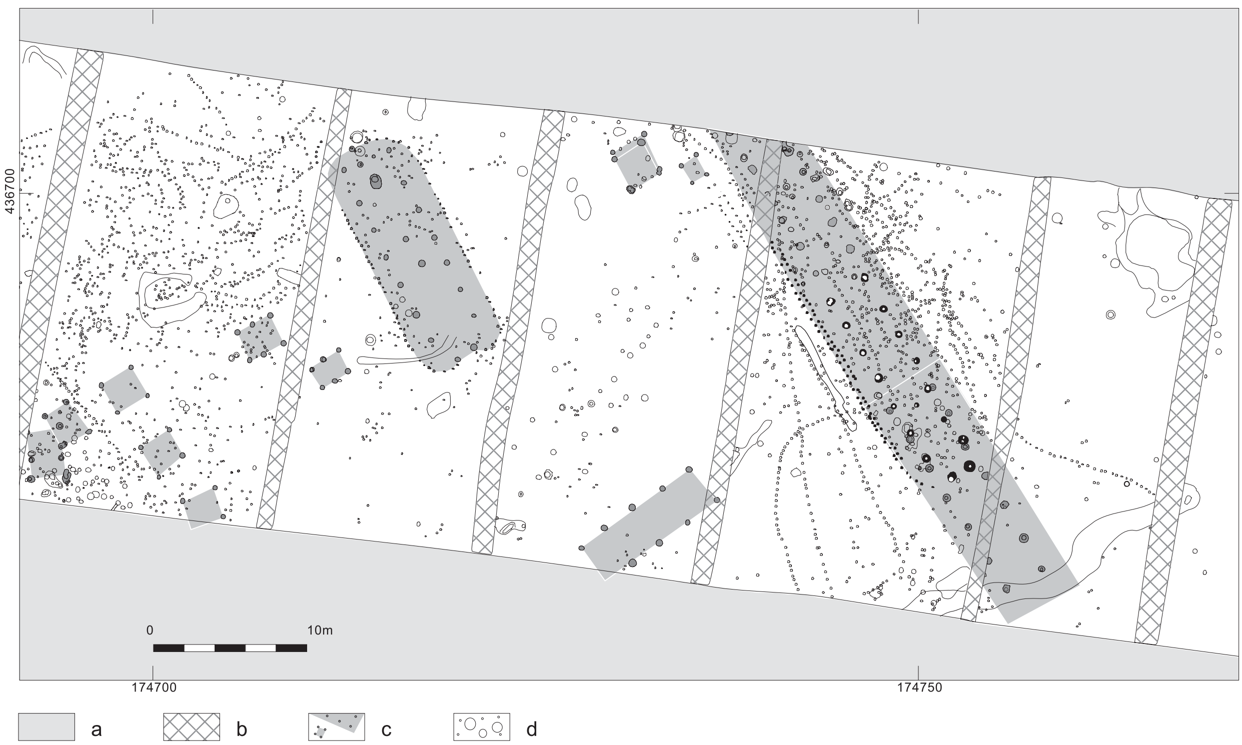

Fig. 4.36 Part of the Dodewaard excavation plan showing the close proximity of house-site 1 (right) to house-site 2. a: not excavated, b: recent disturbances, c: features associated with structures, d: other features.

Houses

A cursory glance at the excavation plan shows two house-sites, of which one house has not been completely excavated (fig. 4.36). There are large variations in feature densities. The western part shows the highest concentrations while – with the exception of the zone around house 1 – the feature density decreases eastwards. As no height measurements of the excavation surface are published, it was not possible to investigate the relation between feature density and micro-topography. It is very likely that in the south-western part of the excavation, dense feature clusters of various structures are represented that cannot be isolated from the clutter of postholes.

Based on the interpretation by Theunissen, the two houses form the centres of possibly two house-sites (Theunissen & Hulst 1999a, 155-156). The eastern, incomplete house-site is interpreted by Theunissen and Hulst as comprising two house-phases (houses 1a-b; *op. cit.*, 140). Based on two feature intersections, house-phase 1a preceded house-phase 1b (*ibid.*). A sample of unspecified charcoal from an unknown posthole of house-phase 1b was radiocarbon dated to *c.* 1880-1620 cal BC.[166] Although this sample has been used to claim that this house should

165 GrN-5934: 3690 ± 35 BP; Lanting & Mook 1977, 120-121.

166 GrN-5935: 3430 ± 35 BP; Lanting & Mook 1977, 120-121; Theunissen 1999 & Hulst 1999a, 139; Lanting & van der Plicht 2003, 160.

date to the Middle Bronze Age-A, the poor sample quality and available parallels for the buildings allow for a more plausible Middle Bronze Age-B age.[167] No direct dates are available for house-phase 1a, house(-phase) 2 or any of the other presumably Bronze Age structures. Typological arguments may favour a Middle Bronze Age-B dating for these structures as well (Chapter 5).

House(-site) 2 contains a complete and – judging by the preservation of the wall-stakes – well preserved ground plan of a house. Few features and no structures crosscut the house ground plan. On both sides of house 2 ancillary structures – possibly granaries – are reconstructed. The long axes of the two westerly situated six-post structures are almost perfectly perpendicular to that of house 2. The same applies to the orientation of the two four-post outbuildings to the east. House-phases 1a and 1b share the orientation of house 2. This parallel orientation may have sparked the interpretation as two contemporaneous farmhouses (Theunissen & Hulst 1999a, 156).

The house-phases of house-site 1 are not as clear as the single phased house-site 2. The ground plan of house-phase 1b, in spacing of the trusses and presence of an entrance portal, compares well to that of house 2 and other ground plans from the river area (section 5.2.3.3, esp. table 5.6). Since both house-phases 1a and 2 consist of houses of seven trusses, it may be worthwhile to look at house-phase 1b in more detail (fig. 4.37). Excluding the entrance portal, if one proposed a hypothetical 'end' of house 1b after seven trusses, two remarkable details are clear. First of all, there are somewhat larger features present where one may expect the northern entrance portal of the hypothetically shortened house-phase 1b. Secondly, the alignment of the remaining northern posts of the north-eastern row of roof-bearing posts appears to be slightly off mark. These observations allow to postulate a third phase (house-phase 1c; fig. 4.37, D). The divergence in orientation is minimal – as is the disruption of the spacing – and the hypothetical house-phases 1b and 1c do not overlap. The double rows of wall-stakes to the south continue across the hypothetical 1b-1c

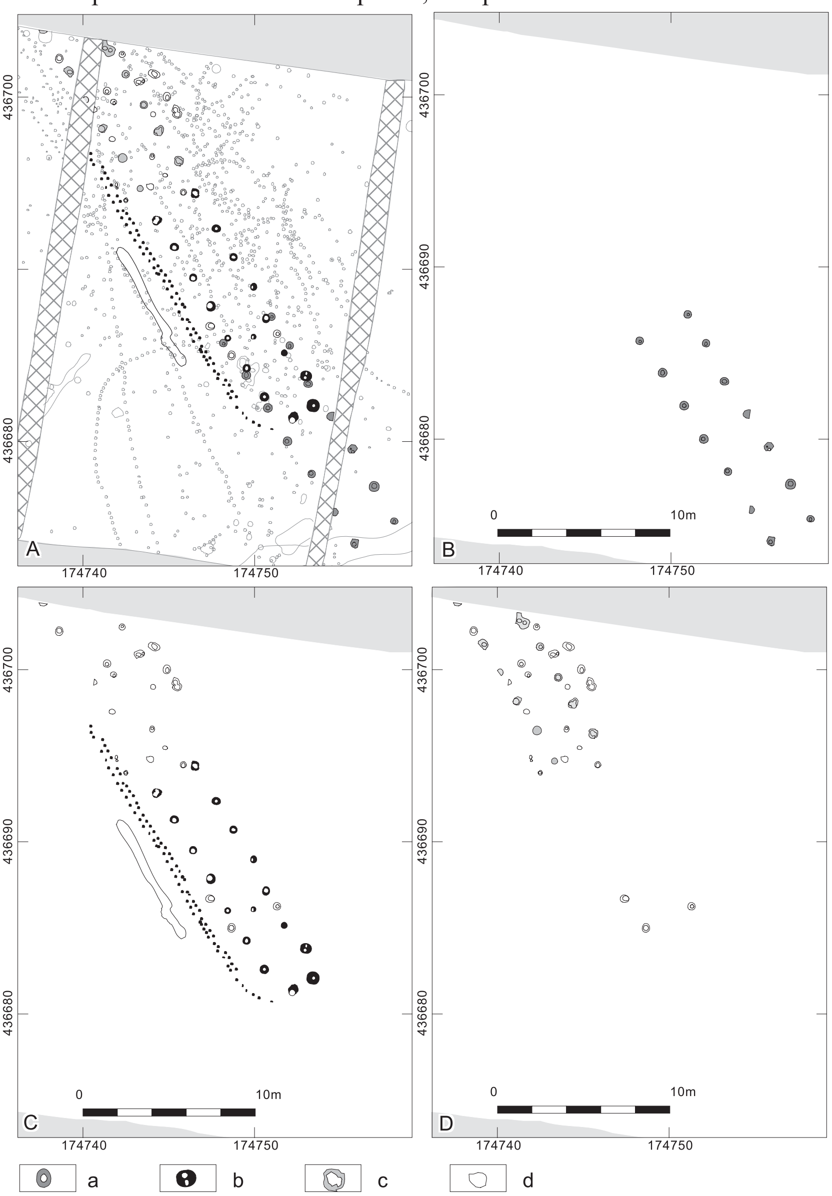

Fig. 4.37 Tentative house phases and unassigned larger posts at Dodewaard house-site 1 (A: overview, B: house-phase 1a, C: house-phase 1b, D: house-phase 1c).

a: house-phase 1a, b: house-phase 1b, c: house-phase 1c, d: unassigned larger postholes.

167 *Cf.* section 5.2.3.1 and 5.2.3.3, *contra* Theunissen & Hulst 1999a, 156; Fokkens 2001, 252.

division. Consequently, house-phase 1c remains highly tentative. With or without house-phase 1c, there remain a number of larger postholes that cannot be assigned to any of the house-phases on house-site 1 (fig. 4.37, d).

A number of posts belonging to house-phases 1b and 1c show two post-pipes. These may be interpreted as representing repairs, or – as has also been suggested for Zijderveld house 1 (Theunissen & Hulst 1999b, 161; section 4.2)– a doubling that was part of the original design, possibly to support a loft. The fact that the 'added' posts are not found consistently throughout the plan, do not show a systematic placement in relation to the roof-bearing posts and the fact that some of the postholes display a 'figure-of-eight' or three-lobed shape does indicate that these were not part of the original construction. The extra post-pipes represent reinforcement or repairs, even if it is unclear whether the original post(stump)s remained in place or not. The repairs may be a functional expression of a desire to prolong the occupation of a particular house(-site). Perhaps the overbuilding of house-phase 1a by phase 1b – and if valid, the addition of house-phase 1c to 1b – reflects as a slightly different desire to continue living in a comparable house on the same place. House-phase 1c, if it ever existed as such, may have represented a replacement or addition to house-phase 1b, but decisive arguments are lacking.

If the characteristics of the various house-phases of house-site 1 can be interpreted as an effort to maintain an initial functional usage over a prolonged period of time, we can perhaps extend this argument to some of the outbuildings. Two of the granary-type outbuildings appear to have been replaced on nearly the same spot (fig. 6.17, D-E). The other outbuildings tend to cluster, in groups of the same types (four- and six- post granaries). Although two sets of granary-type outbuildings overlap, it cannot be excluded that all others were contemporaneous. If we accept the fact that these structures may have been in need of replacement after a certain period (*cf.* section 3.4.2), we may need to be more open to the possibility that they represent a sequence. Although this sequence is less clear than with the rebuilt granary-type outbuildings, the clustering may imply that a specific part of the (house-?) site was preferred to erect such structures.

House-sites

No evident house-site structuring is apparent at Dodewaard. The high feature density and narrow excavated strip and absence of dates further complicate house-site analysis. Furthermore, the high numbers of features present within, and directly outside, the ground plans of houses 1a-1c demonstrate that house-site 1 has undergone at least two very distinct phases of use. Visual analysis shows that only a few outbuildings do not conform to the orientation of the houses or the orientation perpendicular to that (section 6.3.10). Although highly speculative, this conformation is interpreted as a consequence of erecting structures to conform to either a mental template or to an already existing landscape structuring. For this excavation, we simply cannot tell what was there first, but the orientation of the bulk of the granary-type structures suggests that they were part of the same system as the houses.

The two larger barn-type outbuildings also show a comparable orientation pattern to the houses as the granary-type structures: either parallel or perpendicular. The fences do not show any obvious spatial relation to either the houses or the outbuildings. Some conform in orientation to the axes as laid down by the other structures, but just as many follow a rather arbitrary trajectory, be it straight, angular or meandrous. It should be noted that whereas the area of house-phases 1a-1c is covered in stakes and fences, they are nearly absent near house 2. This may suggest that the fences are associated with house(-phase) 2. Arguments are lacking, which means that one may equally well assume the fences to pre- or post-date all house-phases. The various pits do not show any remarkable clustering.

It must be concluded that among the three house-phases of the Dodewaard excavation little evidence of a highly structured house-site can be found. Nonetheless, structuring principles such as the corresponding or perpendicular orientation of granary-type outbuildings and barn-type outbuildings to houses, can be outlined. The narrow width of the excavation has without doubt hampered the interpretation of the house-sites.

Settlement site

No archaeological correlates for interpreting the two house-sites as a settlement can be pointed out.[168] Their contemporaneity cannot be established and structural features such as fences or ditches linking the two – or forming

168 *Cf.* section 8.2.3.1.

a common outer defining structure – are absent. The opposite, that the two house-sites were nonetheless once part of a single settlement, cannot be excluded either. Once again, the small size of excavation severely hampers our understanding of the settlement site. The high density of features, and the fences that cross-cut the house, indicate that the settlement site has seen multiple periods of use. If the fences played a role in keeping live-stock in or out of parts of the site, a phase of agricultural use may have preceded, or followed that of the houses. However, it is also likely that these fences do not date to a single particular, but to several house-phases, and represent a palimpsest. The frequent cross-cutting of fences may support this.

Unfortunately, the longevity of a domestic function for the site cannot be established accurately. The charcoal and Late Neolithic ceramics from a single pit have been interpreted as a hearth, hinting at a domestic function, but this remains the only argument for this period (Theunissen & Hulst 1999a, 145). Although Van der Broeke (pers. comm., June 2002) indicated that Late Bronze Age ceramics are also present at this site, their number and contexts have not been studied, implying that the function of the site during this period remains unclear.

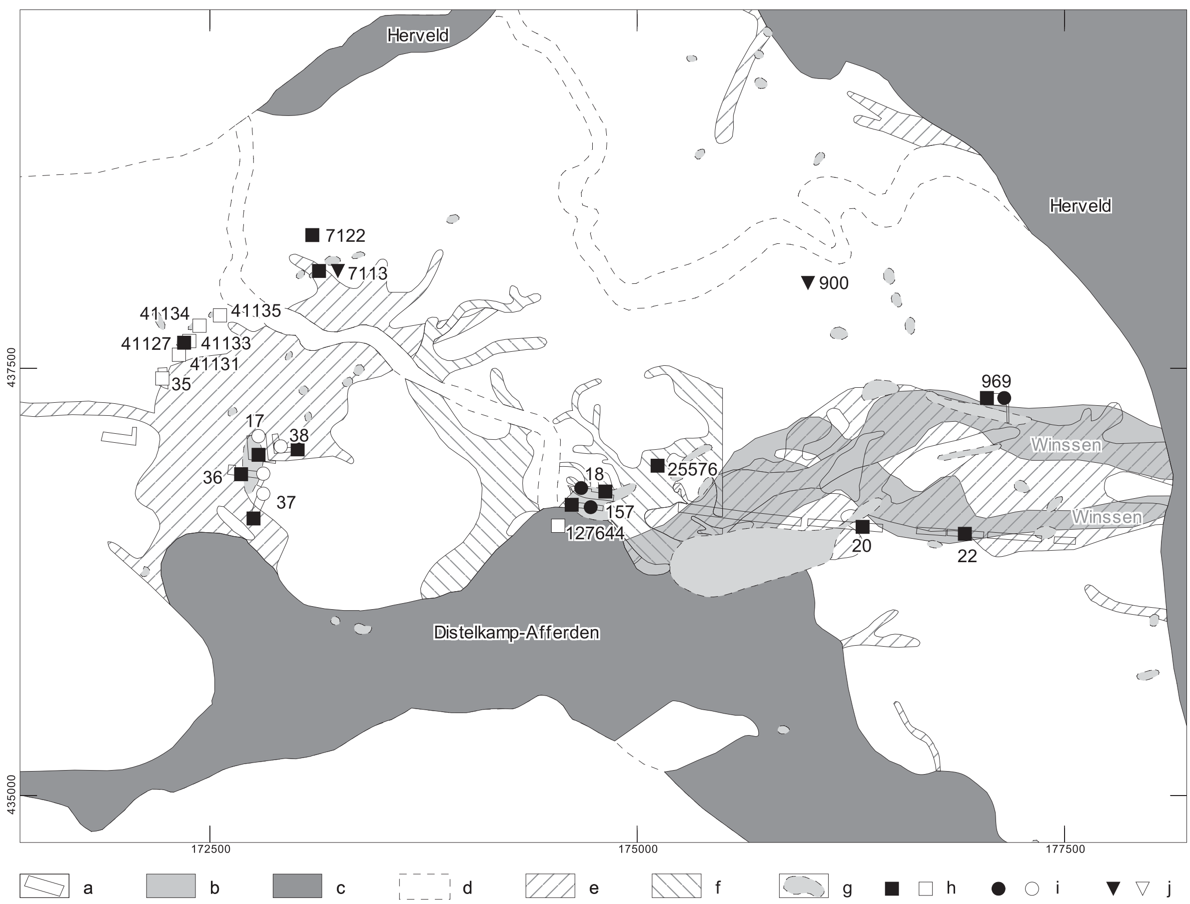

Fig. 3.38 Main fluvial systems and findspots dated to the Middle Bronze Age-B in the Dodewaard macro-region (filled symbols indicate certain interpretations, outlined symbols uncertain interpretations). See Appendix VI for the various numbers listed.

a: areas of Betuweroute test-trenches, b: fossil fluvial systems, c: active fluvial systems, d: younger fluvial systems, e: crevasse deposits based on Berendsen, Faessen & Kempen 1994; Berendsen *et al.* 2001, f: crevasse deposits based on Van Zijverden 2003b, g: 'ancient settlement soils' according to Havinga (1969; Havinga & Op 't Hof 1975; 1983), h: pottery, i: features, j: bronze tools.

Some inferences on the density of Bronze Age domestic sites within a wider area can be made. The Middle Bronze Age sites for which a domestic function is reconstructed uncovered by the Betuweroute research, are never more than 1.7 km apart (fig. 4.38; Appendix VI). It is very likely that the number of sites, and thus the inter-site distance, is biased by the narrow linear trajectory of the Betuweroute investigation (see Appendix VI). The map made by Havinga indicates that prehistoric (assumed Late Neolithic or Bronze Age date) culture layers have been mapped that are as little as 30 m apart (fig. 3.38, g). Combining this information with assumptions on the highly variable local micro-topography, it is quite possible that what in prehistory may have functioned as a settlement, comprised a series of house-sites that were situated on separate, slightly elevated, parts of the undulating crevasse splays. This assumption cannot be backed up by evidence yet, as the sites in the vicinity of the main excavation of Dodewaard have not yielded house-sites, nor adequate dating arguments to assume contemporaneity.

Settlement and landscape

Possibly, the Distelkamp-Afferden fluvial system on which levee- and crevasse deposits the Middle Bronze Age-B sites in the Dodewaard macro-region are situated was still active during the Middle Bronze Age-B. This activity, however, seems not to have led to the sedimentation of floodbasin deposits at the location of the main excavated site (no 157) and the test-trenched site 18 (fig. 3.38).[169] In many of the higher parts of the landscape, a thick vegetation horizon formed. This indicates that flooding of these parts occurred only infrequently – if at all. Sedimentation did however occur in the floodbasin to the south of the main Dodewaard excavation (Steenbeek 1990, 174; 185; 193), suggesting that a channel of the Distelkamp-Afferden fluvial system (situated at 60 m to a maximum of 1.5 km distance) or the Boelenham fluvial system (located at 120 to 250 m distance) was still part of an active drainage system. From these fluvial channels, or from a crevasse gully originating from them, the occupants of the Dodewaard site could perhaps have obtained fresh-water. An alternative source of fresh water, riverine products and communication could have been provided by the Herveld and possibly also Wuustegraaf fluvial systems (located at one to three kilometres distance respectively), which were presumably also active.The results of pollen analyses of Distelkamp-Afferden channel-bed deposits, the relatively highest parts of the landscape, are rather imprecise, but could indicate the presence of Bronze Age meadows (Steenbeek 1990, 188; Appendix VI). For the lower lying parts of the floodbasin, the pollen evidence suggests an expansion of the alder carr in the floodbasin. This could indicate that, albeit high (some decimetres below the highest parts of the Distelkamp-Afferden levee deposits), the floodbasin water-level was relatively stable (Steenbeek 1990, 186; 200). Detailed analysis of the height of the crevasse splay deposits in relation to the floodbasin sedimentation and groundwater table rise, indicates a predominantly gradual drowning of the inhabitable landscape.[170] By the Early Iron Age, the former surface area of the Middle Bronze Age-B is completely covered with floodbasin deposits, presumably originating from the Boelenham fluvial system.[171]

4.7.4 Conclusions

Research in the Dodewaard macro-region has as yet yielded evidence for human activities from the Neolithic onward. A modest part of a presumably Middle Bronze Age settlement site has been uncovered, with various smaller test-trenches in the vicinity that yielded finds, or even features dating from the Neolithic to the Late Bronze Age period. The complex crevasse morphology needs to be studied in more detail in order to determine the temporal and spatial relations between the various sites. Consequently, we lack the overview pivotal to gain understanding what the (cultural) landscape looked like to Bronze Age farming communities. It is however very clear that during the Middle Bronze Age, various parts of the landscape were intensively used. It is likely that due to the amount and nature of the debris on domestic sites, that they have been found in larger numbers compared to non-domestic sites. This might explain the – apparent? – absence of funerary monuments and graves. It is remarkable that the physical landscape for both the Neolithic and the Bronze Age period is quite well comparable. Active river courses were never far away and offered – by means of their levee and crevasse deposits – an extensive, yet locally very variable surrounding (see Appendix VI).

Even without information on the function and exact dating for all structures recovered at the Dodewaard excavation, they nonetheless reflect a strong and continued desire of Bronze Age communities to actively shape their surroundings. The erection of structures such as outbuildings, farmhouses and fences may appear the most visible of these intentions. The smaller test-trenches in the surrounding of the excavation provide a more balanced long-term narrative of human occupation as well as an insight into the extent of local landscape variability (Appendix VI).

169 Steenbeek 1990, 174; 185; 193; Appendix VI, esp. fig VI.8 and fig. VI.9.
170 Steenbeek 1990, 194-200; Cohen 2003; Van Zijverden 2003b; Appendix VI.
171 Steenbeek 1990, 140; 200; Van Zijverden 2003b; Appendix VI.

5 Bronze Age settlement site elements

5.1 Introduction

In the previous chapter, the rich data set on Bronze Age settlement sites in the Dutch river area was introduced. To present the data from a number of Bronze Age settlement sites from the Dutch river area as concisely as possible, the discussions in the preceding chapter focussed on the houses, the house-sites and the settlement sites as a whole during the Bronze Age. Despite the necessity to provide such an overview, it may be criticised for its particularity. Little attention has been paid to the representativeness of the data offered. To what extent can the data from the selected settlement sites be considered part of shared larger (spatial) wholes or conversely rather regional traits? What is generic and what is particular in the data presented in Chapter 4? To answer these and related questions, the settlement site data need to be placed in a broader and more comparative framework. This is the aim of the present chapter. It will entail the description and analysis of the various settlement site elements from both a static (*i.e.* technical) perspective and, if appropriate, from a more diachronic perspective. The individual discussions at this point of settlement site elements like outbuildings, houses and fences, form the foundations for the analyses of their interrelations in the ensuing chapter.

5.2 The phasing and dating of Dutch Bronze Age houses

Presently, 70 reliable Bronze Age house plans are known from the Dutch river area and of these 59 are situated within the study area as defined in Chapter 1. For comparative purposes, a data set of over 150 (*cf.* table 7.2) reliable and published Bronze Age houses from other geogenetic regions in the Netherlands is available. The distribution of these houses over the various regions is reasonably even (fig. 5.1),[1] but the distribution of these houses over the different sub-phases of the Bronze Age is rather imbalanced. Very few to no houses are known for the Early Bronze Age (*c.* 2000-1800 cal BC) and the Middle Bronze Age-A (*c.* 1800-1500 cal BC). The majority of reliable Bronze Age houses date to the Middle Bronze Age-B (*c.* 1500-1050 cal BC). For the Late Bronze Age (*c.* 1050-800 cal BC), the number of houses is again somewhat smaller, but much larger numbers of houses are known compared to the periods preceding the Middle Bronze Age-B. In the sections below, I will argue that this unequal distribution over the different sub-phases of the Bronze Age, is related to the variable archaeological recognizability of the houses during these periods.

5.2.1 Like no other? Dutch Early Bronze Age houses

The onset: Early Bronze Age houses

The number of recognised and reliably dated Early Bronze Age house plans from the Netherlands is small. At present, only the houses from Molenaarsgraaf and Noordwijk can with any degree of certainty be identified as Early Bronze Age houses.[2] Despite claims of recognized Early Bronze Age houses at several other sites, these are the only two locations where stratigraphic arguments, artefacts recovered and absolute dates indicate an Early Bronze Age origin.[3]

At Molenaarsgraaf, two partially superimposed ground plans have been tentatively dated to the Early Bronze Age. The reconstruction of the Molenaarsgraaf houses has been criticised (Van der Waals 1984, 10), but their reconstructions comprise most, if not all, of the posts of significant depth and diameter and do provide some regularities in placement. It should be noted that the two houses from Molenaarsgraaf differ significantly from each other (fig. 5.2, A-B; Louwe Kooijmans 1974, 197-202; 1993a, 84). The 17.4 m long ground plan of house 1 displays

1 Yet note the relative scarcity of sites in the western peat areas east of the coastal dunes (*cf.* fig. 1.3, c) and in the former coastal flats in the northern Netherlands (*cf.* fig. 1.3, b).

2 For Molenaarsgraaf see Louwe Kooijmans 1974, 167-339 and for Noordwijk see Van Heeringen, Van der Velde & Van Amen 1998; Van Heeringen & Van der Velde 1999; Van der Velde 2008.

3 See Verlinde 1984; 1993; Van Beek & Wevers 1995; Waterbolk 1995; Jongste 2001; Meijlink & Kranendonk 2002 (see Appendix III); Ufkes 2005 and Bouwmeester 2008 for other claims.

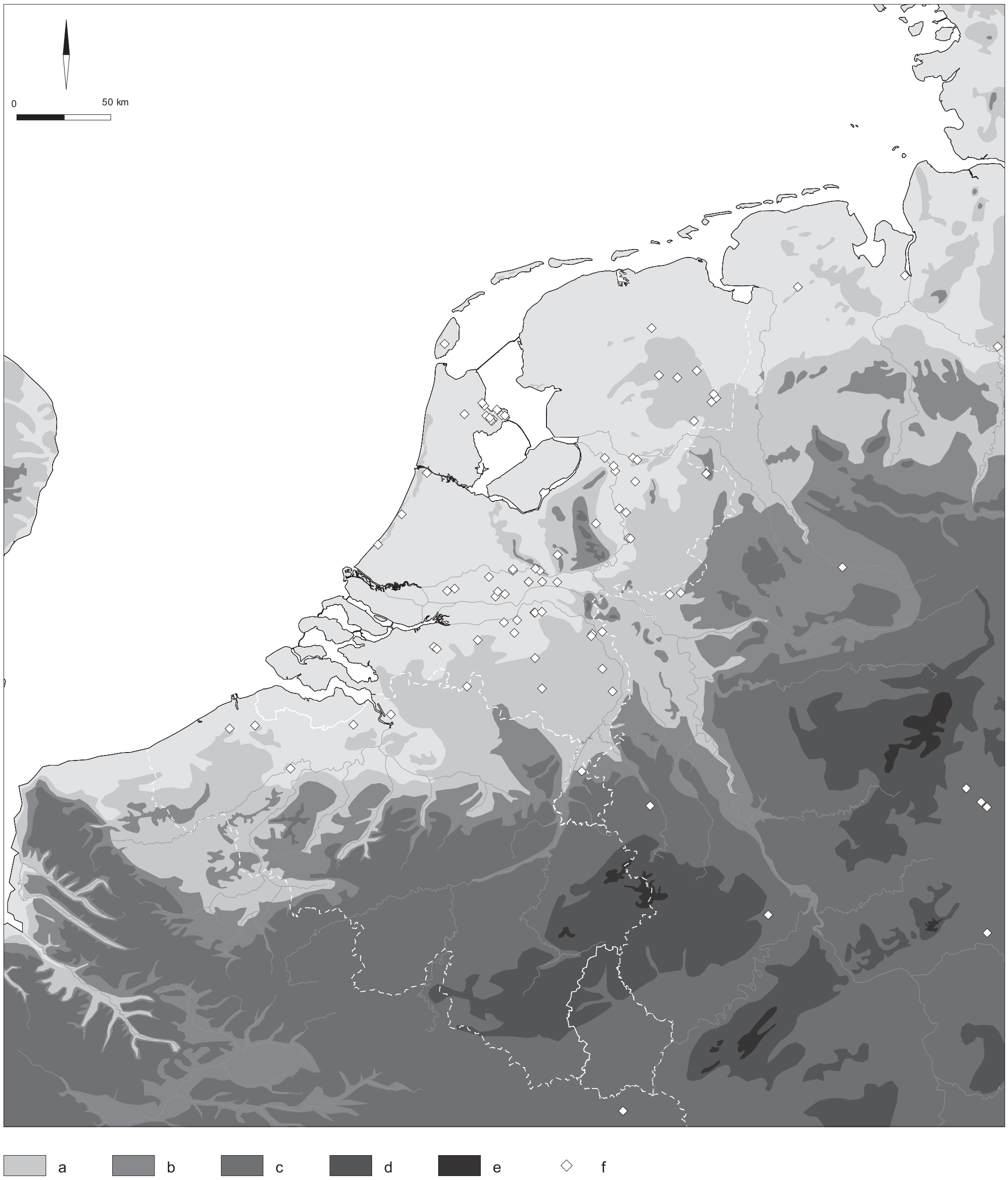

Fig. 5.1 Distribution of settlement sites with Bronze Age house-plans from the Low Countries and directly adjacent areas.
a: 10 m contour, b: 40 m contour, c: 80 m contour, d: 400 m contour, e: 600 m contour, f : Bronze Age settlement site with house(s).

a two-aisled roof-bearing structure, but some outer posts have also been assigned to the plan. It is unclear whether these posts represent parts of the wall proper, or whether the wall needs to be reconstructed beyond them. Of house 2, a line of roof-bearing posts and several possible wall-posts have been preserved. Although generally of a two-aisled plan, two pairs of roof-bearing posts (*c.* 2.8 m apart) suggest a partially three-aisled structure of the house.[4] This plan is only partially preserved, but if we use the doubled, possibly squared-off, ridge posts as a centre point along which to mirror-rotate the plan, the house could have been as long as 29.2 m. The dating evidence for both houses is weak and predominantly relies on the types of pottery (late Veluwe Bell Beakers and Barbed Wire-stamp decorated ceramics) recovered from the site, together with five radiocarbon dates for bone and charcoal. Both the pottery, and

4 *Cf.* Zeewijk: Hogestijn 1997; Van Ginkel & Hogestijn 1997, Hesel: Schwarz 1997; 2004 and Noordwijk: Van der Velde 2008.

the radiocarbon dates, allow for a dating of this site somewhere in the last centuries of the Late Neolithic or in the Early Bronze Age.

The house of Noordwijk (fig. 5.2, C) shows again a distinctly different plan.[5] Here, many possible wall-posts have been preserved and seem to indicate a curvilinear to somewhat ovoid plan. The structure is assumed to have been two-aisled in plan, but among the various posts in the centre part no evident ridge posts are identifiable. In one of the reconstructions, several paired roof-bearing posts are reconstructed, suggesting a combined two- and three-aisled plan.[6] Dates for this house are also indirect. Six radiocarbon dates for botanical macro-fossils and from peat are known and – save for one or two Hilversum-style decorated sherds – all ceramics recovered fit well within the corpus of known Early Bronze Age ceramics (Van Heeringen, Van der Velde & Van Amen 1998, 26-27; 38-42).

For comparison, at Bocholt, just a few kilometres across the Dutch border into Germany, a ground plan of a house of 14 to 16 meter length by minimally 4.5 m wide was discovered. The placement of the roof-bearing posts suggests an essentially four-aisled structure (Deiters 2004, 500), as the ridgepoles and 'paired' sets of roof-bearings are found on the same line at three to four meter longitudinal distance from each other. The dating is based on a charcoal sample from a posthole and the association with three nearby pits – two also radiocarbon dated – yielding a Barbed Wire-stamp decorated pot and sherds from other vessels decorated in Early Bronze Age traditions (*op. cit.*, 501-502).

The plans discussed above are by no means 'ephemeral' (*cf.* Arnoldussen & Fontijn 2007, 298-307), and represent a building practice of erecting large houses in a tradition that relied on dug down posts. Nonetheless, the structure of their ground plans can certainly be labelled 'irregular'. It is easily understandable that if two of such houses overlap, or are overlain by later structures, they can no longer be recognized with any degree of certainty. This,

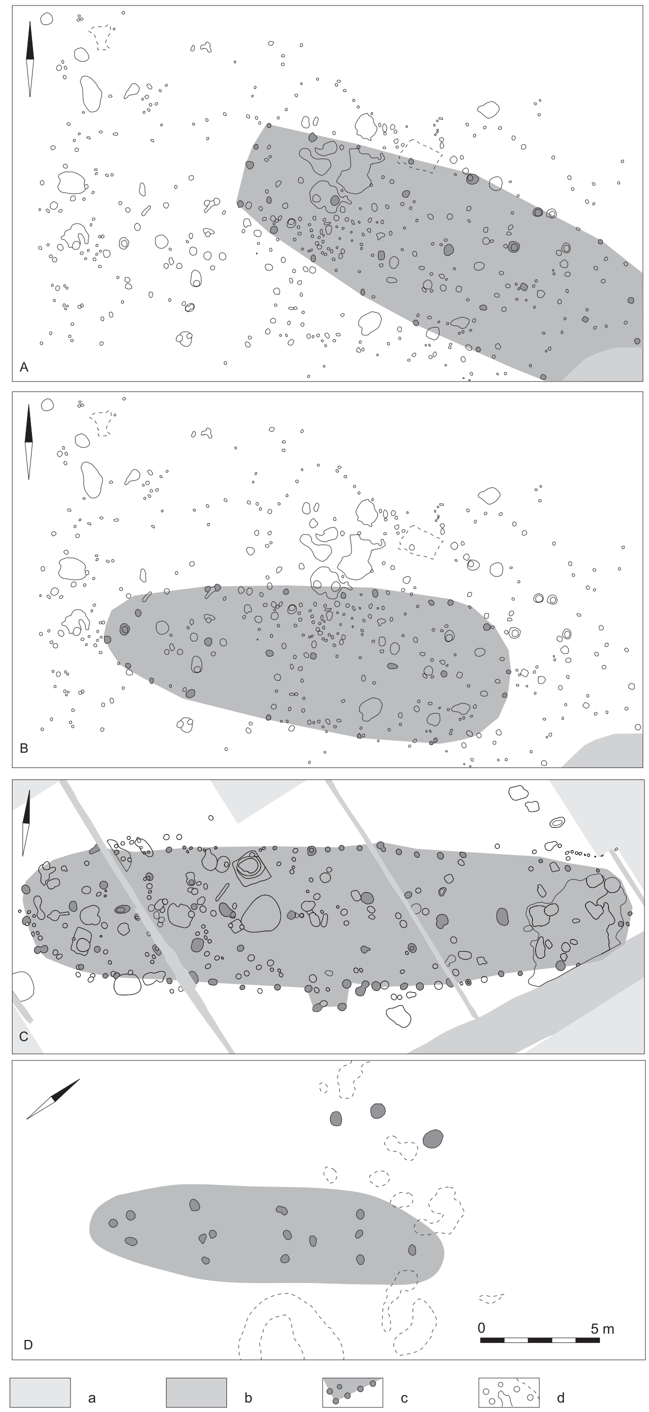

Fig. 5.2 Early Bronze Age houses from the Low Countries (all to same scale), A: Molenaarsgraaf house two, B: Molenaarsgraaf house one (after Louwe Kooijmans 1974), C: Noordwijk (after Van der Velde 2008), D: Bocholt (after Deiters 2004).

a: not excavated, b: recent disturbances, c: features associated with houses, d: other features.

5 Van Heeringen, Van der Velde & Van Amen 1998, 19-23; Van Heeringen & Van der Velde 1998, 28-29; Jongste, Meijlink & Van der Velde 2001, 4-7.

6 Jongste, Meijlink & Van der Velde 2001: 5; Van der Velde 2007.

combined with the fact that the houses rarely yield any datable finds, may account for the small numbers in which they are currently known. Yet, despite these arguments, it remains enigmatic why in large scale projects such as at Oss and Someren, where together well over 50 ha have been uncovered, no clear ground plans datable to the Early Bronze Age could be recognized. Within such larger – as well as in the smaller – projects, Early Bronze Age remains are typically found as (clusters of) pits or wells, which frequently yield no high density of other features in their direct vicinity. It is possible that the domestic structures from the Early Bronze Age in the regions beyond the coast and inland peat district are not situated on the same (types of) location(s) where the pits with diagnostic pottery are recovered or, alternatively, that the tradition of house building in the other areas did not rely on dug-down posts, but made use of sleeper-beams or perhaps altogether different methods of housing.

Fig. 5.3 Examples of two-aisled Late Neolithic to Early Bronze Age house-plans from different areas of Europe (topright, clockwise: Hemmed (Boas 1991), Limensgård (Nielsen 1999), Esbeck (Thieme 1985), Bezingerode (Brauer 2006), Brezno (Pleinerová 1992), Pavlov (Krause 1997a), Franzhausen (Neugebauer 1998), Zuchering (Schefzik 2001), Bopfingen (Krause 1997a-b), Greding (Schefzik 2001), Bocholt (Deiters 2004), Noordwijk (Van Heeringen, Van der Velde & Van Amen 1998), Hesel (Schwartz 2004), Kvåle (Børsheim 2005).

Dutch Early Bronze Age houses in a Central- and Northwest European perspective

In the above sections it has been shown that Early Bronze Age house plans in the Netherlands are a heterogenic group if judged by plan morphology and inner post-placement. Unlike in other parts of north-western Europe, no building tradition based on ridge-posts, outer posts and relatively straight and dense lines of outer wall posts emerged. In contrast, the Scandinavian ground plans of for example Hemmed (Boas 1991; Rasmussen 1991), Limensgård (Nielsen & Nielsen 1985; Nielsen 1999) and Kvåle (Børsheim 2005) can be classified as a two-aisled building tradition that shows considerable regularity in post placement and general plan (fig. 5.3).[7] There, the outer posts presumably

7 Boas 1991; Rasmussen 1991, Nielsen & Nielsen 1985; Nielsen 1999; Børsheim 2005, *cf.* Boas 1983; 2000; Nielsen 1997; Ethelberg 2000; Artursson 2005a, esp. 103; 2005b, esp. 14; 16-17; Björhem & Säfvestad 1989 (esp. 36; 38; 57).

carried a considerable part of the weight of the roof.[8] The Early Bronze Age house plans in the southern parts of Germany and the adjacent central west-European area, also display a more regular, two-aisled building tradition in which densely spaced outer posts carried part of the roof-burden.[9] These houses seem to be characterized by the roughly rectangular shapes of their ground plans, whereas the examples from the Low Counties are of irregular ovoid shape in plan.[10]

The ground plans from the Low Countries do deviate distinctly from this – elsewhere well-documented – tradition of having large numbers of substantial (wall)posts to carry part of the roof-weight. Apparently, the building techniques for the Early Bronze Age buildings in the Low Countries show less regularity and less internal coherence than those in other parts of the Northwest European basin, while the factors behind this variation remain currently unknown. The Early Bronze Age house plans from the Low Countries discussed above share few constructional traits other then a basically two-aisled roof-bearing structure.

Disputable claims for Early Bronze Age and two-aisled house plans

In addition to the reasonably acceptable Early Bronze Age house plans (fig. 5.2), several other two-aisled structures have been uncovered in the Netherlands (fig. 5.4). Generally, the dating evidence for these structures is circumstantial or altogether absent, or the validity of the structures is diminished because they have been compiled from excavation plans only during post-excavation analysis (*cf.* section 3.2.3). Furthermore, house plans of the (late) Middle- and Late Neolithic are also thought to have been essentially two-aisled (see Hogestijn & Drenth 2000; 2001 for an overview), which complicates the dating of two-aisled structures even more.

Besides two possible house plans dated to the Vlaardingen period, the excavations near the village of Vlaardingen also yielded a tentative two-aisled structure that is dated to the Bell Beaker period (fig. 5.4, no 1).[11] This date is however not backed-up by sound evidence and the overall plan is rather incomplete.[12] Its validity as a structure and the proposed Bell Beaker period dating must therefore be questioned (Van Beek 1990, 172; Lanting & Van der Plicht 2002, 82).

At Ottoland - Kromme Elleboog, a small rectangular two-aisled structure was recognized (fig. 5.4, no 2), for which no direct dates are available.[13] At this site, some Bell Beaker and Hilversum-style decorated ceramics were found, but the majority of the ceramics concern potbeaker and Barbed Wire-stamp decorated sherds, leaving open the option of an Early Bronze Age date for the structure (Wassink 1981, 59-60; Thanos 1995, 86).

The nearby site of Ottoland - Oosteind, which has also yielded pottery datable from the Bell Beaker period to the Late Bronze Age, yielded a post-row at one of the lower levels which may have been a line of ridge-poles (fig. 5.4, no 7; Deunhouwer 1986, 31-32). The spacing of the posts is rather wide and lacks direct parallels in the Low Countries, but has been documented for long two-aisled houses in Scandinavia (*cf.* fig. 5.3).[14] Only one posthole yielded a datable (potbeaker) sherd, which serves as a *terminus post quem* date from the Late Neolithic to the Early Bronze Age for this tentative structure (Deunhouwer 1986, 36).[15] A large two-aisled ground plan was uncovered

8 Note that some examples of two-aisled houses with traces of partitioning walls or cattle stalls have been found (*e.g.* at Hesel (Schwarz 1996, 32 fig. 9.3), Limensgård (Nielsen 1999, 158 fig. 9c) and Straubing (Nielsen 1999, 160 fig. 10d)), which may indicate an early start to the longhouse tradition of housing livestock and people under one roof.

9 *E.g.* Zwenkau, Bopfingen, Eching, Franzhausen, Bezingerode (*cf.* Thieme 1985; Krause 1997a-b; Stäuble & Campen 1998; Neugebauer 1998; Nielsen 1999; Schwarz 1996; Schefzik 2001; Brauer 2006).

10 Note that in Bayern a local tradition of curved to rhomboid house plans existed (*e.g.* Krause 1997a-b; Schefzik 2001).

11 Van Regteren Altena *et al.* 1962c, 232-235; Van Beek 1990, 172-173.

12 Hogestijn & Drenth's (2001, 62-63) claim that Maritime Bell Beaker ceramics and radiocarbon dates are associated with this house in the north-east of trench 15 is incorrect. These radiocarbon dates and the pottery originated from trench 9 (Van Beek 1990, 116; 249).

13 The pits located near the reconstructed walls, yielded Bell Beaker and Barbed Wire-stamp decorated pottery. If these were contemporaneous with the house (Wassink 1981, 60), the presence of Barbed Wire-stamp decorated pottery may provide a *terminus post quem* date to during or after the Early Bronze Age.

14 It remains the single representative of an Early Bronze Age house plan of this type in the Netherlands, which does not bolster its credibility.

15 This structure was discussed with the excavator (Louwe Kooijmans, pers. comm., Jan. 2007), who stated that this post row had been recognized already during fieldwork and consisted of regular posts of significant depth and comparable fill (*cf.* Deunhouwer 1986, 21).

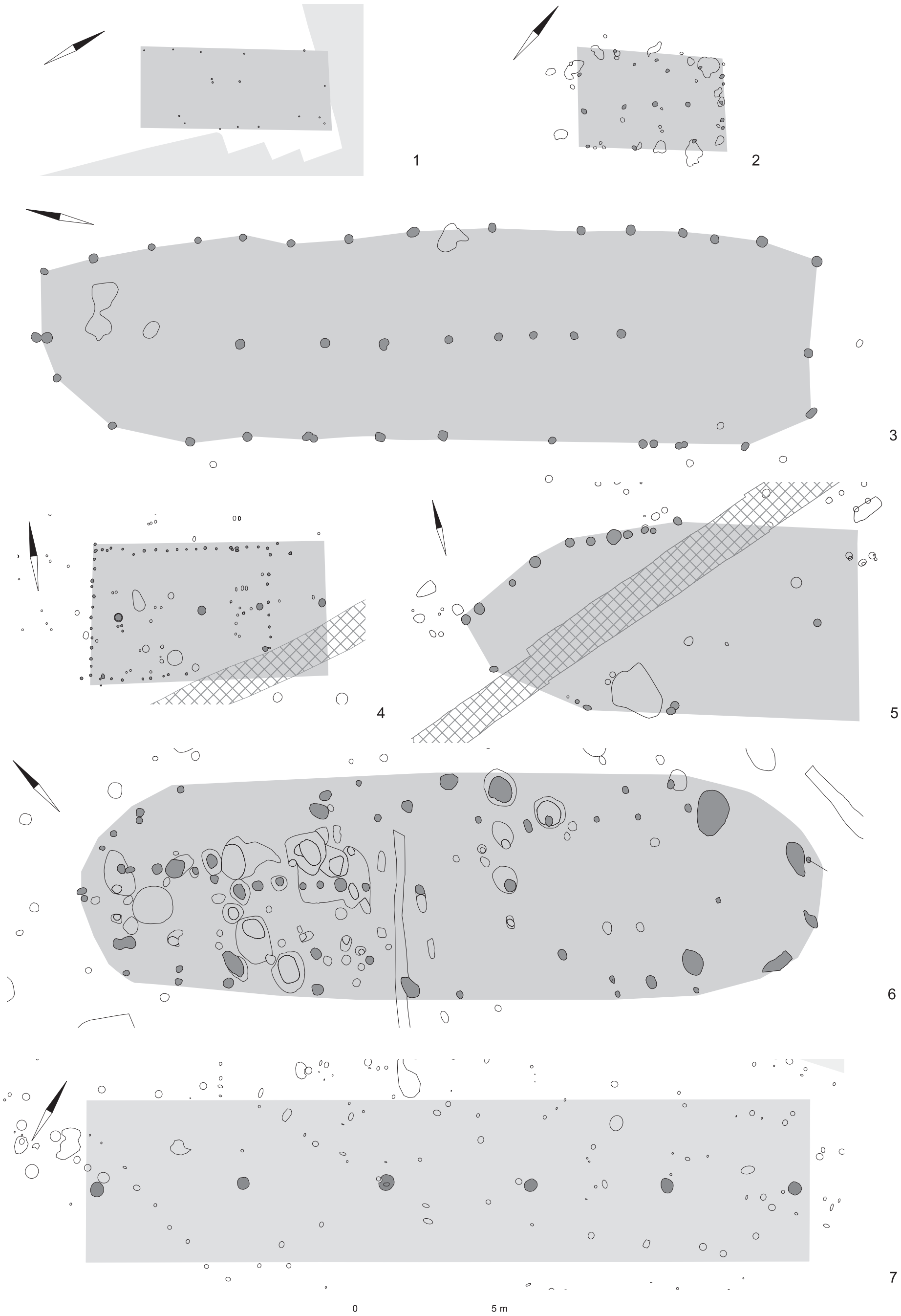

Fig. 5.4 An overview of Dutch claimed two-aisled structures of unclear dating and/or construction, all to the same scale (1: Vlaardingen (after Van Beek 1990, fig. 98), 2: Ottoland - Kromme elleboog (after Wassink 1981, fig. 56), 3: Vasse (after Verlinde 1984, fig. 2), 4: Meteren - De Bogen (after Hielkema, Brokke & Meijlink 2002, fig. 3.12a), 5: Tiel - Medel 5 (after Ufkes 2005, fig. 3.6), 6: Rhenen - Remmerden (after Jongste 2001, fig. 21), 7: Ottoland - Oosteind (after Deunhouwer 1986, fig. 12)).

in an area of low feature density at an excavation near Vasse (fig. 5.4, no 3; Verlinde 1984). No dateable material was found in relation to these features and the exact age of this plan remains unknown (Verlinde 1984, 8-9). The plan was originally dated to the Early Bronze Age because of its two-aisled structure (*loc. cit.*), but later-on the plan was claimed to date to the Single Grave Culture period (*c.* 2900-2500 BC, hereafter SGC) because of assumed similarities to the SGC period houses of Mienakker and Zeewijk.[16] Essentially, the dating and function of this plan remains unknown without the availability of adequate parallels.

In the southwest part of De Bogen site 29, part of an 5 m wide and at least 8 m long structure was uncovered.[17] A centrally located row of postholes may have held the ridgepoles. As no datable material was recovered in association with the plan, its dating is unknown but likely to fall within the general main use-phases of this site, which are dated to between the Late Neolithic and the Late Bronze Age.

A configuration of posts at Tiel - Medel site 5 has also been claimed to represent part of a possible house plan (fig. 5.4, no 5; Ufkes 2005, 26; 34). From one of the postholes and from two pits in the vicinity, Early Bronze Age ceramics were recovered which, together with the reconstructed two-aisled nature of the post-configuration, led to an assumed Early Bronze Age date (*ibid.*). The difference in depth, irregular and incomplete placements of the posts and absence of adequate parallels again argues against an interpretation as an Early Bronze Age house (*contra* Ufkes 2005, 117, *cf.* Hielkema & Hamburg 2008, 127-129).

In 2001, several irregular groupings of features from Rhenen-Remmerden have been published as representing one or more Early Bronze Age house plans (Jongste 2001, 27-30). Some postholes and pits used in the reconstruction of house 1 yielded Early Bronze Age ceramics (Jongste 2002, 30). As the absence of various posts, as well as the differences in feature dimensions and depth cannot be explained satisfactorily, the reliability of this reconstruction is limited (Fokkens 2002, 130; Van Hoof & Meurkens 2007, 27-33).[18] The same arguments apply to the other tentative Early Bronze Age structures forwarded by Jongste (2001).

The three-aisled ground plans discovered at Zwolle - Windesheim and Regteren, were originally dated to the Early Bronze Age, based on Early Bronze Age sherds found during the excavation, yet none originated from postholes of the houses (Van Beek & Wevers 1995, 111-113). The roof-bearing structures of these ground plans are comparable to Middle Bronze-B house plans, and accordingly a Middle Bronze Age date has been suggested for these houses.[19]

Waterbolk, in his 1995 re-interpretation of the excavation results of Zwolle - Ittersumerbroek, suggested that 43 structures may date to the Early Bronze Age (Waterbolk 1995a, 131-149; 1995b, 86). As detailed discussions of the structures and the associated finds are absent, not much weight is carried by these claims (*cf.* Theunissen 1999, 194; Fokkens 2001, 252). At Zutphen - Looërenk, a configuration of posts has been interpreted as a possible Early Bronze Age house (Bouwmeester 2008, 69-70). However, the reconstructed house plans is rather irregular and unconvincing. Moreover, it is incomplete and lacks directly associated pottery to substantiate an Early Bronze Age claimed age.[20]

In the above section, various claims for two-aisled house plans have been discussed. None of the above examples proved convincing. Whereas the structures from Vasse, De Bogen, and Ottoland may be convincing in plan, their dating is unclear. The overall validity of the claimed structures from Vlaardingen, Tiel and Rhenen is too questionable to refer to these structures as possible ground plans of houses.

Conclusion

It is remarkable that so few indisputable houses datable to the Early Bronze Age are known, especially since extensive excavations have been undertaken in the Netherlands and many houses are known from later Bronze Age phases. It is most likely that this is predominantly related to the absence of regularity in post-placement for buildings of these phases. This renders ground plans for such houses hard to recognise. In addition, no standardisation is visible. Even

16 Pers. comm. Verlinde in Hogestijn & Drenth 2001, 66, for Mienakker and Zeewijk see Hogestijn 1997.

17 Hielkema, Brokke & Meijlink 2002, 181-183; Appendix III, fig. III.11, D.

18 Jongste argues that the different posthole sizes can be explained by the locally very different lithology, as the site is situated on ice-pushed sediments (sandr deposits; Jongste pers. comm., April 2004). While this may account for some of the variability in feature diameter, it does not explain differences in feature depth or the absence of posts.

19 Van Beek, Clevis & Verlinde 1998, 144; Hogestijn & Drenth 2001, 70; Klomp 2003, 13; 23, Fokkens 2005b, 416-417.

20 The dating was based on Barbed-wire stamp decorated sherds found while digging to the feature level and from a tree-throw hollow (Bouwmeester 2008, 69). In addition, no feature depths have been published, which complicates the evaluation of the validity of the proposed house plan.

the two super-imposed house plans from Molenaarsgraaf differ distinctly in their overall shape and roof-bearing structure. This means that we at present hold no adequate 'key' or template with which we can look for such houses at sites where they are – based on recovered other remains – to be expected. The examples from Molenaarsgraaf, and especially Noordwijk, are reassurance that at least in those geogenetic regions of The Netherlands, Early Bronze Age houses relied on earthfast posts to begin with. For other areas, this is not yet clear.[21]

An interesting observation was that the Dutch Early Bronze Age house plans deviate distinctly from a Late Neolithic to Early Bronze Age building tradition that was shared as widely as from Norway to Austria; namely a tradition of rectangular houses based on widely spaced ridge-posts with many outer (wall)posts, set in a (sub)rectangular placement (fig. 5.3). Why the Early Bronze Age houses of the Low Countries do not reflect this evidently widely spread tradition is at present unknown. For some reason, supra-regional building traditions were either not shared with, or accepted by, the Dutch Early Bronze Age local communities. That these communities were in any case certainly not beyond the reach of such larger Northwest European interaction networks, is indicated by the presence of other elements of such interaction spheres, such as the traditions of 'Barbed Wire'-stamp decorated pottery and Scandinavian flint daggers that *did* find their way to the Dutch communities during the Early Bronze Age.[22]

5.2.2 A dark age? Houses from the Middle Bronze Age-A?

Evidence for the nature of domestic structures datable to the Middle Bronze Age-A (*c.* 1800-1500 BC) is very limited to absent. Whereas a few house plans have been shown above to be representative of a regional style of Early Bronze Age house-building, as yet almost no house plan that has been claimed to date to the Middle Bronze Age-A can withstand scrutiny.

Claimed Middle Bronze Age-A houses

Initially, a radiocarbon dated sample from a posthole of a house at Dodewaard was interpreted as indicating that one of the houses may date to the Middle Bronze Age-A.[23] Remarks made in passing suggest that houses at Zijderveld (Fokkens 2001, 243; 252) and from West-Friesland (Theunissen 1999, 139) date to the Middle Bronze Age-A.[24] In these cases, the nature and context of the samples on which the assumed dating is based, have not been given due consideration. Charcoal from postholes (*i.e.* not from post-pipes or covering deposits) can only serve as a *terminus post quem*, indicating a minimum age for the context in question. The houses from Dodewaard, Zijderveld and West-Friesland can be dated to the Middle Bronze Age-B through analogy with directly dated house plans (see section 5.2.3.1).

In addition, several houses at the De Bogen excavation (section 4.4.3) have been claimed to date to the Middle Bronze Age-A and these claims are discussed at length in Appendix III. While two of the eight claimed Middle Bronze Age-A structures are presumably house plans, their dating remains unclear (section 4.4.3; Appendix III, esp. fig. III.17). For house 28-1AH a Middle Bronze Age-A date cannot be excluded, although for this house too a Middle Bronze Age-B date is suggested based on typological grounds.[25] This house in any case deviates somewhat

21 The house plan from Bocholt may indicate the same for the eastern coversand areas of The Netherlands. Uncovered Neolithic structures in various regions may also provide some long-term continuity (Arnoldussen & Fontijn 2006, 293 fig. 3).

22 Barbed Wire-stamp decorated pottery is spread as wide as from the United Kingdom (*e.g.* Clarke 1970; Clarke 1982; Case 2001, 366; Needham 2005, 200), the Low Countries (Lanting 1973; Hoffman 2004, 82-85), France (Guilaine 1984; Souville 1994; Blouet *et al.* 1996, 411; Lemercier 2002, 204-208, 224; Lemercier & Gilabert *in prep.*), Northern Italy (Gilli, Salzani & Salzani 2005) and Scandinavia (*e.g.* Nielsen & Nielsen 1985, 109-110; Liversage 2003, 45; Gröhn 2004, 238; 256; Vandkilde 2007, 86) to the south-east Baltic (Czebreszuk & Kryvaltsevich 2003, 109). On Dutch Early Bronze Age Scandinavian flint daggers, see Bloemers 1968 and Beuker & Drenth 2006.

23 *E.g.* Theunissen & Hulst 1999a, 139-141; Fokkens 2001, 252; 2002, 130. For (discussions of) the date of Dodewaard see Theunissen & Hulst 1999a, 139; Lanting & Mook 1977, 120-121; Lanting & Van der Plicht 2003, 160.

24 *Cf.* Theunissen 1999, 127 on Middle Bronze Age-A at Elp, but see Waterbolk (1987, 200-201) who only assigned a generic Middle Bronze Age age (and estimate of 3300 BP) for the earliest phase at Elp. See also Dautzenberg, Koning & Vaars (2002, 16) for a tentative Middle Bronze Age-A dating of the house plans at Engelen, for which direct arguments are however lacking.

25 See section 4.4.3; Appendix III, fig. III.22. The assumed Middle Bronze Age-A age was based on a possible Hilversum-style decorated sherd from a posthole and the correlation of a dating of the floodbasin peat in the direct vicinity (Hielkema, Brokke & Meijlink 2002, 249-253, *cf.* Appendix III, fig. III.15).

from the majority of the Middle Bronze Age-B houses in its rather wide span (*c.* 3.75 m) between the two rows of roof-bearing posts (*cf.* fig. 5.27, B).

Fig. 5.5 An overview of Dutch claimed Middle Bronze Age-A houses (1: Oss – Ussen/Schalkskamp (after Fokkens 1992, fig. 24), 2: Boekel (after Arts & De Jong 2004, 2), 3: Gennep - De Smele (after Mooren & Van Nuenen *in prep.*), 4: Rumpt - Eigenblok (after Jongste & Van Wijngaarden 2002).

At Oss, a possible house plan has also been tentatively dated to the Middle Bronze Age-A (fig. 5.5, no 1), based on the presence of Bronze Age ceramics in the postholes and the presence of Hilversum-style decorated ceramics in nearby wells (Fokkens 1992).[26] Although the low-feature density allowed the isolation of this plan with reasonable reliability, direct parallels for structures of such a type are as yet lacking. The pottery from the postholes solely indicates that this construction may date from or after the Bronze Age and offers no confirmation of an assumed Middle Bronze Age-A date. Re-analysis of the data by Fokkens has led to the conclusion that the reconstruction a single ground plan as well as the proposed dating should be dismissed, but that several features in its vicinity in any case date to the Middle Bronze Age-A (Fokkens, pers. comm. May 2007).

A large structure from Boekel has also been claimed to date to the Middle Bronze Age-A (fig. 5.5, no 2; Arts & De Jong 2004). In the small posthole in the middle of its north-eastern short side a Hilversum-style decorated urn was buried upside-down (*cf.* table 8.1). Unfortunately, no details on the post depths and contents have been published, which means that the certainty of this reconstruction cannot be assessed. The excavator himself has expressed some doubts on the validity of the suggested reconstruction (Arts, pers. comm. October 2005). The absence of posts, lack of regularity and lack of adequate parallels necessitate labelling this house plan as tentative for the time being.

An ovoid configuration of postholes was uncovered near Gennep (fig. 5.5, no 3; Mooren & Van Nuenen, *in prep.*). Within this cluster, two rows of roof-bearing posts placed *c.* 3.5 m apart were identified. This may indicate a three-aisled house-structure. The posts within these rows were not always placed directly opposite each other and various posts were found of which the former function remains unclear.[27] For this site, three radiocarbon dates are available that indicate a general phase of use around *c.* 1630-1510 cal BC.[28] Considering the low feature density at this site, this ground plan may be one of the best available examples of a structure (presumably a house) datable to the 16th century BC.

Another possible Middle Bronze Age-A house plan has been reconstructed relatively recently (Bulten *in prep.*) from the excavation plans of the site Den Haag - Bronovo, that was excavated between 1990 and 1991 (Waasdorp 1991). In small trenches of *c.* 10 by 10 m, a 6.2 m long section of a presumably originally longer structure was excavated. A roof-bearing structure of two rows of posts, placed only 2 to 2.35 m apart was identified (Bulten *in prep.*).[29] Some smaller posts, placed at 0.5 to 1 m from the rows of roof-bearing posts, are also assigned to the plan, but these show little consistency in placement and depth. The dating of this plan is relatively insecure, as the pottery recovered from the postholes can only be assigned a generic 'Bronze Age' date and the two radiocarbon dates for this site provide only a crude indication of the period of use in the 19th to 16th century BC.[30] Moreover, as this ground plan has been reconstructed during post-excavation analysis from an area of relatively higher feature density and lacks adequate Middle Bronze Age-A parallels, its functional interpretation and assumed dating must be treated with caution.

Finally, a post-alignment from Eigenblok (see section 4.3.4) must be considered. At the stratigraphically lowermost level of Eigenblok site 6, a number of postholes were uncovered of which one yielded wood that could be dated to *c.* 1690-1440 BC (GrN-24105; Jongste 2002a, 35-36). This post-alignment was recognized by the original excavator (Jongste) and the present author after fieldwork and full publication (Jongste & Van Wijngaarden 2002)

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26 One well containing Hilversum-style decorated pottery was radiocarbon dated to *c.* 1890-1740 BC (charred ends of wooden posts part of the well lining; GrN-19666: 3485 ± 20 BP; Lanting & Van der Plicht 2003, 176) and a well containing Hilversum-style decorated and Barbed Wire-stamp decorated sherds was dated to *c.* 1870-1660 BC (wood from lining; GrN-19667: 3425 ± 20 BP; *ibid.*). See also Engelse 2003, 35-56 for details on the contents of these wells.

27 From a larger pit within this ground plan, 331 sherds of a single Bronze Age vessel with a row of fingertip impressions under the rim were discovered, which may represent intentional an deposition (Mooren & Van Nuenen *in prep.*).

28 Poz-gnppe 157: 3315 ± 35 BP (resin from pit next to ground plan), Poz-gnppe 205: 3325 ± 35 BP (hazelnut shell from posthole (s113) of the ground plan) and Poz-gnppe 414-320: 3260 ± 30 BP (hazelnut shell from a pit (s103) within the ground plan (Mooren, pers. comm., July 2007; Mooren & Van Nuenen *in prep.*).

29 This span (2.1 to 2.35 m) is remarkably small for Middle Bronze Age-B farmhouses (fig. 5, B.27), but does occur sometimes with Late Bronze Age houses (section 5.2.4).

30 Of the 300 sherds from this trench, 273 were dated to the Bronze Age and 11 to the Middle Bronze Age-A in particular (Bloo in Bulten *in prep.*). The relation between these sherds and the structure recognised is however weak. A sample of peat underneath the finds-layer was dated to *c.* 1690-1510 cal BC (GrN-15010: 3320 ± 35 BP) and some charcoal from the finds-layer itself to *c.* 1880-1640 cal BC (GrN-15011: 3435 ± 35 BP). The highest parts of this site were still used during the (Late) Iron Age and Roman period (Bulten *in prep.*).

of the site. The posts have been checked for consistency in depth, diameter and placement (fig. 5.5, no 4).[31] As the structure can no longer be checked in the field and is incomplete, an interpretation as reflecting a line of ridge-posts of a Middle Bronze Age-A house must remain speculative.

Houses, sites and the problem of the Middle Bronze Age-A

The sections above indicate that claimed Middle Bronze Age-A structures are few in number and diverse in plan. For most of these reconstructions the dating and configurations of posts must be challenged and may in the future (if clear Middle Bronze Age-A house plans can be identified) be dismissed as erroneous. So how can this be explained?

An obvious solution would be to blame this deficiency on limited research intensity or low numbers of relevant find-spots. The large number of Middle- and Late Bronze Age houses known (see below) counters the first argument and the second proposition is equally untenable. In all but the northeast part of The Netherlands, Hilversum-style decorated pottery that is thought to date to the Middle Bronze Age-A, has been discovered (fig. 5.6). As the definition of 'Hilversum ceramics' has frequently shifted, a small digression on Hilversum-style decorated ceramics is needed here. This allows the reader to evaluate which types of pottery the author has classified as 'Hilversum-style' decorated.

Hilversum-style decorated pottery

The nomenclature of Bronze Age ceramic traditions is somewhat confusing. Glasbergen (1954; 1956a-b; 1969) postulated an evolutionary sequence of early (convex-concave to biconical in shape, rope- or fingertip-decorated between shoulder and rim) Hilversum (HVS) pots, which devolved into Drakestein (DKS; knotted-pear shaped pots with a cordon on the pot shoulder) pottery and finally undecorated barrel or bucket-shaped Laren (LRN) pottery.[32] Initial radiocarbon dates required these phases to be seen as less discrete and the absolute age ranges were investigated.[33] Undecorated fragments, or fragments showing only a cordon, proved to be of similar old age (Lanting & Mook 1977, 117-119). To confuse matters even more, according to Glasbergen's own definition (Glasbergen 1969, 14), even 'HVS' may be undecorated.[34]

Faced with these problems, Ten Anscher (1990, 72-77) proposed to rename 'HVS', 'DKS' and 'LRN' into HVS-1, HVS-2 and HVS-3 respectively, and to use these as typological labels only, in order to more objectively assess their chronological distribution. Unfortunately, Ten Anscher too failed to explicitly define the types 'DKS/HVS2' and 'LRN/HVS3'.[35] As undecorated ceramics occur throughout the Bronze Age and 'DKS' is rather-ill-defined, Theunissen argued that 'LRN' and 'DKS' have no chronological value (Theunissen 1999, 205). This has led to some archaeologists using 'HVS1' and 'HVS2/3' as shorthand for early (*i.e.* Middle Bronze Age-A) and later (*i.e.* Middle Bronze Age-B) ceramic complexes respectively, although Theunissen (*loc. cit.*) had proposed the more generic term 'Middle Bronze Age-B pottery' for the latter.[36]

Presumably as a consequence of Ten Anscher's labels and the fact that Theunissen argued to use (or more accurately; to retain[37]) the label 'Hilversum culture' for relicts of Middle Bronze Age(-A) societies in the Low Countries (*op. cit.*, 214), some archaeologists have since used 'HVS' to designate Middle Bronze Age pottery from the Low Countries in general. For example, Fokkens (2001, 249) has suggested that the 'true' Hilversum-style decorated pottery should be labelled 'Early Hilversum' and pottery without such traits as 'Late Hilversum'.[38] Such approaches

31 Only for the south-easternmost post may stratigraphic contemporaneity be questioned.
32 *Cf.* Ten Anscher 1990, 68; Theunissen 1999, 29-32; 202-205.
33 Lanting & Mook 1977, 117-119; Ten Anscher 1990, 72-73.
34 *Cf.* Fokkens 2001, 248-249.
35 He also proposed a subdivision of 'HVS-1' into three sub-phases and 'HVS-3' into two sub-phases (Ten Anscher 1990, 76-77), but the data sets are as yet too few in number and poor in quality to accept or refute these propositions.
36 This label 'Middle Bronze Age-B pottery' is flawed by the observation that generally in any Bronze Age ceramic complex *c.* 70% or more of the fragments are undecorated and cannot be dated stylisticly. Therefore, for undecorated fragments the labels 'possible Bronze Age pottery' or 'presumed Bronze Age pottery' should be used.
37 Louwe Kooijmans 1974, 31 note 75.
38 Fokkens places the transition between the two at 1500 cal BC (2001, 249) or 1600 cal BC (Fokkens 2005c, 28).

blur labels and contents even further.[39] As a way out, the contents and labels for Middle Bronze Age pottery need to be redefined (*cf.* Fokkens 2001, 247-251; 2003, 24). I propose the following definitions, which may serve as a typological shorthand, and whose chronological positions and additional characteristics need to be defined by future research:

Label	Aliases	Age (cal BC)	Description
Hilversum - style 'HVS'	HVS, HVS-1	suspected: MBA-A proven age range: (1960)1880-1660(1600)	Middle Bronze Age pottery which is characterised by the presence of decoration between the rim and pot-shoulder that is executed in impressed cord or nail-impressions in diagonal, vertical, cross-hatched, triangular or looped motifs. Horse-shoe handles occur. Cord-decoration on the (inner) rim and vertical nail-impression on the inside-rim angle have been documented. Cordons are common. There is no diagnostic pot shape or rim-type, although convex-concave and biconical profiles and wide and outward-protruding rims may be shown in the future to occur more frequently with this group.
Drakestein-style 1 'DKS1'	DKS, HVS-2	suspected: MBA (A&B) proven age range: (1890)1750-1390(1120)	Middle Bronze Age pottery which is characterised by the presence of a horizontal cordon around the pot, which may be an appliqué, or which may have been formed by deforming the pot-wall.[31] This cordon may (DKS1a) or may not (DKS1b) be decorated with finger-tip or nail impressions. No decoration of the pot-shoulder and rim as described for 'HVS' above. There is no diagnostic pot shape or rim-type.
Drakestein-style 2 'DKS2'	DKS, HVS-2	suspected: MBA (A&B) proven age range: (1880)1780-1490(1210)	Middle Bronze Age pottery which is characterised by the presence of a row of nail- or fingertip-impressions near the pot-shoulder, which is not executed on top of, or in combination with, a cordon. There is no diagnostic pot shape or rim-type, although barrel-shaped profiles may be shown in the future to occur more frequently with this group.
Laren-style 'LRN'	LRN, HVS-3	suspected: (M?)BA proven age range: (1890)1670-1430(1120)	Middle (?) Bronze Age pottery of bucket- or barrel shape, which is characterised by the absence of decoration. In order for identification, archaeologically complete profiles must be reconstructable. There is no diagnostic rim-type and undecorated pots of this morphology may have occurred throughout the entire Bronze Age.
Bronze Age pottery 'BAP'	'HVS2/3', 'MBA-B pottery	suspected: EBA-LBA	Bronze Age pottery lacking sufficient diagnostic characteristics to be classified as any of the above or other (e.g. WKD, LBA, Elp (?)) ceramic traditions. In order to designate the security of interpretation these ceramics may be labelled as 'possible Bronze Age pottery' or 'presumed Bronze Age pottery'.

Table 5.1 Typological labels and main characteristics for (Middle) Bronze Age pottery.

Furthermore, the available Dutch radiocarbon dates for pottery decorated in Hilversum-style tradition indicate that it was current between 1960 to 1600 cal BC, but certainly between 1880 and 1660 cal BC (table 5.1; Theunissen 1999, 205; Fokkens 2005c, 28).[40] This implies that this ceramic style was current during the Middle Bronze Age-A and may thus serve to pin-point settlement sites from this period.

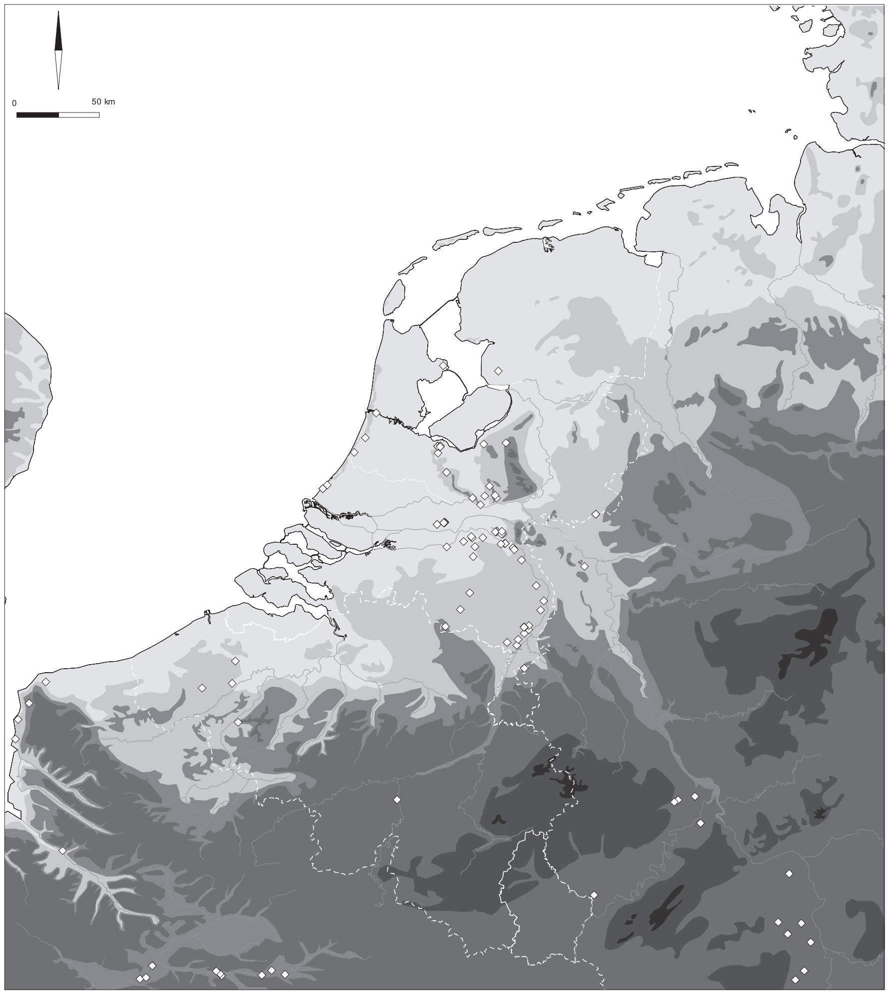
While the ceramics decorated in Hilversum-style provide good chronological markers for the Middle Bronze Age-A, no houses could be reliably reconstructed at the sites where these ceramics were uncovered. The validity of the structures from Oss-Schalkskamp (Fokkens 1992) and Boekel (Arts & De Jong 2004) has been questioned by the original excavators, and the post-excavation reconstruction of a post-row at Eigenblok (fig. 5.5, no 4) must also remain speculative. What may explain this situation?

Where have all the (Middle Bronze Age-A) houses gone? Evidence of absence?

An important observation is that only few sites are known where an abundance of Hilversum-style decorated ceramics has been recovered. Generally, the find-spots of Middle Bronze Age-A ceramics entail only a few sherds from a limited number of features (generally pits) even in extensive excavations. This may indicate that the nature

39 See also the discussion in Lanting & Van der Plicht 2003, 155-156.

40 For radiocarbon dates see Bloo (2003, 25), Theunissen (1999, 124), Lanting & Van der Plicht (2003, 154-155; 161; 176; 184-185; 187), Van Heeringen, Van der Velde & Van Amen (1998, 38-43).



a b c d e f

Fig. 5.6 Distribution map of find-spots with Hilversum-style decorated ceramics in the Low Countries.

a: 10 m contour, b: 40 m contour, c: 80 m contour, d: 400 m contour, e: 600 m contour, f: find-spots with Hilversum-style decorated ceramics.

of the occupation (*e.g.* the types of domestic structures, the dealing with refuse and the frequency of pit-digging *et cetera*) of the Middle Bronze Age-A differed distinctly from that of later periods (Arnoldussen & Fontijn 2006, 307). Even for sites where Hilversum-style decorated pottery was the dominant type and where this pottery was recovered in some quantities (*e.g.* Vogelenzang - Tweede Doodweg and Den Haag - Bronovo), house plans or other structures proved difficult to recognize.

At Vogelenzang - Tweede Doodweg, a site situated in the coastal dunes area, some bones and many (> 12 kg) lithic artefacts were excavated (fig. 5.7). The majority of these artefacts, including over 3.5 kg of predominantly Hilversum-style decorated ceramics, originated from two extensive features known as pits 1 and 2 (Ten Anscher 1990, 45-48).[41] The pits contained homogenous grey sand, which became increasingly humic with depth, but the overall depth was limited and did not exceed 0.4 m. Based on these observations, it is quite possible that these represent natural, somewhat marshy depressions in the dune micro-topography. Indications that these were dug by people are in any case not visible in the sections drawn (Ten Anscher 1990, 47). Several smaller features could be

41 Two pots showed Barbed Wire-stamp decoration (Ten Anscher 1990, 64-65). The 'Hilversum'-style decorated sherds represent at least 62 other pots (*op. cit.*, 50).

identified as postholes, but these could not be grouped into structures (*op. cit*, 45). It is plausible that these features belonged to a settlement site of the people also responsible for leaving or depositing this debris close-by. Although an area of over 600 square meters was uncovered, no recognizable structures can be identified. This again argues for a different nature of the settlement sites during the Middle Bronze Age-A compared to later phases of the Bronze Age.

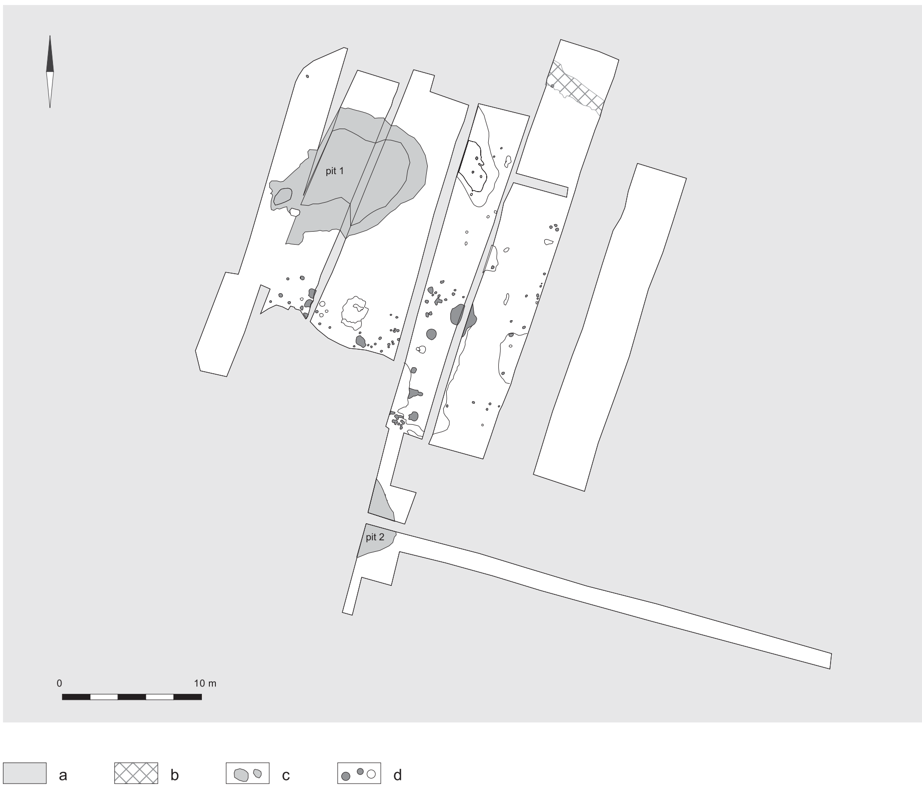


Fig. 5.7 Overview of the archaeological features at Vogelenzang - Tweede Doodweg (after Ten Anscher 1990, 46 fig. 2).

a: not excavated, b: recent disturbances, c: ‘pits’ with the majority of the Hilversum-style decorated ceramics, d: postholes and other features.

At Den Haag - Bronovo, a similar situation exists. This site, also situated in the Dutch coastal dunes area, has yielded a significant amount (> 18 kg) of Hilversum-style decorated pottery (Bloo, in: Bulten *in prep.*). For this site, ground plans of houses and outbuildings proved difficult to recognize. A tentative house-structure has been forwarded (*supra*), but the reliability of this reconstruction suffers from the high feature density there, its indirect dating and the possibility of a younger period use of this site. Nonetheless, it is very plausible that Den Haag - Bronovo represents a unique example of a settlement site from the Middle Bronze Age-A where Hilversum-style decorated pottery was common. The fact that structures prove hard to identify, indicates that our knowledge on what (domestic and/or agricultural) structures looked like during this period may be too limited to recognize and isolate these from denser posthole clusters.

The quest for Middle Bronze Age-A houses: looking abroad

Having established the difficulty in recognizing domestic structures for the Middle Bronze Age-A in the Netherlands, we now need to look at a larger spatial scale. Perhaps in neighbouring areas Middle Bronze Age-A houses of distinct types are known that may help to recognize these in the Dutch data?[42]

42 Because of the different nature of their domestic structures, lake dwellings such as Meilen-Schellen or Zurich Mozartstrasse – which may be placed in the 17th and 16th centuries BC (*e.g.* David-El Biali 1992, 361 table 1; Ruoff 1996; Wolf *et al.* 1999; Lanting & Van der Plicht 2003, 129, *cf.* Schlichterle 1997) – will not be discussed here.

In adjacent Belgium, only two sites have yielded Middle Bronze Age house plans and these are both most likely to date to the Middle Bronze Age-B.[43] While also in Belgium find-spots of pottery comparable to Hilversum-types are discovered, few informative settlements sites datable to the Middle Bronze Age-A are known.[44]

At Frouard - Saule Gaillard in northern France, charred acorns and charcoal from postholes of a Bronze Age house were dated to *c.* 1950-1390 cal BC, suggesting that this house may have been constructed during or after this period (fig. 5.8, no 1).[45] If the suggested dating to the Middle Bronze Age-A (F: *Bronze Ancien tardif*) is correct, the houses from the Lorraine already display an essentially three-aisled roof-bearing structure centuries before this became current in the Netherlands.[46] At other sites in this region, less clearly interpretable post configurations – not unlike those in the Netherlands? – can only be interpreted as tentative Middle Bronze Age-A house plans (Blouet *et al.* 1996, 438). The house plans from Izier-Le Joannot are dated indirectly (*i.e.* based on the date range of all ceramics recovered) to the *Bronze Ancien* (fig. 5.8, no 2; Dartevelle 1996, 476). The house plan from Hettange-Grande is also dated indirectly based on the recovered ceramics from the *Bronze Ancien* or *Bronze Moyen*, but the two-aisled roof-bearing structure may favour a dating to the former period (fig. 5.8, no 3; Faye 2005, 158). Three radiocarbon dates for this structure have not yet been published in full (*ibid.*), which means that its dating must remain provisional. In short, while in France some clear house ground plans have been uncovered that may be contemporary to the Dutch Middle Bronze Age-A, ascertaining their age and recognizing these in the first place is also difficult in northern France (*e.g.* Blouet *et al.* 1996, 432-439; Billard *et al.* 1996, 579-580; Lepaumier *et al.* 2005, 240).[47] These difficulties are sometimes explained as being caused by later agricultural disturbances, but also by assuming a less substantial nature of the domestic structures involved and/or an assumed more pastoral subsistence base of the societies in question (*e.g.* Roussot-Larroque 1996, 510-511; Merlet 1996, 537).

From Germany as well, different types of houses have been claimed to date to the period of the Dutch Middle Bronze Age-A. For the well-preserved farmhouse from Telgte - Wöste (fig. 5.8, no 4; Reichmann 1982), a Middle Bronze Age-A age has been suggested (Reichmann 1982, 437; 442; Fokkens 2002, 129). This is based on ceramics recovered from nearby pits and ceramics from some of the smaller post holes within the building's ground plan (*ibid.*). For the ceramics, a Middle Bronze Age-A dating is far from certain. These sherds are thin-walled (< 10 mm), and the fingertip-impressed cordons may date to either the Middle Bronze Age-A, or to the end of the Middle Bronze Age-B and Late Bronze Age (Reichmann 1982, 441 fig. 5, 20-22, *cf.* Arnoldussen & Ball 2007). Most published sherds of Telgte - Wöste do indeed appear to be typologically datable to the (end Middle Bronze Age-B to) Late Bronze Age age.[48] Combined with the absence of (published?) Hilversum-style decorated sherds, a final Middle Bronze Age-B to Late Bronze Age date for the house of Telgte - Wöste should be seriously considered.[49]

43 Sites: Maldegem - Burkel; Crombé 1993; Crombé *et al.* 2005, Weelde; Annaert 1998; 2008. For an overview see Bourgeois, Cherretté & Bourgeois 2003, esp. 177-178.

44 Warmenbol 1996, 642; Bourgeois, Cherretté & Bourgeois 2003, esp. 177-179.

45 Ly-4332: 330 ± 100 BP (acorns) and Ly-4333: 3400 ± 100 BP; Blouet *et al.* 1996, 443.

46 This appears plausible as the ceramics are also interpreted as dating to the *Bronze Ancien* (Blouet *et al.* 1996, 420 fig. 4 and another sample of charcoal from this site was dated to 3480 ± 110 BP (Ly-4334; *op. cit.*, 443).

47 On the varied nature of Middle Bronze Age-A remains in France see several of the contributions in Mordant & Gaiffe 1996; *e.g.* Blouet *et al.* 1996, 432-439; Aimé 1996, 464; Dartevelle 1996, 475; Roussot-Larroque 1996, 510; Merlet 1996, 537; Billard *et al.* 1996, 579-580, *cf.* Pautreau 1992, 294; Brun & Pion 1992, 118. Note that besides presumed long house plans, also frequently "U-shaped" ancillary structures are recognized at these sites (*e.g.* Blouet *et al.* 1996, Dartevelle 1996, 477 fig. 10). In addition, some hilltop sites dated to the *Bronze Ancien* are known (Passard *et al.* 1992, 198).

48 It may be telling that Reichmann himself (1982, 448 note 9) compares the surface treatment of some sherds (not associated with the house) to Haps urn 440 (Verwers 1972, 19 fig. 15), for which a radiocarbon date of 2920 ± 50 BP is available (*c.* 1300-970 cal BC; Lanting & Van der Plicht 2003, 196).

49 Despite absence of clear Middle Bronze Age-A ceramics, four clear relicts of (Late Neolithic to?) Early Bronze Age use of the site are known (Reichmann 1982, 441 figs. 5.1, 5.7, 5.9 and 5.10; a plano-convex flint knife, a flint arrowhead with concave base, a pierced (potbeaker?) rim sherd and a Barbed Wire-stamp decorated sherd respectively). Moreover, it may be conspicuous that older and Late Bronze Age pottery occurs interspersed in the lowermost agricultural layer (Reichmann 1982, 447). In the case of a Late Bronze Age date for this building, House 3 from Hamburg - Marmstorf (Först 1997, 43 fig. 4) and possibly house 4a;b/o17;o18 from Zwolle (Verlinde 1993, 38; Waterbolk 1995a, 143) could serve as parallels.

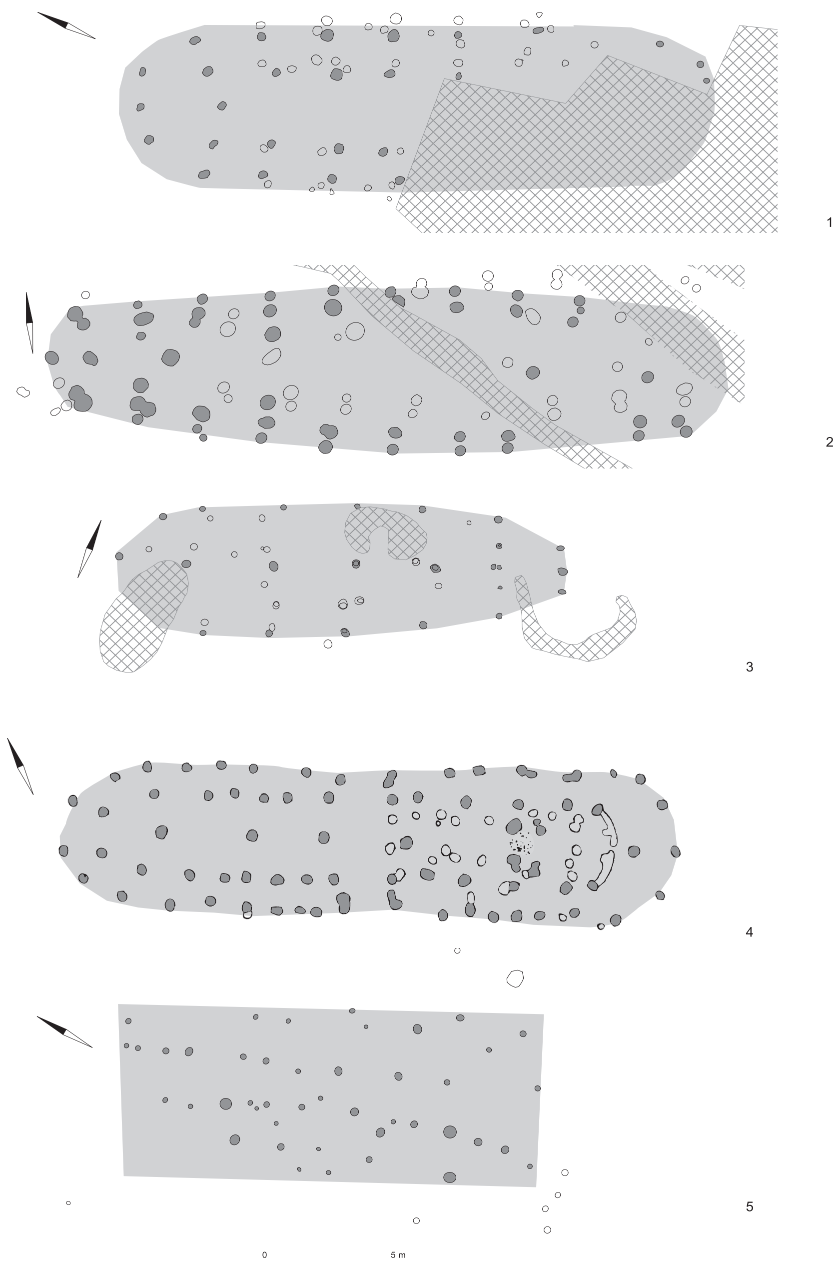


Fig. 5.8 Claimed MBA-A house-plans from France (1: Frouard - Le Saule Gaillard (after De Hingh 2000, 21 fig. 2.2), 2: Izier - Le Joannot (after Dartevelle 1996, 473 fig. 5), 3: Hettange-Grande (after Faye 2005, 156 fig. 6)), Germany (4: Telgte-Wöste (after Reichman 1982, 440 fig. 4.A), 5: Inden - Altdorf (after Päffgen & Wendt 2004, 59 fig. 42)).

At Inden - Altdorf a cluster of postholes was found in relative isolation, but without any regularity in post-placement (fig. 5.8, no 5; Päffgen & Wendt 2004). Based on the ceramics recovered from postholes and pits both within and beyond the house plan, the site is dated to the Middle Bronze Age (Päffgen & Wendt 2004, 59). This implies that a dating to the first part of this period should in any case be left open.

Noteworthy deviations from the more general pattern of post-built structures are the several pit-dwellings from Mayen - Sauperg, of which one is reproduced here (fig. 5.8, no 6; Hoffman 2004, 49-51, ref. to Wagner 1937). The associated ceramics are dated to the Meckelheim and Lanquaid phases (Hoffmann 2004, 276-286), which is

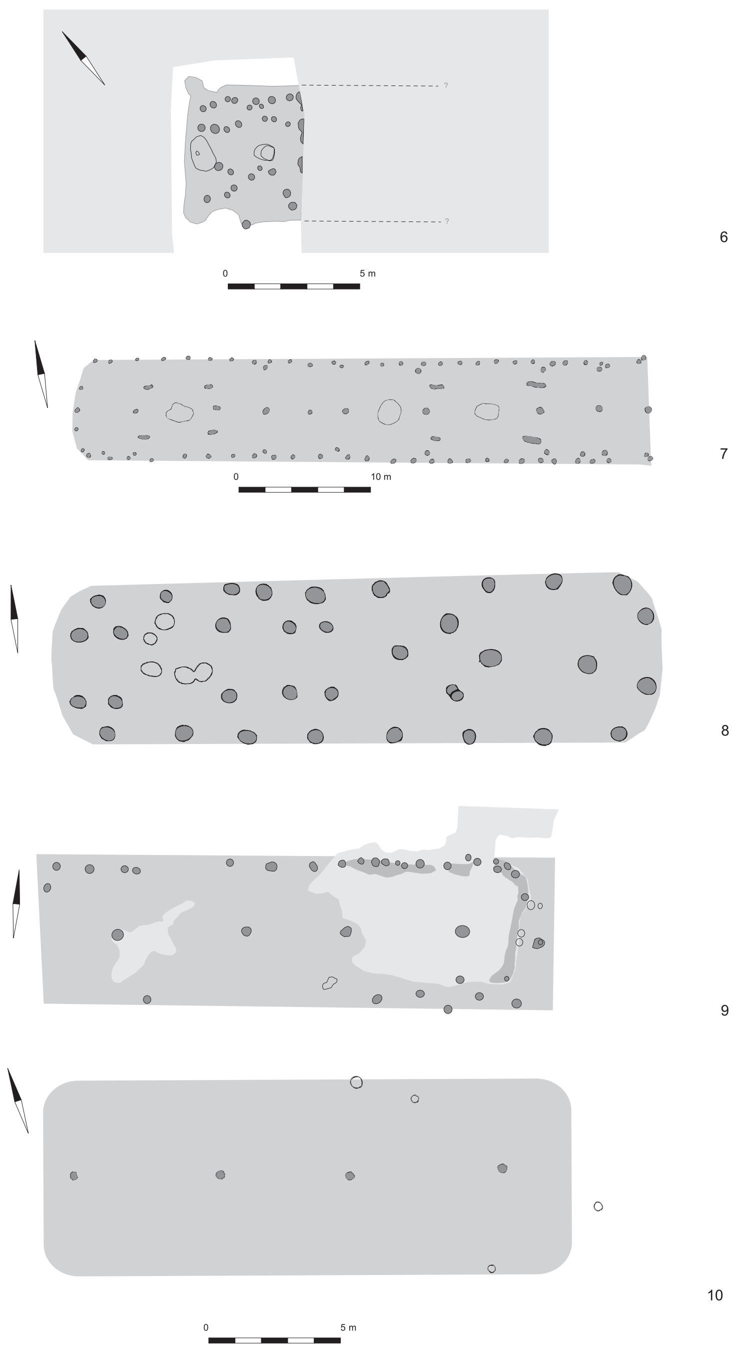


Fig. 5.8 (continued) Claimed MBA-A house-plans from Germany (6: Mayen-Sauperg (after Hoffmann 2004, 50 fig. 9)), Denmark (7: Hemmed- Church (note: different scale; after Boas 1991, 133 fig. 23), 8: Højgård (after Ethelberg 1991, 153 fig. 19), 9: Egehøj (after Boas 1983, 93 fig. 3)) and Sweden (10: Elinelund 2a (after Sarnäs & Nord Paulsson 2001, 77 fig. 64)).

roughly between 1850 and 1650 cal BC (*ibid.*, 35). No evident regularities in the placement of the inner posts can be observed (Hoffman 2004, 49-51).[50]

50 For other sunken-floor houses possibly attributable to this period see Gröhn 2004, Chapter 4 esp. 260-270 or Tesch 1993, 158-159.

From the Scandinavian countries, some house plans are known that are likely date to the Middle Bronze Age-A. The best case in point is the Danish house III from Hemmed - Church (fig. 5.8, no 7; Boas 1991), for which several radiocarbon dates are available (Rasmussen 1991, 157-158). Although most concern *terminus post quem* dates (*i.e.* charcoal from postholes), two radiocarbon dates and the recovered ceramics and artefacts indicate a construction phase between 1950-1450 cal BC, presumably after 1620 cal BC.[51]

House II at the Danish site of Højgård (fig. 5.8, no 8; Ethelberg 1991) may also be dated to the Dutch Early Bronze Age or Middle Bronze Age-A. A *terminus post quem* and *terminus ad quem* date are available and both fall within *c.* 2050-1500 cal BC (Rasmussen 1991, 159).[52] As another *terminus post quem* date of end-Middle Bronze Age-B or Late Bronze Age age was also obtained (*ibid.*), the age of this building is somewhat less reliably established compared to that of Hemmed. From a technological-evolutionistic perspective, a partly two- and three-aisled roof-bearing structure and the sturdy outer posts typical of the later Scandinavian Bronze Age houses may have formed the bridge between a two-aisled and three-aisled building tradition.[53]

For the two-aisled house III at Egehøj (fig. 5.8, no 9), only a single *terminus post quem* date of *c.* 1700-1100 cal BC is available (K-2238: 3160 ± 100; Boas 1983, 101), but the dating of two wells at this site and the artefacts recovered do allow a Period I (*c.* 1700-1500 cal BC) interpretation for all three two-aisled buildings recognized there (Boas 1983). For a two-aisled house discovered in the excavations at Malmö - Elinelund 2A (fig. 5.8, no 10; Särnas & Nord Paulsson 2001, 77-78), radiocarbon dates suggest that this building may have been constructed as late as between *c.* 1690 and 1440 cal BC.[54] Several other two-aisled houses near Malmö - Almhov are likely to have been constructed during the period of the Dutch Middle Bronze Age-A.[55]

Middle Bronze Age-A houses: a conclusion

The Scandinavian data in particular, supported by meagre Dutch evidence such as the tentative house plans from Gennep, Eigenblok or Den Haag and less well dated houses elsewhere in Northwest Europe, indicate that the transition of houses with a two-aisled to a three-aisled roof-bearing structure must have taken place around the period of the Dutch Middle Bronze Age-A.[56] The start of the latter tradition is generally placed after (sometimes during) the Scandinavian period I, *i.e.* 1800-1700 cal BC.[57] The splendid overview of the Swedish data by Artursson lists several examples of two-aisled houses that are likely to date to the 19th to 17th century cal BC (Artursson 2005b, 17; 23 ; 28; 30; 34; 43). There, the two-aisled tradition can safely be assumed to continue until *c.* 1700 cal BC, after which a three-aisled tradition takes over. Further research must indicate whether the dating of their transition around *c.* 1700 cal BC also applies to the Dutch situation. Thus far, reliable well-dated Middle Bronze Age-A structures and houses from the Netherlands have been shown to be few in number, and the oldest three-aisled houses appear only near (the end of) the 16th century BC (see section 5.2.3.1).

The diverse nature of the claimed Dutch Middle Bronze Age-A houses argues against their validity. Additionally, there remains an unsettling discrepancy between the numbers of find-spots where Middle Bronze Age-

51 Age range based on the youngest *terminus post quem* date for a posthole (K-5783: 3150 ± 80 BP; Rasmussen 1991, 157) and a possible *terminus ad quem* date for an oven or cooking pit (K-5781; 3400 ± 100 BP; *op. cit.*, 158) and the possibly associated type V flint dagger datable to *c.* 1950-1750 cal BC (Willroth 2002, 102). If sample K-5784 is indeed charcoal of the post proper (Rasmussen 1991, 159; 3370 ± 80 BP), this serves as an additional *terminus ad quem* date of *c.* 1890-1490 cal BC.

52 Charcoal from posthole; Ua-706: 3450 ± 100 BP, charcoal from cooking pit; Ua-706: 3450 ± 100 BP (both Rasmussen 1991, 159).

53 *Cf.* Schwarz 1996, 25-26 for the partly two-aisled and three-aisled roof-bearing structure of Hesel house I, for which a *terminus post quem* date of 3185 ± 75 BP (Hv-21212; *ibid.*) is available (Lanting & Van der Plicht 2003, 159; 165). Possibly, inner posts such as those of Hemmed Church house III (above) and Vestervang (dated *c.* 1890-1770 BC; Artusson 2005, 34) may be considered technological preludes to a fully three-aisled construction.

54 Samples of cereals from two postholes were dated to 3250 ± BP (Ua-13942) and 3310 ± 55 BP (Ua-11786) respectively (Sarnäs & Nord Paulsson 2001, 78).

55 Gidlöf, Hammerstrand Dehman & Johansson 2006, *e.g.* 102 (hus 1); 118 (hus 22), *cf.* 104-141.

56 For other examples of (less securely dated) relatively young two-aisled houses see Boas 1983, 101; 1991, 131; Jæger & Laursen 1983, 112; Björhem & Säfvestad 1989, 57; 73; Rasmussen 1991, 158-159; Rasmussen 1992-93, 93-95; Schwarz 1996, 45; Ethelberg 2000, 103-104; Müller & Czebreszuk 2003, 92; Børsheim 2005, 111; Arturson 2005, 17; 23; 28.

57 *E.g.* Ethelberg 1986, 165; Louwe Kooijmans 1993, 88; Nielsen 1993, 95; Tesch 1993, 162; Larsson 1997, 56; Nielsen 1999, 161; Fokkens 2001a, 252; Willroth 2003, 112, Gröhn 2004, 260-273.

A ceramics have come to light and the number of recognized and reliable structures for this period. This imbalanced situation may very well indicate that Middle Bronze Age-A houses (and wider house-environments; see Chapter 6) lack constructional properties (large aligned or regularly placed postholes) that allow easy recognition. The fact that many postholes have been recovered from sites like Den Haag - Bronovo, Gennep and Vogelenzang - Tweede Doodweg (*supra*), suggest that in any case some structures at these sites (and for other sites in this period?) relied on a technology of earth-fast posts. These structures may, but need not have been, houses, although the composition of materials recovered at these sites does in any case argue in favour of an interpretation as a domestic (settlement) site. With the extent and nature of the available Dutch large scale excavations, the scarcity of structures from the Middle Bronze Age-A cannot be explained by research intensity. Rather, the outcomes have to be taken at face-value: Middle Bronze Age-A houses relied on construction techniques that do in most cases not allow them to be identified in archaeological contexts. The fact that at settlement sites used during the Middle Bronze Age-B, Middle Bronze Age-A ceramics are frequently encountered, and even construction wood which can be dated to the Middle Bronze Age-A, indicates that the motives determining settlement site location need not have differed significantly between the Middle Bronze Age-A and Middle Bronze Age-B. The limited amount of Middle Bronze Age-A remains discovered in such cases, together with the absence of recognizable architecture, however hints that Middle Bronze Age-A utilization of comparable landscapes involved other ways of dealing with refuse, or may have been more short-lived, or is otherwise more difficult to recognize.

5.2.3 Middle Bronze Age-B houses; their dating and typology

5.2.3.1 The start of the tradition of three-aisled farmhouses

In the sections above it has been argued that within a wider Northwest European context, a transition from a two-aisled to a three-aisled building tradition takes places presumably near the end of the Dutch Middle Bronze Age-A. As it has also been shown that convincing and well-dated Middle Bronze Age-A houses are absent, some attention must be paid here to the oldest claimed dates for three-aisled Bronze Age farmhouses.

At Deventer, Emmerhout, Hijken, Elp, Wijk bij Duurstede, Dodewaard, Meteren, Tiel, Loon op Zand and Breda samples of charcoal or charred cereals have been radiocarbon dated with 2 sigma ranges that span into the Middle Bronze Age-A (table 5.2), but as these are likely to represent *terminus post quem* instead of *terminus ad quem* dates, not too much value may be assigned to them.[58] Furthermore, several of these samples originated from pits whose contemporaneity with the houses within which they were situated cannot be proved. Presumably as a consequence of pre-treatment with preservative, two bone samples dated at Andijk and Bovenkarspel may have yielded results which were too old (Lanting & Van der Plicht 2003, 159).

The reliability of the samples listed in table 5.2 has been evaluated for all samples individually, but no indisputable pre-Middle Bronze Age-B date for a three-aisled Dutch Bronze Age farmhouse has been encountered. Nonetheless, there are some more indirect lines of argument that would permit a start of the three-aisled building tradition in (but most likely near the end of) the 16th century BC.

Circumstantial evidence?

The site of Lienden, for instance, has yielded two plausible three-aisled longhouses (see section 4.6 and Appendix V) which unfortunately, could not be dated directly. All available radiocarbon dates for the excavated part of the settlement site, indicate a period of use concentrated in the 16th and 15th century BC (fig. 5.9).[59]

58 For the sample from Dodewaard see above, for Elp (house 11 or 12) see Waterbolk 1964, 1989; 1987 and Lanting & Van der Plicht 2003, 159. For Emmerhout (house 11) see Van der Waals & Butler 1976, 56 and Lanting & Van der Plicht *loc. cit.*, who challenge the structural interpretation of house 11. For Meteren - De Bogen see Meijlink 2002a, 47 and Hielkema, Brokke & Meijlink 2002, 145; 149 and for Tiel - Medel 8 see Van Hoof & Jongste 2007, 40. See also Crombé *et al.* 2005, 99 and Annaert 2008, table 1 for Belgian examples of early *terminus post quem* dates.

59 For context of the samples see Schoneveld 2002b, 252 table 10.1. The youngest sample contained insufficient collagen (*ergo* bone submitted; GrA-16182) and is discarded by Schoneveld (2002b, 251). Remarkably, according to Lanting & Van der Plicht (2003, 189) this sample consisted of organic residue on a sherd (although no residue was observed on sherds from this finds-number). Due to these problems, the sample is best discarded.

Date	Site	Context	Reference	Reason(s) for possible dismissal
GrN-9967 3130 ± 70 BP	Deventer - Margijnen Enk	charcoal from pit 'in' house	Lanting & Mook 1977, 125	Presumed *t.p.q.*, also MBA-B data for pit available, house typology
GrN-4171 3230 ± 80 BP	Elp	cereals from pit 'in' H11	Waterbolk 1987, 200	Presumed *t.p.q.*, association between pit and house questionable, pit was assigned to two houses (H11, H12) (Lanting & Van der Plicht 2003, 159) house typology
GrN-5266 3105 ± 65 BP	Elp	cereals from pit 'in' H8	Waterbolk 1987, 200	Presumed *t.p.q.*, association between pit and house questionable, pit was assigned to houses H11 and H6/7 (Lanting & Van der Plicht 2003, 159) house typology
GrN-5588 3320 ± 60 BP	Emmerhout	cereals from pit 'in' H11	Van der Waals & Butler 1976, 56	Presumed *t.p.q.*, association between pit and house questionable, house reconstruction questioned (Lanting & Van der Plicht 2003, 159)
GrN-5935 3430 ± 45 BP	Dodewaard	charcoal from posthole H1b	Theunissen & Hulst 1999a, 139	Presumed *t.p.q.*, house typology no HVS-style ceramics in excavation
GrN-6745 3325 ± 65 BP	Hijken - Hijkerveld	charcoal from pit 'in' H4	Harsema 1991, 27	Presumed *t.p.q.*, house typology, other houses dated to MBA-B
AA-37511 3510 ± 40 BP	Meteren - De Bogen	charcoal from posthole 30E/BH	Meijlink 2002a, 47	Presumed *t.p.q.*, feature assigned to two houses (30EH and 30 BH) house typology
AA-37515 3445 ± 50 BP	Meteren - De Bogen	charcoal from posthole 30AH	Meijlink 2002a, 47	Presumed *t.p.q.*, house typology
AA-37501 3360 ± 45 BP	Meteren - De Bogen	charcoal from posthole 45HH	Meijlink 2002a, 47	Presumed *t.p.q.*, two additional MBA-B dates available, possibly end MBA-B funerary structure
AA-37504 3185 ± 40 BP	Meteren - De Bogen	charcoal & cereals posthole 45AH	Meijlink 2002a, 47	Presumed *t.p.q.*, posthole possibly not part of house
AA-37497 3270 ± 60 BP	Meteren - De Bogen	charcoal from posthole 45BH	Meijlink 2002a, 47	Presumed *t.p.q.*, two additional MBA-B dates available, house typology
AA-37497 3270 ± 60 BP	Tiel - Medel 8	charcoal from posthole H8	Van Hoof & Jong-ste 2007, 40	Presumed *t.p.q.*, possibly extension phase of MBA-B house(s) 1(a;b), no HVS-style ceramics in excavation
GrN-11973 3240 ± 30 BP	Andijk	bone from ditch around H19	Lanting & Van der Plicht 2003, 185	Bone pre-treated with preservative, stratigraphy and associated ceramics argue for (end) MBA-B date
GrN-11974 3230 ± 30 BP	Andijk	bone from ditch around H7	Lanting & Van der Plicht 2003, 185	Bone pre-treated with preservative, stratigraphy and associated ceramics argue for (end) MBA-B date
GrN-11975 3265 ± 30 BP	Andijk	bone from ditch around H7	Lanting & Van der Plicht 2003, 185	Bone pre-treated with preservative, stratigraphy and associated ceramics argue for (end) MBA-B date
GrN-11976 3165 ± 30 BP	Bovenkarspel - Het Valkje	bones from ditch around H11	Lanting & Van der Plicht 2003, 185	Sample context and type (combined samples), bone presumably treated with preservative, house assumed MBA-B
GrN-14677 3060 ± 100 BP	Wijk bij Duurstede - De Horden	charcoal from post-hole H5 (=pit, not H5)	Hessing 1991, 51; Lanting & Van der Plicht 2003, 188	Context wrong, pit dated (Appendix IV)
GrN-16516 3185 ± 35 BP	Loon op Zand	charcoal from pit 'in' house	Roymans & Hiddink 1991, 114	Presumed *t.p.q.*, yet low feature density assumed MBA-B age (DKS(2) pottery)

Table 5.2 Samples from Dutch three-aisled Bronze Age houses whose calibrated range extends into the Middle Bronze Age-A.

Date	Site	Context	Reference	Reason(s) for possible dismissal
GrN-27566 3170 ± 60 BP	Oss - De Geer	charcoal from hearth (?) H1	Jansen & Van Hoof 2003, 43	Presumed *t.p.q.*, yet low feature density
AA-52384 3245 ± 50 BP	Breda - Huifakker	charcoal from posthole H5	Brandenburgh & Kooistra 2004, 33	Presumed *t.p.q.*, house typology

Table 5.2 (continued) Samples from Dutch three-aisled Bronze Age houses whose calibrated range extends into the MBA-A.

The diversity of sample types (charcoal, bone, residue) and their distribution (Schoneveld 2002, 252 fig. 10.1) and contexts (from the residual gully as well as from various pits), argues against an inherent bias. Nonetheless, as all dates are indirect, they cannot be used as definitive proof for the emergence of the three-aisled building tradition in the last centuries of the Middle Bronze Age-A.

Another case of an indirectly indicated possible early start of the three-aisled building tradition is Oss - De Geer (Jansen & Van Hoof 2003; 2004). There, in an area of relatively few other traces, a small (max. 15.3 m long) three-aisled structure was recognized (fig. 5.10, C).

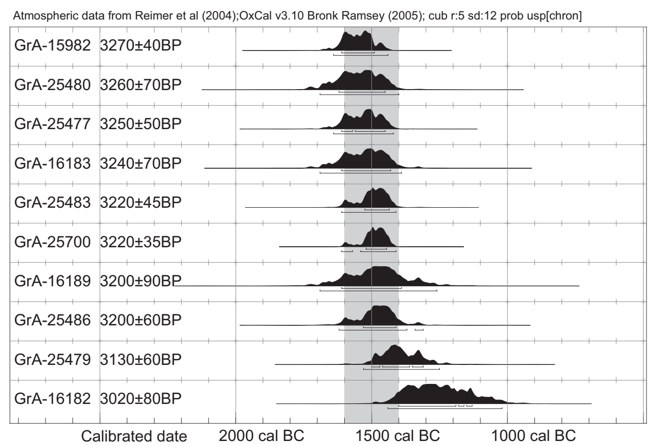


Fig. 5.9 Oxcal 3.10 plot for the Middle Bronze Age samples from Lienden – Kesteren (after Schoneveld 2002, 252 Table 10.1).

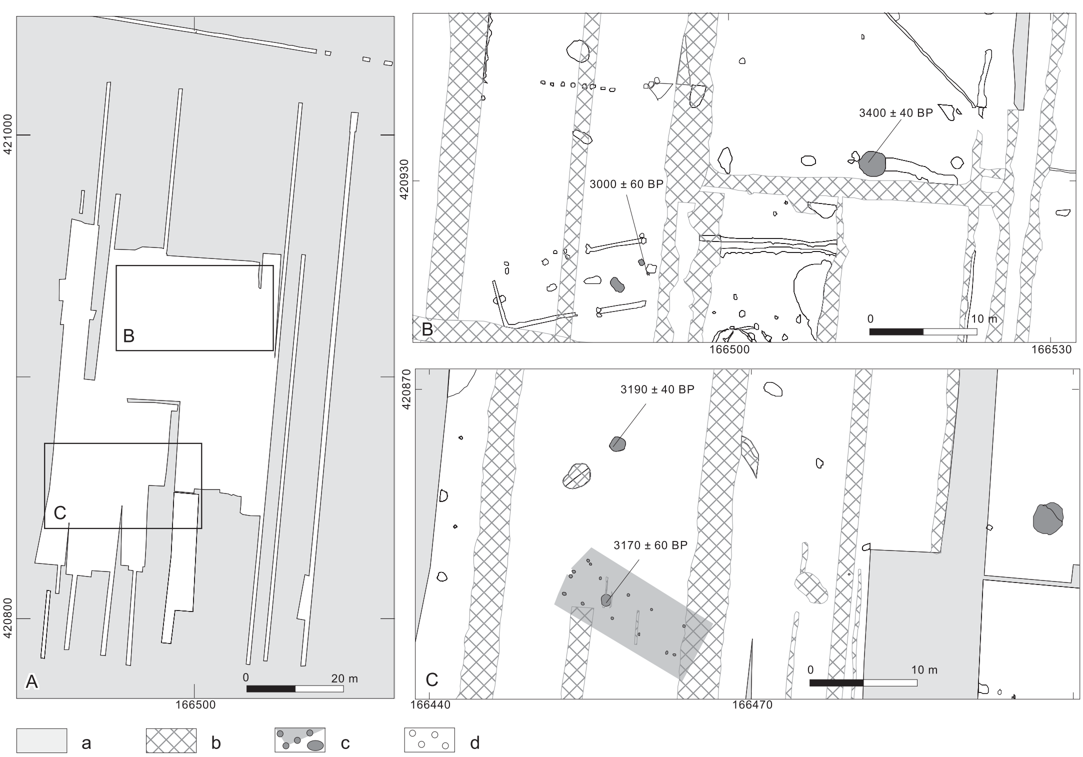


Fig. 5.10 Bronze Age features at Oss - De Geer (A: overview, B: location near house, C: location of well and cremation grave).
a: not excavated b: recent disturbances, c: features attributed to the Bronze Age, d: other features.

Charcoal from a centrally located pit was radiocarbon dated to *c.* 1610-1300 cal BC and charcoal from a nearby silo to *c.* 1540-1390 cal BC.[60] Although it is tempting to interpret these remains as a relatively early Middle Bronze Age occupation phase with a three-aisled house, some caution is necessary. In the northern part of the excavation (fig. 5.10, B), a well was found that may well pre-date the southern occupation, as well a cremation grave that clearly post-dates this phase.[61] This suggests that Bronze Age settlement traces are discontinuous and rather widespread over the landscape here, and that the option of accidental overlap of later structures and older features cannot be ruled out. The precise location of the pit between the roof-bearing posts may suggest that this was, however, not the case here.

Direct dates: Middle Bronze Age houses dated by construction wood

Fortunately, the sometimes excellent organic- and feature preservation conditions of the Dutch river area have yielded a number of direct dates (*i.e.* construction wood dated) for three-aisled Bronze Age buildings. Although at this point it is still a rather limited data set (ten dates for five houses at two sites), these dates are the best indications yet for the earliest construction of Dutch three-aisled Bronze Age farmhouses (fig. 5.11 and table 5.3).[62]

Based on the data as listed in table 5.3, the oldest date for a three-aisled house concerns the house from Rumpt - Eigenblok site 4, which is dated to *c.* 1520-1425 cal BC.[63] The other direct dates support the interpretation that the construction of Dutch three-aisled Bronze Age farmhouses is well documented from the very start of the 15th century BC onward (*infra*).

Date	Site	Context	Reference	Remarks
Ring-1276 1421 ± 5 BC	Zijderveld (outer ring 1437 BC)	Oak post house 3	Knippenberg & Jongste 2005, 12	*T.ad.q.*, more dates available (*infra*)
Ring-1272 1396 ± 6 BC	Zijderveld (outer ring 1416 BC)	Oak post house 3	Knippenberg & Jongste 2005, 12	*T.ad.q.*, more dates available
GrN-28929 3120 ± 30 BP	Zijderveld	Alder post house 3	Knippenberg & Jongste 2005, 12	*T.ad.q.*, more dates available (Oxcal 3.10, 2σ; 1460-1310 cal BC)
GrN-28932 3025 ± 30 BP	Zijderveld	Alder post house 3	Knippenberg & Jongste 2005, 12	*T.ad.q.*, presumably repair, more dates available (*supra*) (Oxcal 3.10, 2σ; 1400-1310 cal BC)
GrN-25344 3160 ± 25 BP	Rumpt - Eigenblok 2	Alder post house	Jongste 2002a, 35	*T.ad.q.* (Oxcal 3.10, 2σ; 1495-1395 cal BC)
GrN-25342 3210 ± 25 BP	Rumpt - Eigenblok 4	Alder post house	Jongste 2002a, 35	*T.ad.q.* (Oxcal 3.10, 2σ; 1450-1310 cal BC)
GrN-23647 3165 ± 15 BP	Rumpt - Eigenblok 5	Alder post house	Jongste 2002a, 35	*T.ad.q.*, other date available (*infra*) (Oxcal 3.10, 2σ; 1495-1410 cal BC)
GrN-23646 3155 ± 15 BP	Rumpt - Eigenblok 5	Alder post house	Jongste 2002a, 35	*T.ad.q.*, other date available (*supra*) (Oxcal 3.10, 2σ; 1495-1400 cal BC)
GrN-24391 3100 ± 50 BP	Rumpt - Eigenblok 6	Alder post house 2	Jongste 2002a, 35	*T.ad.q.*, other date available (*infra*) (Oxcal 3.10, 2σ; 1500-1210 cal BC)
GrN-24392 3040 ± 25 BP	Rumpt - Eigenblok 6	Alder post house 2	Jongste 2002a, 36	*T.ad.q.*, other date available (*supra*) (Oxcal 3.10, 2σ; 1400-1210 cal BC)

Table 5.3 Direct dates for Dutch three-aisled Middle Bronze Age farmhouses.

60 GrN-27566: 3170 ± 60 BP and GrN-27158: 3190 ± 40 BP respectively; Jansen & Van Hoof 2003, 43-46.

61 GrN-271158: 3400 ± 40 BP (wooden post in well) and GrN-19971: 3000 ± 60 BP (cremation grave cross-cut by Roman period farm; Jansen & Van Hoof 2003, 45-47).

62 For details on the location of the dated posts see Chapter 3, section 3.4.2 and Appendices I-II.

63 GrN-25342: 3210 ± 25 BP; Jongste 2002a, 35; Hielkema, Prangsma & Jongste 2002, 119.

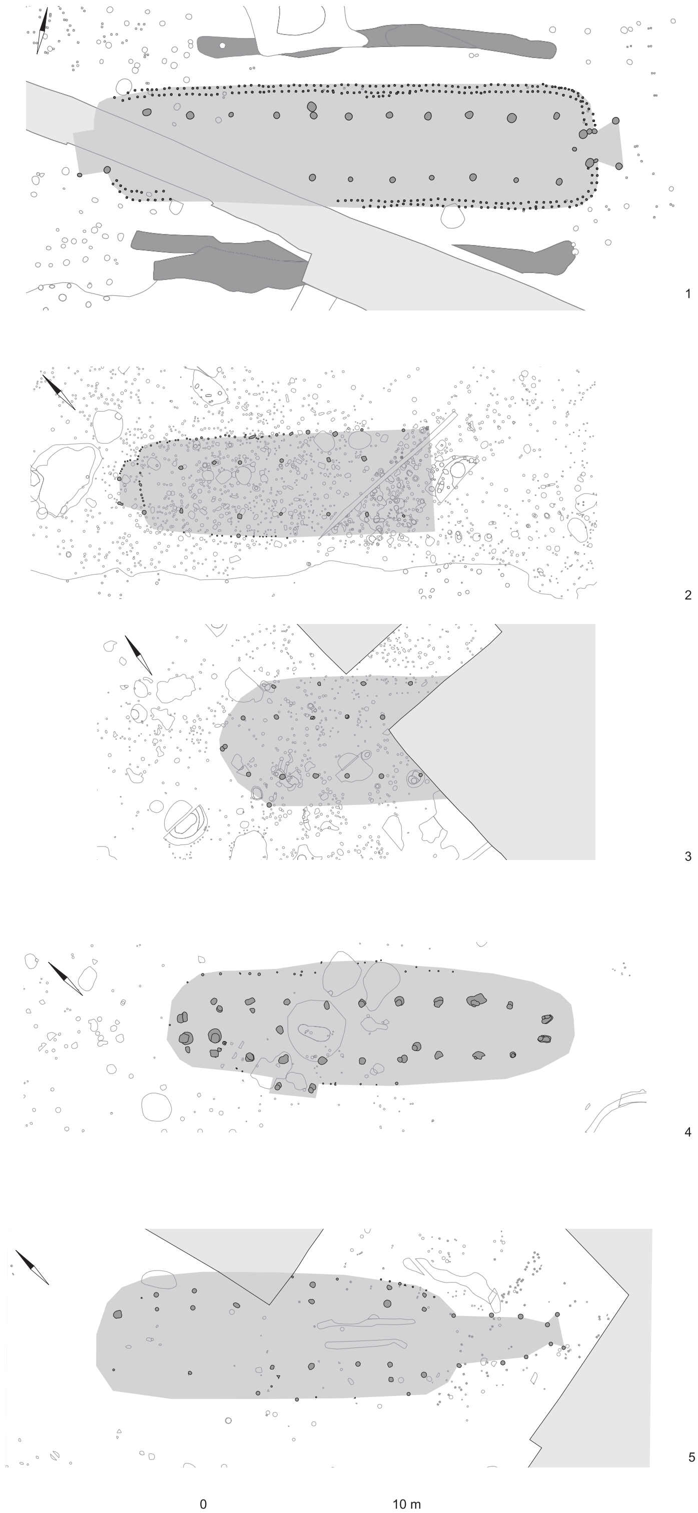


Fig. 5.11 Directly dated three-aisled Bronze Age house-plans (1: Zijderveld house three, 2: Eigenblok house two, 3: Eigenblok house four, 4: Eigenblok house five, 5: Eigenblok house two at site 6).

On the usefulness of indirect dates

In light of the limited number of direct dates, it is necessary to consider to what extent the overall numbers of radiocarbon dates from Bronze Age settlement sites in the Netherlands are useful in establishing a general date for three-aisled farmhouses. Generally speaking, a substantial number of radiocarbon dates from Dutch Bronze Age settlement site is known (nos. > 350), although only a part (*c.* 150) of these have been executed with the intent to date Bronze Age post-built structures such as houses and outbuildings. If this dataset is reduced to only those samples submitted with the objective to date Bronze Age houses (*c.* 110 dates), these dates seem to cluster around 3150 to 3050 years BP (fig. 5.12). The dates with BP dates between 3200 and 3000 yrs BP make up over 65 % of all available dates.

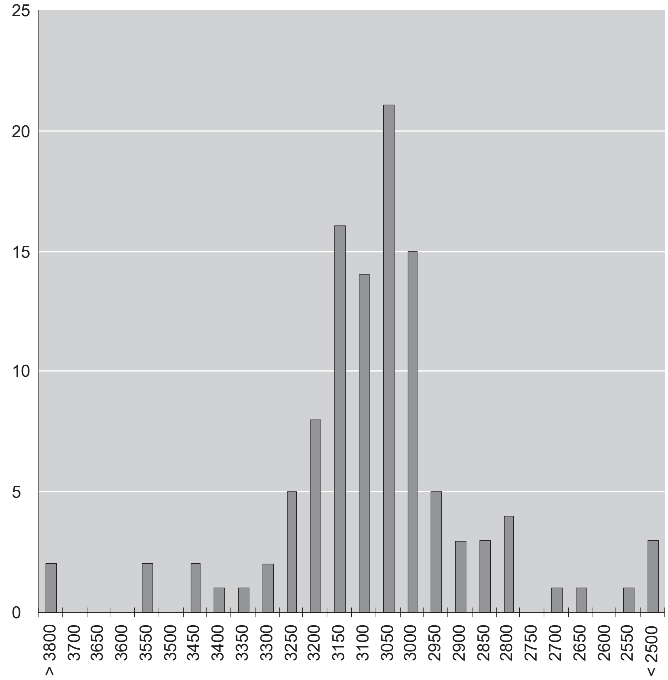


Fig. 5.12 Histogram of BP age classes by 50 year interval for Dutch radiocarbon dates taken with the objective to date houses (n = 110). Note the peak between 3150 and 3050 years BP.

The peak observable in the distribution diagram may be related to the better recognizability of the three-aisled longhouse because of the more regular placement of the roof-bearing posts (see below). As houses became more recognizable, they are more frequently sampled for radiocarbon dating and thus an accumulation of dates in a given period (as shown by fig. 5.12) emerges. If this is also the case here, the peak between 3150 and 3050 BP (and the approximated calibrated range of *c.* 1530 to 1130 cal BC),[64] may relate to this typical three-aisled farmhouse. Thus the three-aisled farmhouse may be expected to have been current during this period.[65]

There is, however, significant difference in sample quality and association between the various dates combined into fig. 5.12. Samples with large standard deviations of their BP ages and the samples with uncertain contexts may have unnecessarily broadened the date-range as depicted in fig. 5.12. To asses such distortions, a discussion and comparison of the dates of different quality is necessary.

A classification of Dutch Bronze Age radiocarbon dates from Bronze Age settlement sites

In the inventory of radiocarbon dates compiled for Dutch Bronze Age settlement sites, all samples have been ranked individually based on their sample reliability and context reliability. These two factors combinedly determine the overall reliability of the sample (see table 5.4). By assigning integer values to both sample and context reliability, the sum of both could be used – with minor individual corrections – to create four broad classes of sample reliability.

Class A comprises the direct dates on construction wood. Classes B to D all concern indirect dates, but distinctions can still be made between samples with good sample types and locations (Class B), dates with moderate sample types and locations (Class C) and samples of poor type and location (Class D).[66]

A diagram with radiocarbon dates for Dutch Bronze Age houses according to the classes A to D introduced above, illustrates that indeed the samples of lowest quality create the broad dating of the three-aisled farmhouse (fig.

64 The mean standard deviation for all house samples is *c.* 47 yrs BP, to stay on the safe side, here the calibrated range is based on Oxcal 3.10 calibrations of 3150 ± 50 BP (1530-1300 cal BC) and 3050 ± 50 BP (1430-1130 cal BC) is used.

65 See Bourgeois and Arnoldussen (2006, esp. 21 fig. 6) for a figure showing the 2σ calibrated ranges for dates from Dutch Bronze Age settlements sites (comprising 133 samples intended to date houses, fences or outbuildings), in which the peak around 3150 BP is also visible, but now in calibrated ages.

66 The boundaries between classes B-C and C-D were put at values 4 and 3 respectively, after corrections.

Type	Value	Contents / Examples
Sample reliability	0	sample unknown, dated material unknown
	1	wood or charcoal, unknown or unspecified, bulk samples
	2	outer growth rings of wood or charcoal of known species
	3	short-lived botanical material (cereals, twigs, bones, shells)
	4	AMS dating of short-lived botanical material
	5	dendrochronological dating of wood
Context reliability	0	erroneous, unknown or very unlikely association
	1	no reliable association (*e.g.* sample from “a pit” or “a sample” that dates a phase)
	2	questionable association (*e.g.* sample from “pit inside a house” or “sample from a posthole” to date a house)
	3	reasonable association, but with possible problems (unspecified or less ideal sample, but from certain context; *e.g.* oak posts without outer rings used to date a house)
	4	good association (*e.g.* outer rings of construction wood dated, willow from wattle work dated, bones from grave dated; direct association)

Table 5.4 Categories of sample reliability and context reliability.

5.13). The dates of classes A and B are confined to between 3200 and 3000 BP,[67] whereas many older and younger dates are only present in the two lowermost classes. This observation indicates that the directly dated samples may indeed provide an adequate starting-point for the three-aisled building tradition. Had this building-tradition started much earlier, one may have suspected the distribution of the age classes for categories B, C and D to be situated much more to the left (and be better represented) of the distribution of class A.

This interpretation of the distribution of the BP ages must be supported by the calibrated date ranges of the data. Elsewhere I have shown (with a slightly smaller dataset; Arnoldussen & Fontijn 2006, 295 fig. 5 and Appendix 1) that indeed for classes A and B no calibrated dates prior to *c.* 1520 cal BC yet exist for Dutch three-aisled Bronze Age farmhouses (*cf.* Lanting & Van der Plicht 2003, 158).[68]

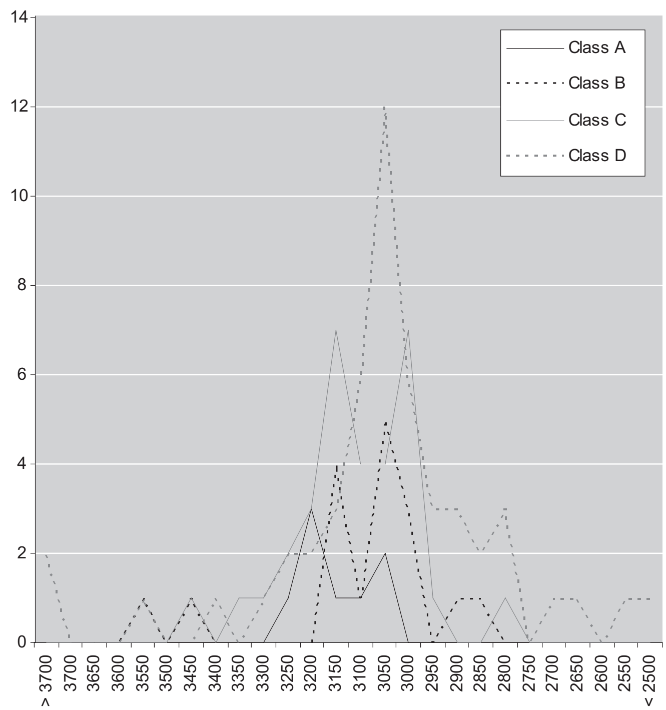


Fig. 5.13 Histogram indicating the number of dates in 50 year BP classes for Dutch Bronze Age houses, by quality classes (A: best, to D: worst, n=108).

Having indicated a plausible starting point for the tradition of three-aisled Bronze Age farmhouses, a few remarks on its assumed end date are in place. In short, the three-aisled building tradition continues throughout the Late Bronze Age (see section 5.2.4) and into the Early Iron Age (*c.* 800-600 cal BC), although frequently Early Iron Age farms have ridge-posts that give it a four-aisled appearance.[69] As I will argue later-on, significant changes in the building tradition occur at the end – or after – the Late Bronze Age. Houses are frequently much smaller, have a rectangular instead of rounded rectangular outline and the main entrances are situated in the short sides. In addition, much more of the roof-burden is carried by posts placed outside (or near or inside) the house’s wall ditch. So, despite a ‘technical

67 The single date in class B prior to 3200 is the dating of Eigenblok house 4 (see table 5.3) and the single date after 2900 is a Late Bronze Age three-aisled house from Tiel (Poz-16714: 2815 ± 35 BP; Van Hoof & Jongste 2007, 41, *cf.* fig. 7.15, B. House 10 is the house with the pits in the side aisle). Note that the two direct dendrochronological dates have been omitted for class A.

68 As calibration is dependent on curves and the calibration software used, no full overview of all dates with their standard deviation in BP and two sigma calibrated ranges is offered here. A file with full details of all dates is available upon request.

69 Roymans & Fokkens 1991, 9; Huijts 1992, 67-72; Schinkel 1994, 42-44; Lanting & Van der Plicht 2003, 165-168, *cf.* fig. 5.31.

continuity' of a three-aisled roof-bearing structure, this may have been perceived of as a radically different building tradition by the occupants themselves.

5.2.3.2 The typology of Dutch Middle Bronze Age farmhouses

After having established the rough chronological framework for Dutch Bronze Age farmhouses, it is important to take a more detailed looked at their typology. As typologies are prone to (mis)use as typochronologies, the system by which prehistoric structures are classified should be as explicit and precise as possible. First, let us consider the traditional typology of Bronze Age farmhouses.

The traditional Dutch Middle Bronze Age farmhouse typo(chrono)logy

After the excavations at Elp and Emmerhout, Van der Waals & Butler (1976) introduced the two eponymous house types, based on Emmerhout houses 1 and 13 (*cf.* fig. 5.17 and fig. 5.23; Lanting & Van der Plicht 2003, 158). The Emmerhout type was dated by Huijts (1992, 37) to the Middle- and Late Bronze Age. Characteristic elements are the fact that inner- and outer- posts of similar size and depth supported the rafters (table 5.6; Huijts 1992, 37-54). If rafters from both farmhouse sides met at the top, this is called a 'full' or 'true-' portal construction. If rafters were tied individually to a ridge-beam, this is called a half-portal construction (*op. cit.*, 45). With the Elp type (Butler 1969, 70-74; Huijts 1992, 55-63), a larger number of inner posts are found, that may have been interconnected lengthwise, as these are no longer paired individually with outer posts.

Harsema (1993b; 1997a) argued that farmhouses of the 'Emmerhout'-type without indications for indoor stalling (as he reconstructed stalling to have occurred in separate outbuildings), should be labelled houses of the 'Angelslo' type (Harsema 1997a, 150) and that these preceded the Emmerhout-types (*i.e.* prior to *c.* 1400 cal BC; Harsema 1993b, 107). As this proposition has been challenged for being dependent on the archaeological visibility of stalls (Fokkens 2001, 255) and for problems with its assumed dating (Lanting & Van der Plicht 2003, 158), the Angelslo-type is not generally accepted.[70]

Farmhouses of the Oss-type, based on a find near Ussen (Vasbinder & Fokkens 1987), are not dissimilar to the Emmerhout-type in the fact these also show a pairing of inner and outer posts (Fokkens 2001, 254). With these farmhouses, however, no evident traces of stall partitions have been recognized.[71]

In her analysis of interregional settlement patterns, Theunissen (1999, 192-193) acknowledged two additional types of roof-bearing structures, of which the farmhouses from Blerick (Schotten & Machiels 1994; Theunissen 1999, 121) and Zijderveld, Dodewaard and Wijk bij Duurstede were examples. Thereafter, the example from Blerick has been used to designate a 'Blerick-type' (*e.g.* Hielkema, Brokke & Meijlink 2002, 254), whereas Fokkens (2001, 253-254) has classified the latter houses as representing the 'Zijderveld-type'. Farmhouses of the Zijderveld type have, according to Fokkens, a broad chronological (*c.* 1800-800 cal BC) and geographical scope, as houses of this type are found in the river area, the coastal area and the West-Friesland inverted creek areas. Essentially, this type entails houses with two instead of four longitudinal rows of roof-bearing posts.

Objections to the traditional typology

Although the traditional house-types serve as a convenient shorthand for describing some types of Middle Bronze Age farmhouses, some objections may be voiced. First of all, it should be stressed that the boundary between typology and typochronology is frequently crossed. Houses of the Elp type are thought to continue later than those of the Emmerhout-, Zijderveld- and Oss-types.[72] The number and quality of the dates on which the assumed dating is based is still low and should be backed-up by more, and more direct, dates in the future.[73]

70 In addition, round houses are no longer accepted (for a discussion see Theunissen 1999, 180-185; Fokkens 2001, 256, *cf.* fig. 5.57).
71 Most small trenches are situated within the centre-aisle and represent partition walls rather than livestock stalls (Fokkens 2001, 254, but see Roymans & Kortlang 1991, 115 fig. 4).
72 Huijts 1992, 37-63; Schinkel 1994, 11; Fokkens 2003, 13 fig. 2; Lanting & Van der Plicht 2003, 158-160.
73 For an overview of the 2002 situation see Lanting & Van der Plicht 2003, 158-160.

Type	References	Characteristics
Emmerhout (MBA-B - LBA)	Huijts 1992, 37-54; Fokkens 2001, 255	Inner- and outer posts of similar depth and size formed half- or true-portals; they correspond on a one-to-one basis A wall (of stakes, planks or larger posts, possibly encased in sods) was situated outside the outer posts Ridge-posts of limited depth occur occasionally, that may have supported rafters or a ridge-beam Both short sides are generally rounded, entrances occur in short and long sides The houses are marked by a threefold lengthwise functional division, with the stalls in the central part
Elp (end MBA-B LBA)	Huijts 1992, 55-66; Fokkens 2001, 256	Inner- and outer posts are of similar depth and size, but many more inner posts than outer posts are found. Less and less regularly spaced outer posts. Plates and - more frequent - half-portals interconnected near the ridge-beam (or true portals) occur Seldom ridge-posts, a two-fold lengthwise division with extra inner posts in byre Entrances opposed halfway in long sides, sometimes also at short ends
Oss (Ussen 1A) (MBA-B)	Schinkel 1994, 36; Fokkens 2001, 254	Inner- and outer posts of similar depth and size formed half- or true-portals; they correspond on a one-to-one basis. Wall materials unknown. Ridge-posts of limited depth occur occasionally, that may have supported rafters or a ridge-beam Entrances opposed in long sides, sometimes in short sides Sometimes partitioning walls are preserved in the centre-aisle Much variation in short-side house shape
Zijderveld (MBA)	Fokkens 2001, 253-254	Two rows of roof-bearing posts placed opposite each other, suggesting a cross-beam connection (truss) [74] Frequently an irrregular line of possible ridge-posts, no stalls visible. Entrances in the short-sides marked by more closely-set posts 'entrance portals' and eaves-drip gullies near the long side common repairs sometimes visible, in West-Friesland frequent extension phases.

Table 5.5 Traditional Dutch Middle Bronze Age farmhouse typology.

Secondly, the traditional typology has strong geographic connotations. Elp- and Emmerhout types are thought to be confined to the north-eastern sandy soils of the Netherlands (*cf.* Van Beek 2001, 107 fig. 6.5), whereas Zijderveld types are thought to be typical of the Holocene areas (Fokkens 2001, 253) and Oss-types of the southern coversand areas. Although this pattern in general still holds true (see below), it belies much of the regional variability and it should be periodically reconsidered which types are dominant in what period within which region.

Thirdly, and most fundamentally, many of the criteria involved in classification (*e.g.* the presence of stalls, entrances and shapes of the short sides; table 5.6) are severely affected by feature preservation. In less desirable preservation conditions, an Emmerhout-type farm is perhaps not that much unlike an Oss-type farm (*infra*, *cf.* fig. 5.14). Likewise, how is one to classify houses from the southern coversand areas where only two rows of roof-bearing posts have been preserved?[75]

To avoid entrenchment in typological debates (*e.g.* Harsema 2002), I suggest that a classification system based primarily on the roof-bearing structure, which has the best changes of archaeological survival, is required. Such a classification system is essentially descriptive in nature and only the first step towards more developed typochronology. Moreover, classifications done in this way are fundamentally etic in approach. It will not inform us on past meanings of particular constructional features, nor on the relative importance of types (*e.g.* is this a highly particular or a very common configuration?) of individual plans as such. It is a methodology for systematic descriptions and analyses. Nonetheless, it is a fundamental first step in approaches that aim to assess the chronology, regional variability and representativeness of specific house types. In contrast to the traditional approaches, it allows to query data sets of house plans for specific structural elements (*e.g.* entrance portals), for which the correspondence to other elements, the dating and the representativeness can thereafter be quantified on different regional scales. This allows to unravel the sets of characteristics that are instrumental in the traditional typo(chrono)logies and to test whether these indeed show most correspondence. Such a full correspondence analysis is however specifically not the

74 Although the paired placement of the posts in these (A; see below) types of houses may indicate a cross-or tie-beam, there is no reason why tie-beams may not also have been present in houses with a type B (see below) roof-bearing structure (*cf.* Harsema 1995, 38).
75 *E.g.* Berkvens, Brandenburgh & Koot 2004, 62-63; Dautzenberg, De Koning & Vaars 2002, 15-16.

aim of this section.[76] Rather, the more systematic classification of Bronze Age types of house plans serves here only to outline whether there is regional variation in house plans between different geogenetic regions in general, and in particular, what the position of the house plans from the river area are in that respect.

A preliminary typology of Middle Bronze Age(-B) farmhouses
The proposed typology – based primarily on the roof-bearing structure – allows to differentiate houses at their most basal level in the number, placement and longitudinal regularity of the lines of roof-bearing posts (fig. 5.14).[77] The most fundamental distinction is between houses with two (A) and houses with four (B) lines of roof-bearing posts. Within the first group, houses with straight (A1) and ovoid- to cigar-shaped placement (A2) of the two lines of roof-bearing posts can be differentiated. The houses with four lines of roof-bearing posts do (B2) or do not (B1) show longitudinal divisions, but both can be further subdivided by the placement of outer versus inner posts. A true-portal construction may be identified as B1a or B2a, a regular half-portal construction as B1b or B2b. In addition, regular off-set outer posts (B1c) can be differentiated from irregular half-portals (B1d). These different types of roof-bearing frames have different frequencies of occurrence in the different regions (see table 5.6), but essentially all Middle Bronze Age(-B) farms are three-aisled. It seem unlikely that the usage of farms in which four or two rows of roof-bearing posts were used differed fundamentally. In addition, while posts placed on a farmhouse's central axis do occur (*infra*), they do not seem to have led to four-aisled longitudinal divisions of floor space.

The visibility of wall construction types is strongly dependent on feature preservation.[78] Therefore, wall construction should be described in addition to, and not as part of, main typological criteria. Walls may be single (W1) or double (W2) lines of stakes that indicate the use of wattle-work. Larger posts (W3), or doubled posts (W4) may also have been used. Finally, the use of posts (W5) or planks (W6) may be documented or no wall construction may be visible at all (W0).

Like with the wall, a diverse number of additional architectural elements can be identified, of which some are also suspected to have poor archaeological visibility, such as dividing walls (DW) and stall partitions (ST). Some elements of possibly better archaeological visibility such as entrance portals (EP), elaborate entrance portals (EEP) and ridge-posts (RP) must also be described *in addition to* and not as an integral part of houses-types, since their association has not yet been systematically investigated and they may occur with different types.

For explanatory purposes, typical schematic farmhouse ground plans for a number of sites or regions have been classified according to this scheme (fig. 5.14, lowermost section). By using this or similarly structured typologies, Bronze Age houses can be accurately described, and the associations of different elements systematically investigated. It also allows better determinations of chronological and regional variations, as the available dates for individual elements or their association may be compared. Thus, typology may eventually lead to a regionally sensitive typochronology.

Problems and limitations

The classificatory scheme as represented in figure 5.14 may aid systematic discussion and analysis of the distribution of different types of Dutch Middle Bronze Age farmhouses, but it also has several limitations. One obvious pitfall is that not all discovered house plans may fall in presently defined categories. Therefore, an analysis of classificatory representativeness is necessary. At present, *c.* 88 % of the sufficiently reliable and published Middle Bronze Age house plans could be classified with sufficient certainty.[79] The remaining category consists predominantly of plans mentioned, but not published in detail (*c.* 4 %) or houses suspected to be of a Late Bronze Age age (*c.* 4 %). For a number of house plans that cannot be classified unambiguously see figure 5.18. The frequently low numbers

76 Although it may provide a suitable methodology to test the traditional typo(chrono)logy or compile alternative typo(chrono)logies, provided that sufficient reliable dates are available.
77 A comparable approach was followed by Laloo (2004, chapter 5), who distinguished half-portal (type B, see below), boat-shaped (type A_(E)EP, see below) and a Danish type with roof-bearing walls (type A_W3, see below).
78 See Harsema 1995, 37 for a notable case.
79 From an inventory of 257 house plans, 212 could be considered reliable and usable Middle Bronze Age house plans. Of these, 187 (88 %) could be classified by roof-bearing structure and 135 (63 %) by roof-bearing structure and additional characteristics (wall type and/or additions such as entrance portals, stalls, dividing walls *et cetera*).

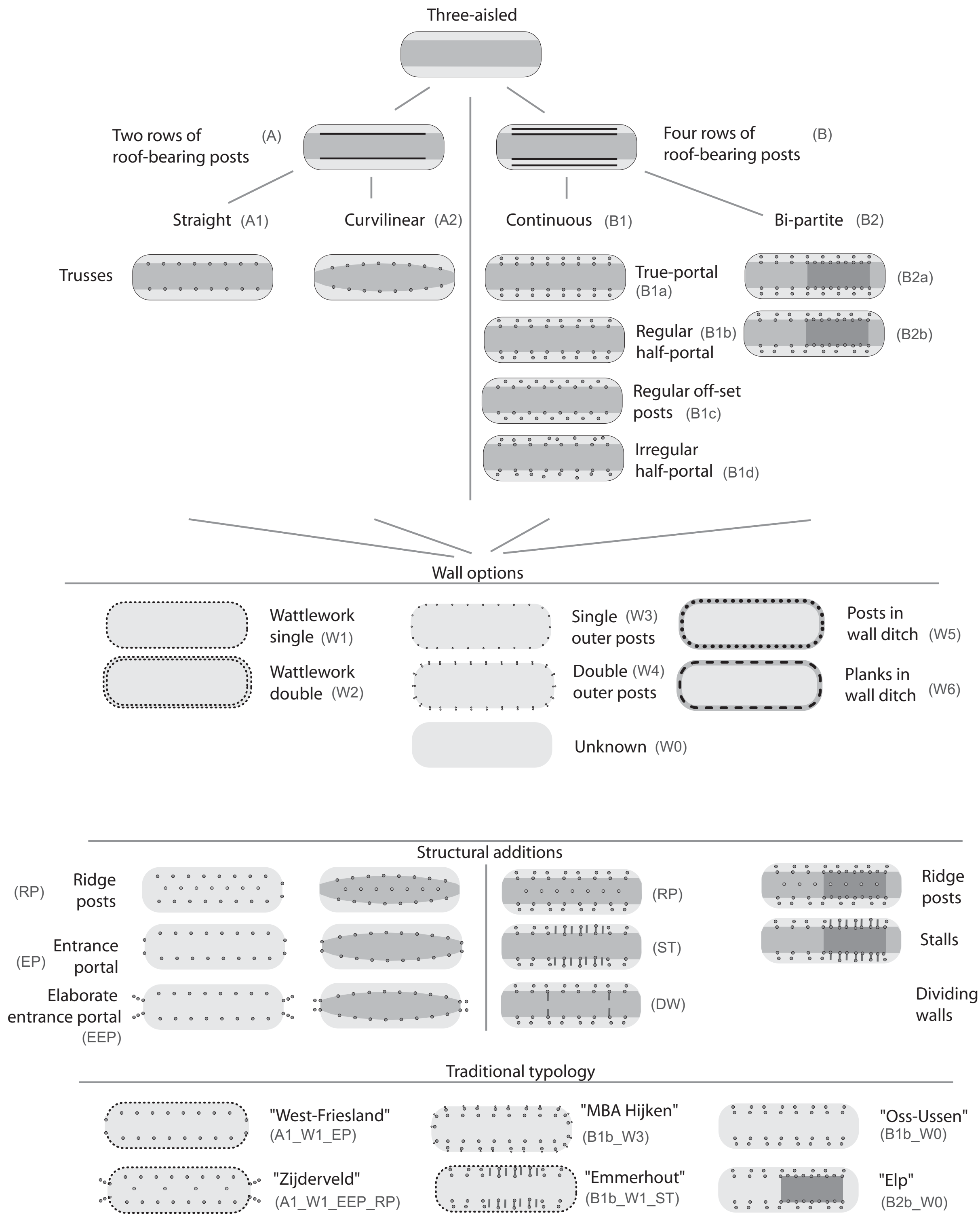


Fig. 5.14 Middle Bronze Age house typology: a descriptive and codified (between brackets, dark grey font) system for describing Middle Bronze Age house plans. The topmost section describes the roof-bearing structures and the second section described wall options. Structural additions are listed in the third section. 'Traditional' types are indicated as examples in the lowermost section.

of currently documented specific associations of architectural traits may not have yet led to the introduction of a specific class, while future research may show the validity thereof. The present typological scheme should therefore be considered preliminary and open to revisions or extensions.[80] For instance, Middle Bronze Age farmhouses that widen significantly in span from one short side to the other have been documented for class A1 (Oss - De Geer; see fig. 5.10) and B1b (Verlinde 1991a, 33 fig. 2), but their numbers are as yet too low to encode these as different classes of roof-bearing frame shape.

To classify house plans primarily by the shape of the roof-bearing structure is sometimes also problematic. Ridge posts, for instance, may have carried a significant part of the roof-burden. As these are not unique to specific types, nor always present and their depth and location within the plan is frequently different, their function is mostly unclear. Consequently, these have been provisionally classed here as architectural additions. Should future research point out that with some types ridge-posts are invariable and veritable roof-bearing elements, such a type may be promoted to a top-level (*e.g.* A, B, C) class.

A similar problem may occur with 'entrance portals', which are sets of roof-bearing posts at the short sides of the roof-bearing frame that are characterized by a distinctly more narrow span. For various farmhouses, such an entrance portal is equated with a farmhouse entrance.[81] For West-Friesland and the Dutch river area, frequently preserved walls do indicate that these indeed were entrances. For the north-eastern coversand and northern boulder-clay areas, this is not as clear. Although there 'entrance portals' do occur and are also interpreted as entrances,[82] it is not always clear whether such claimed entrance portals were indeed always entrances. Especially with houses comparable to those from Hijken (that may represent a 'Hijken' (B1b_W3) type?) [83] and Elp, short-side entrances may have been present, but frequently cannot be identified with certainty. To complicate matters even more, some examples of houses with entrance portals have been found where the wall-line actually continues across the location of a possible entrance portal (*e.g.* fig. 5.15, no 1).[84] As in the north-eastern areas entrances are sometimes outlined by the presence of extra posts, the recognition of entrances is not impossible, but frequently tentative. Feature preservation is also generally inadequate to trace (interruptions in) wall lines.

Feature preservation may moreover affect different parts of houses differentially. Architectural elements that need not have relied on deeply dug-down posts are the first to become archaeologically invisible. For instance, the apparent shape of the short sides (and the discussions on gabled and hipped roofs based on these) may be severely distorted by such differential preservation. Therefore, the shape of the short side is not a classification parameter in the scheme suggested above. One should, for example, keep in mind that the southern Dutch 'rectangular houses' of the Oss-Ussen type (B1a/B1b) may have had equally rounded short sides as their northern Dutch 'Emmerhout'

80 Extending of the basis classification scheme may, for example, be necessary if Middle Bronze Age house plans from neighbouring countries are to be accurately incorporated. In this study, only the Dutch Middle Bronze Age house plans have been described (and depicted; *cf.* fig. 5.16). This is done solely for pragmatic reasons. First, geogentic regions directly bordering the river area have been included, to facilitate comparison. Second, only few German (Rhede; Deiters 2008, Telgte; Wilhelmi 1974; 1982; Reichmann 1982, Hesel; Schwarz 1996; 2004) and Belgian (Maldegem; Crombé *et al.* 2005, Weelde; Annaert 1998; 2008) sites with Middle Bronze Age houses are presently known from geogenetically identical regions abroad. Incorporating these would not significantly have altered the present interpretations, but may be undertaken in the future.

81 See Chapter 4 for examples from the river area, Bloemers & Therkorn (2003, 18 fig. 9) for an example from the coastal dunes, IJzereef & Van Regteren Altena (1991, 69 fig. 6) for an example from West-Friesland. Entrance portals are also found on the southern Dutch coversand areas (*e.g.* Den Dungen (fig. 5.19, no 1; Verwers 1991) and possibly at Engelen (Dautzenberg, De Koning & Vaars 2002)), the sandr deposits of the ice-pushed hills (Van Hoof & Meurkens 2007) and the north-eastern coversand areas (*e.g.* Modderman 1955b; Verlinde 1991a, 34 fig. 3).

82 *E.g.* at Elp (Waterbolk 1987, 199) or Angelslo (Huijts 1992, 36 fig. 21; 23).

83 One particular problematic identification must be briefly addressed here. Houses such as those from Hijken (Harsema 1991, *cf.* Kooi 1991; Verlinde 1982a-b) and Dalen (Kooi 1991), are classified by Huijts (1992, 41) as part of the Emmerhout type, because inner and outer posts occur in one-to-one association. The outermost posts are classified as part of the wall-construction (*ibid.*). In plan, without feature depths, farmhouses of these types are thus hard to differentiate between B1b_W3 or A1_W4. The fact that the doubled outer posts occur placed radially at the short sides, sometimes without inner posts (*e.g.* Huijts 1994, 44; Kooi 1991, 13), suggest that these did not support rafters in the way half-portals are supposed to do. This may favour an interpretation as wall-option W4. Following the argumentation of Huijts (*op. cit.* 44-45), these types are here classified as B1b_W3, but deserve special attention as the wall posts are invariably aligned with the outer posts, a feature that is not necessarily implied for wall options W3 or W4.

84 Verlinde & Theunissen 2001; Huijts 1992, 52 fig. 40, *cf.* Assendorp 1997, 57 fig. 6.

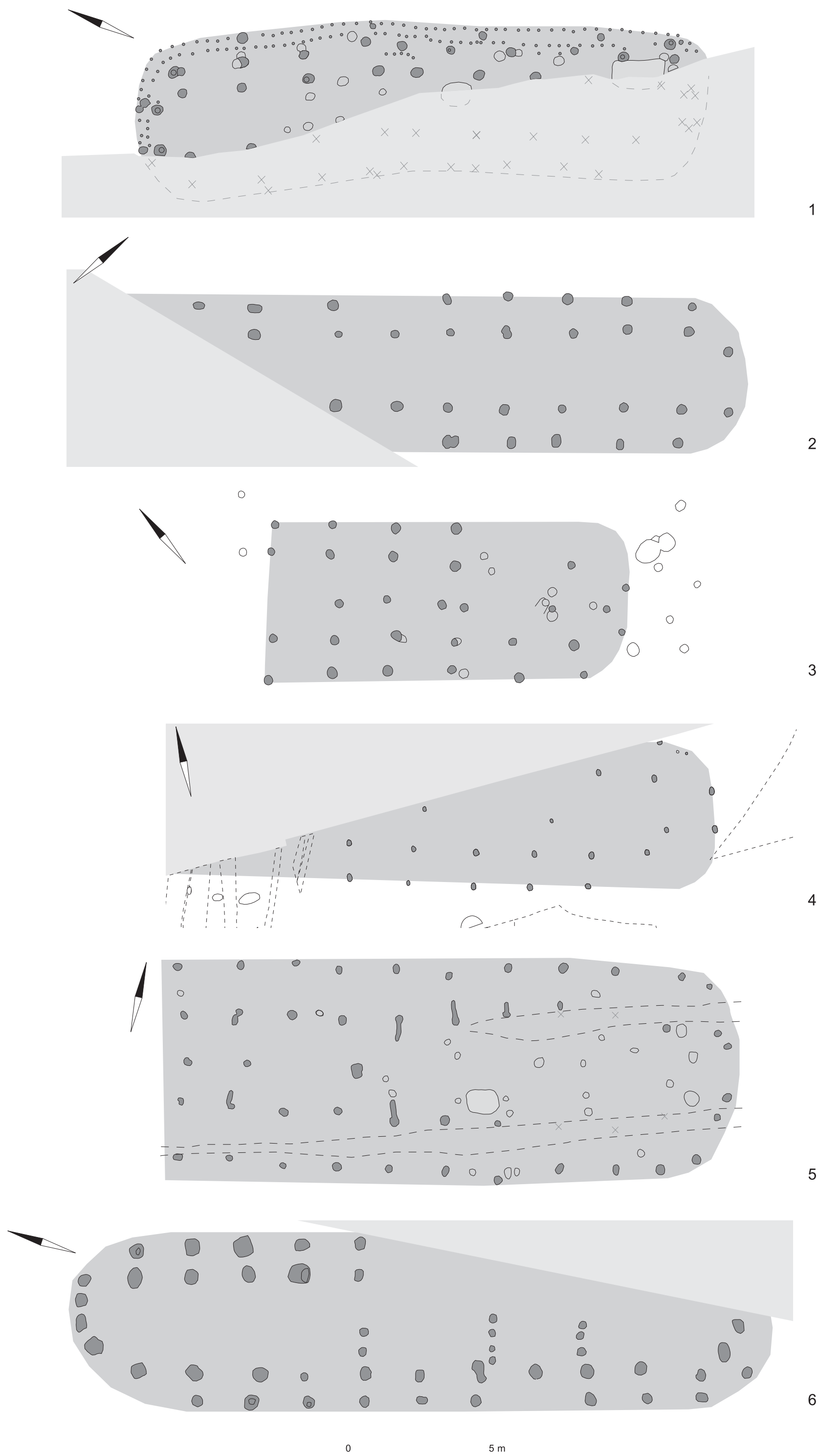


Fig. 5.15 Half-portal (B1a/B1b) houses with one or more rounded short sides (1: Vasse (after Verlinde & Theunissen 2001, 166 fig. 4a), 2: Colmschate (after Verlinde 1991a, 34 fig. 7), 3: Zutphen - Looër Enk (after Bouwmeester *in prep.*), 4: Lienden (after De Voogd & Schoneveld 2001, 66 fig. 3.16), 5: Loon op Zand (after Roymans & Hiddink 1991, 115 fig. 4), 6: Venray (after Theunissen 1999, 122 fig. 4.3d)).

(B1a/B1b) counterparts. The presence of posts near the short sides of several B1a/B1b houses from different regions points in this direction (fig. 5.15).[85]

A final problem in house plan classification, also related to feature preservation, must be discussed. Whereas class A (two lines of roof-bearing posts) and class B (four lines of roof-bearing posts) have been presented as rather discrete entities, they need not be in archaeological cases. Several examples are known where in cases of poorer feature preservation, it is very hard to distinguish between an A1 roof-bearing structure with some outer posts and a B1b ground plan with several posts no longer preserved.[86] Here, again, accurate classification may be constrained by inadequate feature preservation.

5.2.3.3 A regional approach to (the typology of) Dutch Middle Bronze Age farmhouses

Having discussed the basis and limitations of a system of Middle Bronze Age house classification, it is necessary to evaluate whether regionally specific patterns of association can be outlined. To start, it should be stressed that the two main classes (A and B) both have a wide and overlapping distribution (fig. 5.16). Especially the distribution of type B ground plans appears more restricted, as these have not (yet) been documented in the (north)western areas (*e.g.* Texel,[87] West-Friesland, the coastal dunes), the westernmost part of the central river area and in the south-easternmost parts of the Netherlands. The distribution of A types into the north-eastern Netherlands is predominantly based on uncertain recognition, and should be critically evaluated by future research. For now, only the two houses from Deventer - Margijnen Enk (Modderman 1955a, 25 fig. 4) and Emmen - Oude Roswinkelerweg (Drenth 1988, 31 fig. 7) may be considered acceptable examples.[88]

More confined regions can be outlined when looking at sub-classes for the shapes of the roof-bearing structure, such as A2 house plans (cigar- to ovoid shaped roof-bearing structure) and B2b ('Elp') house plans. The distribution of the former concentrates on the central river area (fig. 5.1, c; see Chapter 4) and on Texel (Woltering 2000, 34-40),[89] but less certain individual identifications may be made for Rhenen - Remmerden house 3 (Van Hoof & Meurkens 2007, 36-37) and Andijk house 17 (IJzereef & Van Regteren Altena 1991, 69 fig. 6). The distribution of the latter (class B2b) is predominantly confined to the north-eastern Netherlands, with Deventer - Margijnen Enk as its present southernmost occurrence (fig. 5.16, d).[90]

It is difficult to analyse regional patterns in the construction of wall-types, as these are severely influenced by feature preservation. Consequently, only some comparison of the three areas where walls have been preserved is possible (north-eastern coversand, river area, West-Friesland). It is clear, in any case, that in the north-eastern coversand area more variation in wall types can be documented. House 13 of Emmerhout has a single-stake line wall (Huijts 1992, 36 fig. 21), while also wall-ditches with posts and planks have been recorded (*e.g.* Angelslo 5 & 6; Huijts 1992, 36 fig. 23).[91] Possibly, 'free-standing' larger posts may have been used to construct or confine a wall as

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85 *E.g.* Verlinde 1982a, 183 fig. 8; 1991a, 34 fig. 7; Waterbolk 1987, 199 fig. 11; Roymans & Hiddink 1991, 115 fig. 4; Theunissen 1999, 122 fig. 4.3d; Krist 2000, 20, fig. 10; Verlinde & Theunissen 2001, 166 fig. 4a; De Voogd & Schoneveld 2001, 66 fig. 3.16; Bouwmeester *in prep.*, house 22, *cf.* Woltering 1991, 88 fig. 4; Theunissen 1999, 121 fig. 4.3c. The placement of building H129 in relation to H 128 does, however, suggest that straight short sides may also have occurred (Fokkens 1991, 98 fig. 4).

86 For example Rhenen - Remmerden house 4 (Van Hoof & Meurkens 2007, 37-41), Breda - Moskes house 1 (Berkvens, Brandenburgh & Koot 2004, 57 fig. 4.2), Elp houses 8, 11 & 13 (Waterbolk 1987, 199 fig. 10). The large longitudinal spacing between the outer posts of some Elp farms (esp. house 9; Waterbolk 1987, 198 fig. 8), suggest that the inner row may have taken most of the roof-bearing load, which may explain why outer posts could be spaced at such wide intervals (*cf.* Huijts 1992, 59).

87 Note that some Late Bronze Age to Early Iron Age buildings at Texel have a roof-bearing structure that could be classified as class B1b (Woltering 2000, 41-44).

88 The distribution in fig. 5.16 included houses 10, 11 and 13 from Elp, which may be affected by poor preservation and several other sites where a Late Bronze Age (to Early Iron Age) date for the (claimed Middle Bronze Age) A-class house plans seems more plausible (*e.g.* Leesten (Fontijn 1996), Zwolle - Ittersumerbroek (Verlinde 1993, 38-40), Raalte (Groenewoudt *et al.* 1998), Dalfsen - Welsum (Van der Velde, Van Benthem & Bloo 2001).

89 Note that a Middle Bronze Age-B to mid-Late Bronze Age date may be possible for houses B (the best A2 example) to E is suggested (Woltering 2000, 40).

90 Not mapped is a possible part of an 'Elp' type farmhouse from Dalen - Westakkers (Kooi 1994, 43 fig. 3).

91 A wall ditch may also possibly be reconstructed for one of the house-phases at Velsen - Westerlaan (trench 12), but this site has not yet been published in full.

for instance with Emmerhout house 15 (Kooi 2008, 63 fig. 6) or Noordbarge (Harsema 1997a, 147 fig. 6). For the use of a double-stake line type of wall in these areas see figure 5.15, no 1. With farmhouses like those at Hijken, planks may have been fixed between the double outer posts (Kooi 1991, 14). It is striking that while feature preservation in West-Friesland and the river area is adequate enough to have preserved any alternative wall-options, only single- and double stake line types of walls were apparently current (IJzereef & Van Regteren Altena 1991, 69; *cf.* Chapter 4).

Few architectural additions (fig. 5.14) can be used to outline regional clusters.[92] Some elements are too common (*e.g.* ridge-posts) and some too infrequent (*e.g.* dividing walls) to be useful. The problematic recognition of entrance portals has already been commented upon above, but it should be stressed here once more that in the river area and in West-Friesland entrance portals are most frequently (in combination with A1/A2 roof-bearing structures) encountered. Beyond these areas, entrance portals are infrequently recognized, but are not consistent features and the certainty of recognition is frequently poor.[93] Elaborate entrance portals (EEP; fig. 5.16, e) do not seem to occur in West-Friesland, and cluster in the central river area.[94] Consequently, the presence of EEP's at Vasse (fig. 5.15, no 1) and Deventer - Margijnen Enk (fig. 5.20, no 2) is all the more puzzling.[95]

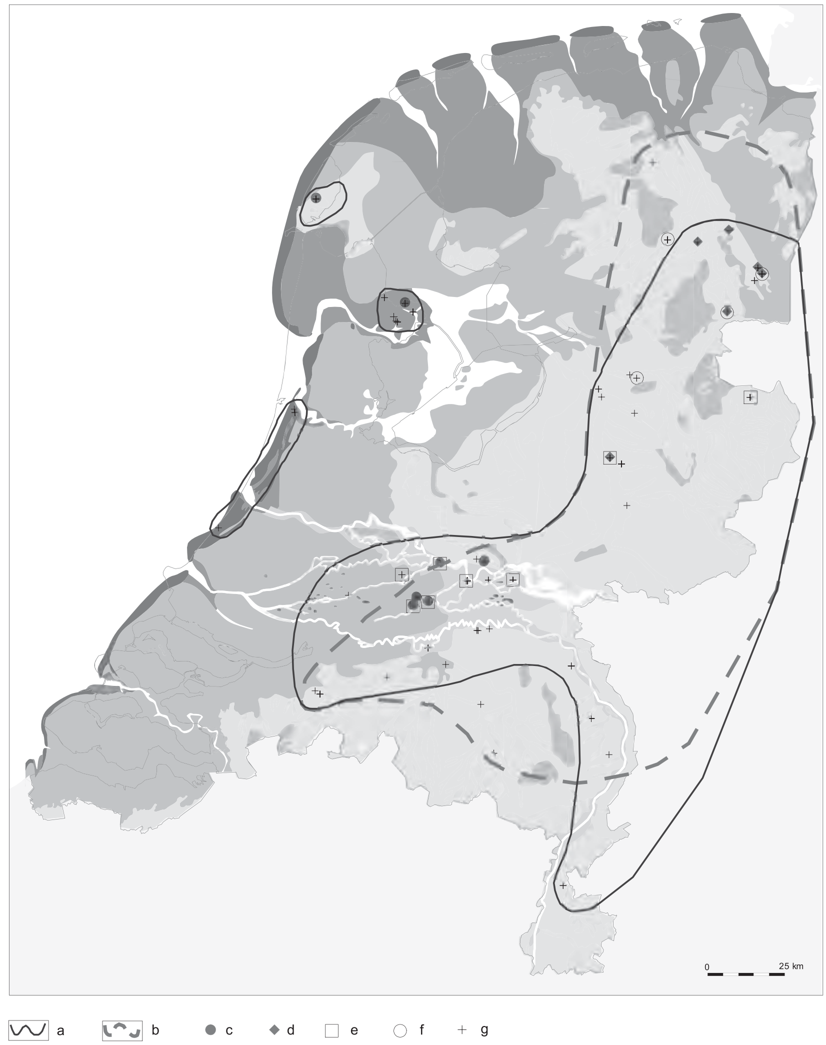

Fig. 5.16 Schematic distribution of Middle Bronze Age house-plans according to the preliminary typology as outlined in fig. 5.16 (for underlying palaeogeographical map see Chapter 1; fig. 1.3).

a: class A, b: class B, c: class A2, d: class B2a and B2b, e: occurrence EEP, f: occurrence ST, g: sites with Bronze Age house-plans.

92 See also the interregional comparison of houses between geogenetic regions in table 5.6.

93 Relatively certain: Velserbroek P63 (Bloemers & Therkorn 2003, 18 fig. 9), Colmschate (Verlinde 1991, 34 fig. 7), Den Dungen - Kloosterstaat (Verwers 1991; fig. 5.19, no 1). Tentative: Texel - Den Burg house E (Woltering 2000, 36), Hijken (*e.g.* house 4; Harsema 1991, 26 fig. 4), Emmen (Drenth 1988, 31 fig. 7), Engelen (Dautzenberg, De Koning & Vaars 2002), Geldrop (Theunissen 1999, 122 fig. 4.3d-e).

94 Tentative EEP's in West-Friesland: Bovenkarspel - Het Valkje 10a (IJzereef & Van Regteren Altena 1991, 72 fig. 8), Andijk II.1 (Van Mensch & IJzereef 1975, 62 fig. 2). For other tentative EEP's see Huijts 1992, 38 fig. 24 (Angelslo 5), Woltering 2000, 39 fig. 20 (Den Burg F).

95 See Modderman 1955b, 25 fig. 4 for the original publication.

Stall partition walls (fig. 5.16, f) can almost exclusively be indicated with Middle Bronze Age farmhouses from the north-eastern coversand and boulder-clay areas (eight houses at four sites).[96] For the other areas, only the house from Loon op Zand (fig. 5.15, no 5) and a house from Enspijk (Chapter 4, fig. 4.6, no 2) have yielded possible traces of stall partitions. This may indicate that constructing stalls in an archaeologically visible way was a feature of northern European Bronze Age farmhouses (fig. 5.17), as in Denmark and possibly southern Scandinavia comparable stall partitions are found and there are no convincing examples (yet) in the central and southern areas of the Lower Rhine basin.[97]

In order to isolate and, if present, understand regional particularities of Middle Bronze Age houses from the river area, a comparison with the houses from other areas is necessary. Therefore, a more detailed analysis of houses and house-processes in the different geogenetical regions (see Chapter 2) of the Netherlands is presented below. The main results of this comparison are summarized in table 5.6.

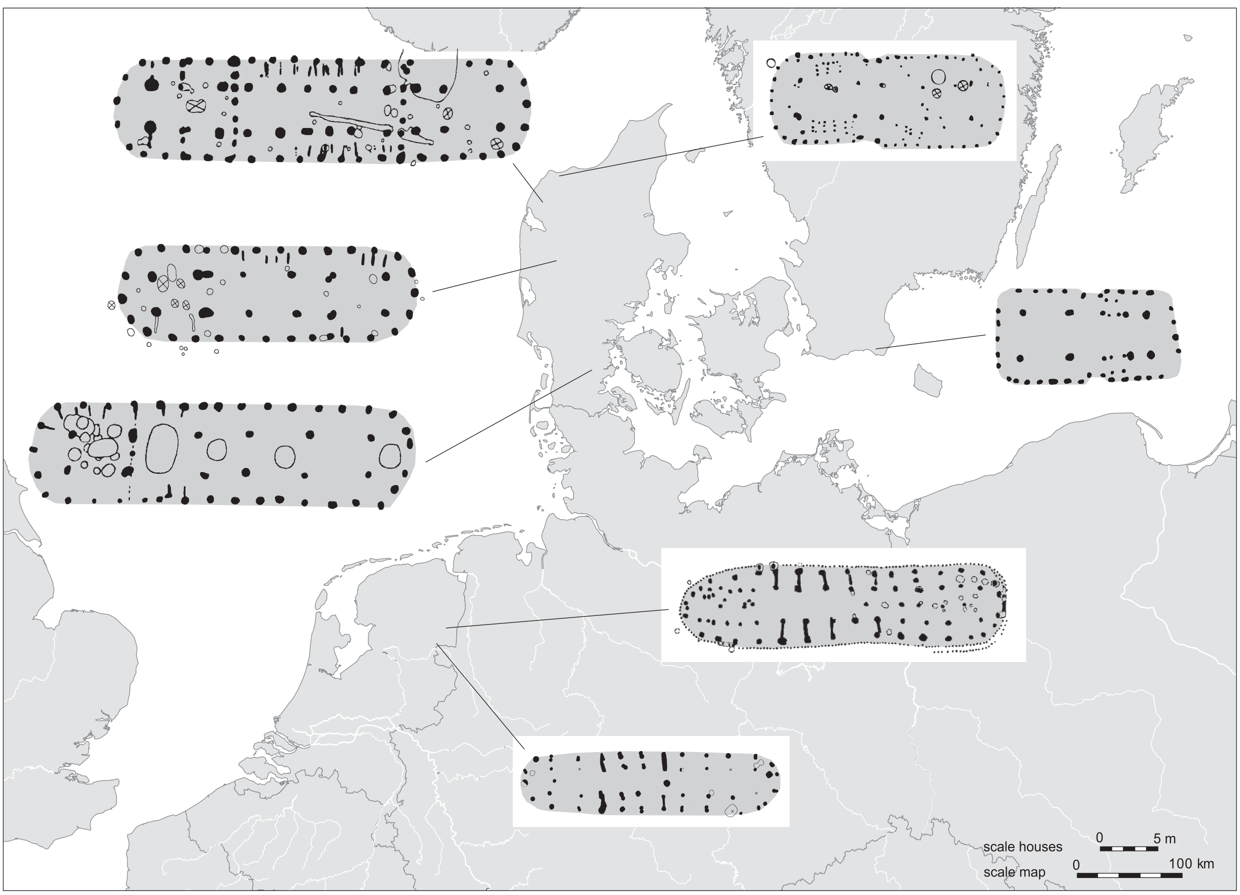

Fig. 5.17 Middle to Late Bronze Age houses with indications of stalls (clockwise from top-right; Bjerre house 2 (after Rasmussen 1999, 282 fig. 1), Stora Köpinga R102-B26 house 1 (after Artursson 2005b, 67 fig. 20), Emmerhout house 13 (after Huijts 1992, 36 fig. 21), Dalen house 2 (after Kooi 1991, 13 fig. 3), Brdr. Gram house 1 (after Rasmussen 1999, 282 fig. 1), Spjald (*ibid.*), Legård house 3 (*ibid.*)).

96 *E.g.* Hijken house 5 (Harsema 1991, 26 fig. 4), Angelslo house 6 (Huijts 1992, 36 fig. 23), Emmerhout houses 8 and 13 (Huijts 1992, 36 fig. 21; 49), Dalen houses 2-4 (Kooi 1991, 13 fig. 3; 15 fig. 4) and Rechteren (Verlinde 1982a, 183 fig. 8).

97 The example from Stora Köpinge R102-B26 House 1 (Tesch 1993, 94-96) is questioned by Gröhn (2004, 275), who suggests that other interpretations for the extra posts (*e.g.* bench or storage box) can also be put forward. Artursson (pers. comm., Feb. 2007) thinks that poor feature preservation conditions may explain the present scarcity of Swedish farms with evident stall partitions.

Houses from the Dutch river area
To characterize the houses from the Dutch river area a dataset of 70 houses is available, comprising 59 houses that can be reliably identified as possible Middle Bronze Age houses and 8 that could not be unambiguously classified. The houses have a mean length of nearly 22 m, with the majority (*i.e.* over 80 %) measuring between 14 and 30 m. Where the width could be documented it ranged between 5.3 and 6.8 m, with a mean of 6.1 m. Establishing the shape of the houses is frequently difficult, but where entrance portals are preserved (*supra*) a rounded short side is assumed. Moreover, all recorded wall lines indicate a rounded shape of the short side. Clear rounded short sides were documented in 23 cases. Only one possible straight short side may be argued for (De Bogen house 30GH; Chapter 4, fig. 4.14, J).

Most houses have a roof-bearing frame of the A1 type (*c.* 58 %) or the A2 type (*c.* 15 %). For an additional 15%, the distinction between A1-A2 was unclear and these may be classed as either type. Only a single possible B1c and one possible and two plausible B1b roof-bearing frames could be recognized.[98] Seven double-stake type (W2) walls could be documented with A1 and A1-A2 houses, and 7 single-stake (W1) walls with houses of all different types.

Ridge-posts are frequently (*c.* 24 %) claimed for all different roof-bearing frame types. Entrance portals are common, and may consist of a single set of posts with a more narrow span (EP, *c.* 42 %) or multiple sets (EEP, *c.* 27 %). As three combinations of EP and EEP were noted, *c.* 64% of the houses has an entrance portal of some sort. It is striking that the two B1b frames from Lienden both had an entrance portal, as if appropriation of a non-typical type of roof-bearing frame was achieved by adding an entrance portal.[99] Four houses show a final, centrally placed post at their short sides (*i.e.* a 'closing post'), whose structural function is not fully known yet.[100]

It is assumed that both EP and EEP's indicate the location of former entrances. This assumption is backed up by the fact that wall lines indeed stop at the entrance portal posts. Frequently, only one entrance (*i.e.* entrance portal) could be documented that is generally located in the east or southeast. As also several entrances have been documented in the west and a fair number at both short sides, it is not yet clear whether a single or preferable eastern entrance was predominant. In five cases extra posts near the long sides or openings in surrounding ditches may indicate side entrances.[101] The ditches at Wijk bij Duurstede are most likely to have served predominantly a drainage function, although those of De Horden houses 3, 11 and 12, Dodewaard house 1b, Eigenblok house 6.2 and Zijderveld houses 1 and 3 presumably were dug to keep the roof's watershed away from the walls (*i.e.* 'eaves-drip ditches', see section 5.6).[102]

Functional divisions of the house can hardly be discerned. Finds-distribution and phosphate mapping are generally inconclusive and hearths are not preserved in situ (Chapter 4; Appendices I-VI). Soil discolorations attributed to hearths formerly situated above these, have however been found between the second to fourth westernmost trusses.[103] For only a single house a tentative stall partition has been claimed (Enspijk house 2; Chapter 4, fig. 4.6, no 2; Ter Wal 2005b, 19). No pits could be unambiguously classified as being part of the house (*e.g.* storage pits).

House repairs are common (22 cases, *c.* 37 %) and generally involve repairs (reinforcements or replacements) of roof-bearing posts, entrance portals or the walls. Extension of houses was infrequent, but may have occurred with

98 Possible B1c: Eigenblok house 4 (Chapter 4, fig. 4.8, no 4), possible B1b: Eigenblok house 6.2 (Chapter 4 fig. 4.8, no 7), plausible B1b farms: Lienden 14D and 15P (Chapter 4, fig. 4.33).
99 It is remarkable that for Lienden, with the relatively rare type B1b farms with entrance portals, relatively early (16th century BC; fig. 5.9) indirect dates are available. The possible B1c from Eigenblok (house 4) also has a relatively early date (GrN-25342: 3210 ± 25 BP; Jongste 2002a, 35). This may suggest that at the beginning of the tradition of three-aisled house-construction, more variation in roof-bearing structures was current, but at present too few direct dates are available to support or refute this claim.
100 Eigenblok house 4 (Chapter 4, fig. 4.8, no 4), Tiel - Medel 8 house 2 (Chapter 6, fig. 6.12, B; Van Hoof & Jongste 2007, 36-38), De Bogen houses 30AH and GH (Chapter 4, fig. 4.14, J-K).
101 Wijk bij Duurstede - De Horden houses 5, 8 and 10; De Geer house 1 (section 4.5.3; Appendix IV) and Eigenblok house 5.1 (section 4.3.4; Appendix II).
102 For Wijk bij Duurstede see section 4.5.3; Appendix IV, for Dodewaard see section 4.7; Appendix VI, for Eigenblok see section 4.3.4 and Appendix II, for Zijderveld see section 4.2; Appendix I.
103 *E.g.* Eigenblok houses 2.1 and 5 (Hielkema, Prangsma & Jongste 2002, 103; 133), Zijderveld house 4 (Knippenberg & Jongste 2005, 36) or De Bogen house 28-4CH (Hielkema, Brokke & Meijlink 2002, 281). At the latter site, several hearths outside house ground plans proper have also been claimed (*ibid.*, 186; 203; 265; 273).

De Bogen house 28-1AH and Eigenblok house 6.2.[104] Rebuilding of a house on the very same spot occurred several times (and in one case a house was rebuilt thrice).[105] If one includes the houses of Wijk bij Duurstede - De Horden that are of comparable types and orientation, but placed so close-by that contemporaneity seems improbable and the possibly rebuilt house-site (2 and 3) at Tiel - Medel 8, as many as ten rebuilt house(-phase)s are known (*c.* 17 %).[106]

Once constructed, houses are almost never overbuilt (see section 3.2.3 for definitions). The three possible exceptions concern Tiel - Medel 8 houses 1 & 8, De Bogen houses 45BH & 45HH and Enspijk houses 2 & 3.[107] Even when accounting for possible exceptions, the remaining 95 % of the houses are not overbuilt by other Middle Bronze Age houses. The fact that outbuildings more frequently (*c.* 20 %) overlap with house plans and that some house plans are reconstructed from areas with high feature densities, indicates that later structures may have been built across Middle Bronze Age-B houses, but these structures are generally not Middle Bronze Age-B houses.[108]

Ten direct and twenty-four indirect dates for Middle Bronze Age houses in the river area are known. These include all typical roof-bearing types and structural additions. The direct dates firmly document their presence in the 15th and 14th century BC, whereas the indirect *terminus post quem* dates roughly range (discarding obvious outliers) between 3180 and 3020 BP.[109] This all suggests that the presently known Middle Bronze Age houses of the Dutch river area were constructed between *c.* 1530 to 1120 cal BC.

Houses from the south Netherlands sandy areas

At present, 32 Bronze Age house plans are known from the southern parts of The Netherlands. For six of these a Late Bronze Age age is suggested or otherwise plausible, so that these have been omitted here. Of the remaining 26, all but two could be classified by the shape of the roof-bearing frame. The majority of the houses are between 14 and 32 m in length, with a mean length of *c.* 20.5 meter. As no walls proper have been preserved, the width is based on the distance between the outer posts.[110] This width ranges from 7.5 to 4.5 m and with a mean of 6.6 m. It should be noted that the largest and smallest widths have been documented for houses that – by their large overall width (*e.g.* Nijnsel - Hazeputten; fig. 5.18, no 1), wide span (*e.g.* Loon op Zand; fig. 5.18, no 2), irregular post-placement (Venray-Hoogriebroek house 3; fig. 5.18, no 3) or small spacing (Geldrop house 2; fig. 5.18, no 4) – do not fit well within the wider corpus.[111] Thus excluding the top- and lowermost dimensions, widths vary between 4.5 and 6.5 m. House shapes may have been varied, as both presumably straight (*cf.* Theunissen 1999, 124 fig. 4.3i-k) as well as rounded (fig. 5.15, no 6) and combined straight- and rounded house-end have been documented (*e.g.* fig. 5.18, no 2).

Both A and B-types of roof-bearing frames are current in the southern Netherlands. Relatively many A1 types (n = 12, *c.* 46 %) are supplemented by B1b (n = 9) and single possible identifications of B1c and B1a types (total type B is *c.* 42 %). The house plans from Oss-De Geer (fig. 5.10, C) and those of Nijnsel and Venray (fig. 5.18, nos. 1-3) cannot be classified with certainty. Entrances may have been present in the short sides, but most of the seven

104 See Chapter 4, fig. 4.14, B on De Bogen house 28-1AH and fig. 4.8, no 7 for Eigenblok house 6.2. Note that the latter is of an a-typical roof-bearing type (B1b?) but is extended with a possible typical river-area type of entrance (EEP).

105 De Bogen house-sites 29B2/3H and 30BH-EH (section 4.4.3; Appendix III), Wijk bij Duurstede - De Horden house-site 2a-b (section 4.5.3; Appendix IV), Eigenblok house-site 2 (section 4.3.4 and Appendix II), Tiel - Medel 8 house-sites 1(a-b) and 6/7 (Van Hoof & Jongste 2007).

106 For these Wijk bij Duurstede house-sites see Chapter 4, figs. 4.27, B-D, for Tiel - Medel 8 house-sites 2 and 3 see section 6.3.11 and fig. 6.12.

107 Tiel - Medel 8 house 8 may alternatively be interpreted as an extension of house 1 (Van Hoof & Jongste 2007, 69 fig 5.9), Bogen house 45HH may be interpreted as a funerary structure instead of a house (section 4.4.3, esp. fig. 4.15). Enspijk house 2 and 3 (section 4.3.4; Ter Wal 2005b) do not actually overlap, but their close proximity and different orientation suggest at least two use-phases of the house-site(s).

108 *Cf.* table 7.2. There are slight indications that granary-type outbuildings may have been preferentially erected on former house-sites (section 4.5.3).

109 Over 80% of the indirect dates range between 3180 and 3020 BP, without three outliers a mean value of 3010 BP with a standard deviation of 60 yrs BP can be established.

110 The extra post(s) beyond the line of the outer posts that indicate the entrance of Oss-Ussen house H125 (Vasbinder & Fokkens 1987, 133 fig. 2), also suggest that the wall proper was situated beyond the outer posts.

111 Note that also the houses from Sittard - Hoogveld are characterized by a wide (4-4.5 m) span (Tol & Schabbink 2004, 21-25). House 1 from Geldrop - Genoenhuis also has a wide (4 m; Wesdorp 1997, 15-16) span. See also fig. 5.27, B.

recognized possible entrance portals are uncertain.[112] The house from Den Dungen (fig. 5.19, no 1), is a noteworthy exception. With its clear entrance portals and type A1 roof-bearing frame, it is much more similar to houses from the central river area than to other houses from the southern Netherlands. Its close proximity to the river area proper (< 10 km) may have been a factor in this.

Entrances in the long-side may be reconstructed for Oss - Ussen house H125 and H128 (Fokkens 1991, 99) and possibly the houses of Venray. At the latter site, both house-phases display dividing walls that are situated at the point where an outer post is missing (Krist 2000, 20 fig. 10). Possibly, the absence of an outer post also indicates an entrance here.[113] With the Loon op Zand house, entrances are also reconstructed in the long sides at the point were dividing walls spanning the centre-aisle are accompanied by possible stall-partitions or partition walls spanning the side-aisles (fig. 5.18, no 2).[114] Although partition walls may indicate functional divisions, it is impossible to indicate what exactly the different functions were.[115] The presence of possible hearths in the northwest part of houses at De Geer and Nijnsel may indicate a living area (Jansen & Van Hoof 2003, 43; Beex & Hulst 1968, 125). Several houses (n = 6, *c.* 19 %) have yielded pits that are interpreted as being associated with the houses or as storage pits.[116] Occasionally, ridge-posts (n = 9, *c.* 35 %) and closing posts (n = 6, *c.* 23 %) are observed.[117]

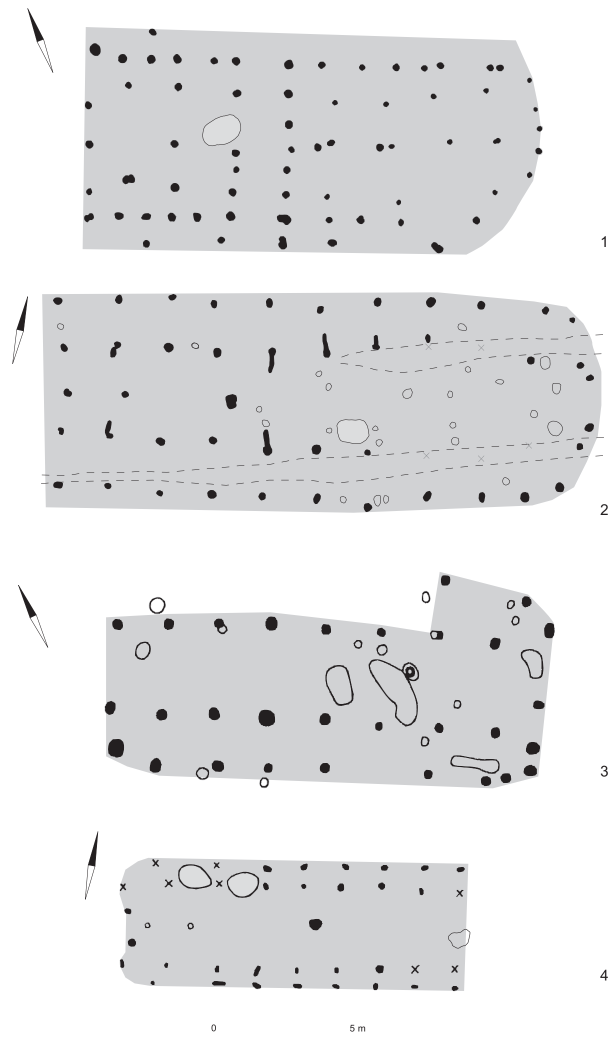

Fig. 5.18 A-typical Middle Bronze Age houses from the southern Netherlands (1: Nijnsel - Hazeputten (after Beex & Hulst 1968, 123 fig. 5), 2: Loon op Zand (after Roymans & Hiddink 1991, 115 fig. 4), 3: Venray-Hoogriebroek house 3 (after Krist 2000, 26 fig. 17), 4: Geldrop house 2 (after Wesdorp 1997, 16 fig. 11)).

112 Those of the Engelen houses 2 and 3 are incomplete or placed at a skewed angle to the farmhouse (Dautzenberg, De Koning & Vaars 2002, 15 fig. 10; 16 fig. 11). Geldrop house 1 is rather unique (fig. 5.18, no 4) but may indeed have had an EP, whereas house 2 from the same site has a rectangular post-setting of which the outermost pair may have been an EP (Wesdorp 1997, 15 fig. 10). Other tentative entrance post-settings concern Breda - Huifakker house 5 (Berkvens, Brandenburgh & Koot 2004, 63 fig. 4.7), Oss - De Geer (fig. 5.10, C) and possibly Boxmeer house 1 (not published as an EP; Hiddink 2000, 25 fig. 8).

113 This may also (in addition to taphonomic explanations; Vasbinder & Fokkens 19827, 133) explain the absence of some of the outer posts of house H125 at Oss (*ibid.*). With Oss - Ussen house H128, both outer and inner posts are absent at one point in the southern short side.

114 The house from Nijnsel (fig. 5.18, no 1) has extra posts that may hint at two entrances opposed in the long-side walls (Beex & Hulst 1968, 123 fig. 5).

115 The dividing walls of Oss - Ussen H129 set apart only one set of roof-bearing posts (Fokkens 1991, 100 fig. 6). Assuming that the east end is no miniature byre, this indicates that diving walls may not always imply a separation of the byre from living areas.

116 *E.g.* Vasbinder & Fokkens 1987, 133; Roymans & Hiddink 1991, 115; Wesdorp 1997, 15-17; Hiddink 2000, 29; Dautzenberg, De Koning & Vaars 2002, 16 fig. 11. They may occur somewhat more frequently in the central and northwest parts of houses, but numbers are too low to be significant. The large (2.5 by 3.5 and 0.5 m deep) rectangular pit of Engelen house 3 is interpreted as a cellar pit (Dautzenberg, De Koning & Vaars 2002, 21).

117 The Breda - Huifakker house 3 ridge-post (Berkvens, Brandenburgh & Koot 2004, 59) may have been a closing post of the first building phase. The ridge-posts of the Sittard - Hoogveld houses 1/2 may be related to its (partial?) rebuilding (see also the examples from the north-eastern Netherlands; fig. 5.22 and fig. 5.23).

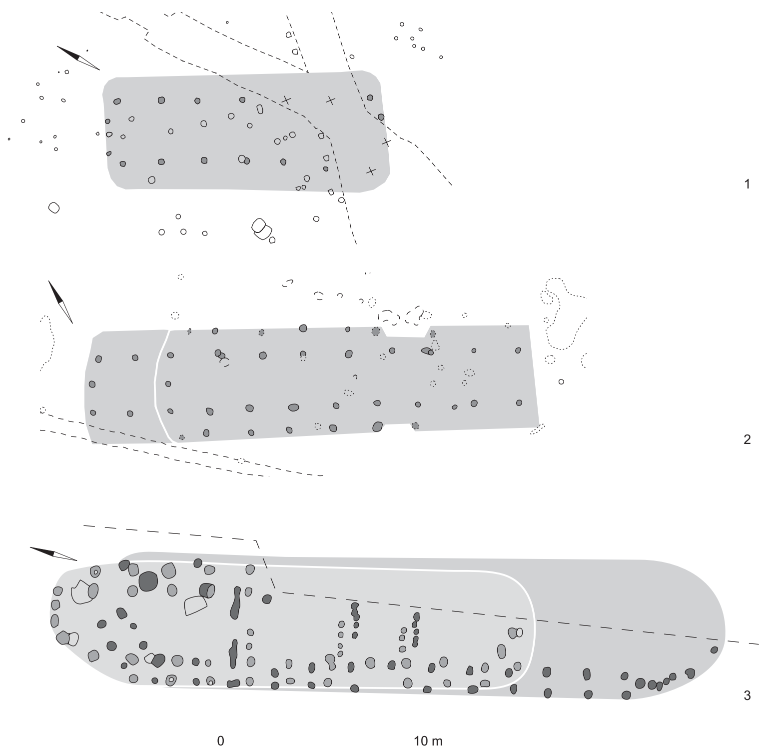

Fig. 5.19 Examples of single-phased (1: Den Dungen - Kloosterstraat), extended (2: Breda - Huifakkers house 3; after Berkvens, Brandenburgh & Koot 2004, 59 fig. 4.5) and rebuilt (3:Venray; after Krist 2000, 18 fig. 8) MBA houses from the southern Netherlands.

Eight farms (*c.* 31 %) show signs of repairs, which generally entailed the doubling (three times tripling) of roof-bearing posts, and less frequently the replacement of wall- or ridge-posts. No clear-cut examples of extended houses are known, but two houses from Breda - Huifakker may have been extended (houses 3 (fig. 5.19, no 2) and 5).[118] Rebuilding of houses took place at Sittard - Hoogveld (Tol & Schabbink 2004, 23), Venray - Hoogriebroek (Krist 2000, 17-18; fig. 5.19, no 3) and possibly at Engelen (Dautzenberg, De Koning & Vaars 2002).[119] No house-sites from the southern Netherlands are known where houses are overbuilt by other Bronze Age houses or outbuildings.[120]

No direct dates are available for the Middle Bronze Age houses from the southern Netherlands, and the indirect (*terminus post quem*) dates available range between 3245 BP (Oss - De Geer, section 5.2.3.1) and 3030 BP, suggesting that these houses may all have been erected during the Middle Bronze Age-B.[121]

Houses from the eastern Netherlands

For the eastern parts of the Netherlands, *c.* 35 claimed Bronze Age house plans have been published. Several of them are claimed two-aisled (Early Bronze Age) houses (Zwolle, Vasse, Zutphen; *supra*) and some are most likely

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118 This may be assumed based on the double 'closing post' with house 3 and the break in the rhythm of the spacing of the roof-bearing posts of house 5 (Berkvens, Brandenburgh & Koot 2004, 59-63). The former may have been the case according to the excavator (Berkvens, pers. comm., March 2005), but the latter assumption is doubted by her.

119 Theunissen (1999, 123) argues that the 37 m long house from Blerick is also rebuilt, but as this site is not published in detail it is not yet clear whether the house is extended or rebuilt. As an alternative to the reconstructions by Tol & Schabbink (2004) for Sittard - Hoogveld, I suggest that house 2 may have been a building phase of house 1. Upon rebuilding the east-end of house 1 (or house 1 entirely), ridge posts were added and a new eastern end with a slightly off-set orientation was constructed. This ties in better with the fact that several posts of the west-part of house 1 are also doubled or tripled. Slight changes in house-orientation are not uncommon when extending or rebuilding Middle Bronze Age houses.

120 Although a support for a loft (or possible four-post outbuilding?) was recognized within the ground plan of Oss - Ussen H125 (Vasbinder & Fokkens 1987, 133). The overlapping houses at Engelen (Dautzenberg, De Koning & Vaars 2002), may differ sufficiently to be classified as overbuilding, but rebuilding cannot be excluded.

121 The mean of eight dates is 3110 yr BP with a standard deviation of 70 years.

to date to the Late Bronze Age to Early Iron Age (*e.g.* Leesten, Dalfsen - Welsum, Raalte - Jonge Raan; *infra*).[122] Accordingly, only 16 house plans remain that are likely to date to the Middle Bronze Age. These have a mean length of 20.2 m, but vary between 11 and 28 meter. One house was presumably extended and reached a final (apparent) length of 47 m (Regteren; see fig. 5.20, no 3). The width of the houses ranges between 4.4 m and 6.2 m and have a mean of 5.3 m, based on the assumption that walls were situated directly beyond the outer rows of roof-bearing post.[123] Not only are relatively small widths documented, but width seems also to be more variable *within* houses. For instance, the house from Windesheim (Van Beek, Clevis & Verlinde 1988) as well as Colmschate houses 5 and 6 (Verlinde 1991) all taper.

Houses with roof-bearing frames consisting of four lines of roof-bearing posts dominate (*c.* 75 %), but some (*c.* 19 %) A1 structures are known.[124] Generally, inner and outer-posts are aligned as to suggest half-portals (*c.* 37 %), but the placing of the inner or outer posts may also be so skewed as to suggest longitudinal connections between the lines of roof-bearing posts. One B1b frame is claimed (Verlinde 1991, 35) and one B2b ('Elp') type of post arrangement is documented (Modderman 1955a, 29 fig. 7; fig. 5.20, no 1). Some houses with B-types of roof-bearing frames are likely to have had straight short sides (*c.* 37 %), although some may have had a (eastern?) rounded short side (*c.* 25 %; see fig. 5.15, nos. 2-3). Houses with A-type roof-bearing frames also show indications of at least one possible (eastern) rounded short side (*c.* 19 %).

The remarkably well preserved wall of the house at Vasse (fig. 5.15, no 1) indicates that single- or double lines of wattle-work may have been used for wall-construction, but no other examples have been preserved. The curved ditches with Zwolle - Ittersumerbroek houses 4a; b may have been foundation trenches for a wall-construction whose constructional details remain unknown (Verlinde 1993, 38 fig. 4). The posts placed at the east end of some houses may have been entrance portals, but the identification is generally not certain (*cf.* fig. 5.15, nos. 2-3). Short side entrances seem however plausible for *c.* 30 % of the houses. The linear nature of the portal features of the A1 at Margijnen Enk (Modderman 1955a, 25) and Regteren (Verlinde 1982a, 183) may suggest that these may not be that different from EEP's, but only the north-west short-side entrance of the B2b house at Margijnen Enk comprises multiple postholes (*op. cit.*, 29 fig. 7; fig. 5.20, no 1). A more wider spacing of roof-bearing posts or extra outer posts may indicate long side entrances at Colmschate houses 5 and 6 (Verlinde 1991a, 33).

Ridge-posts are sometimes encountered (*c.* 31 %, *cf.* fig. 5.15, no 3), but partition walls are scarce. Only with the B2b house at Margijnen Enk can the latter be identified (fig. 5.20, no 1; Modderman 1955a, 25 fig. 7). This house and that of Regteren are the only two to have yielded structural evidence for the presence of byres. No other arguments for functional divisions of the houses are available; hearths are not documented and the few pits found within the house ground plans (*e.g.* Modderman 1955a, 25 fig. 4; Verlinde 1982a, 185; Verlinde & Theunissen 2001, 167) provide no additional clues.[125]

Once erected, houses are commonly (*c.* 25 %) repaired and incidentally extended (Regteren) or rebuilt (Colmschate house 8 and Zwolle-Ittersumerbroek houses 4a-b; Verlinde 1991a, 33; 1993, 38). Once abandoned, house-sites were presumably not re-occupied as no reliable overlapping ground plans of Middle Bronze Age houses and/or other structures have been documented.[126] This is also supported by the frequently low feature density of Middle Bronze Age house-sites.

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122 Here, the 43 two-aisled houses reconstructed by Waterbolk are omitted (Waterbolk 1995a, 131-149; 1995b, 86; *cf.* Theunissen 1999, 126; 149; Fokkens 2001, 252). Only two house-phases from Zwolle - Ittersumerbroek can (with the current state of publication) be regarded as plausible Bronze Age house plans (houses 4a-b; Verlinde 1993, 38-39). Ceramics (*ibid.*) and typology (Waterbolk 1995c, 143) suggest a Middle Bronze Age date, although the large spacing (3 m) is a-typical. To my mind, a Late Bronze Age age should be considered a possibility (*cf.* Verlinde 1993, 40).

123 This may be suggested by the additional smaller posts with some of the outer roof-bearing posts of the Regteren house (Verlinde 1982a, 183 fig. 8). See also Verlinde 1982a, 183 for possible eaves-drip traces.

124 Their importance should perhaps be somewhat downplayed as this group comprises Zwolle-Ittersumerbroek houses 4a-b (see note 122 above, possibly Late Bronze Age in date) and a possible outbuilding from Colmschate (house 8; Verlinde 1991, 34) and an unpublished house from Regteren (Verlinde 1982a, 185). As such, house 1 from Deventer - Margijnen Enk (Modderman 1955a, 25 fig. 4) is the most reliable example.

125 But see Modderman (1955a, 29) for two possible hearths in a probable byre section.

126 The dating of the nine-post granary within Colmschate house 5 is unknown, but it is interpreted as 'not contemporaneous' by Verlinde (1991, 34).

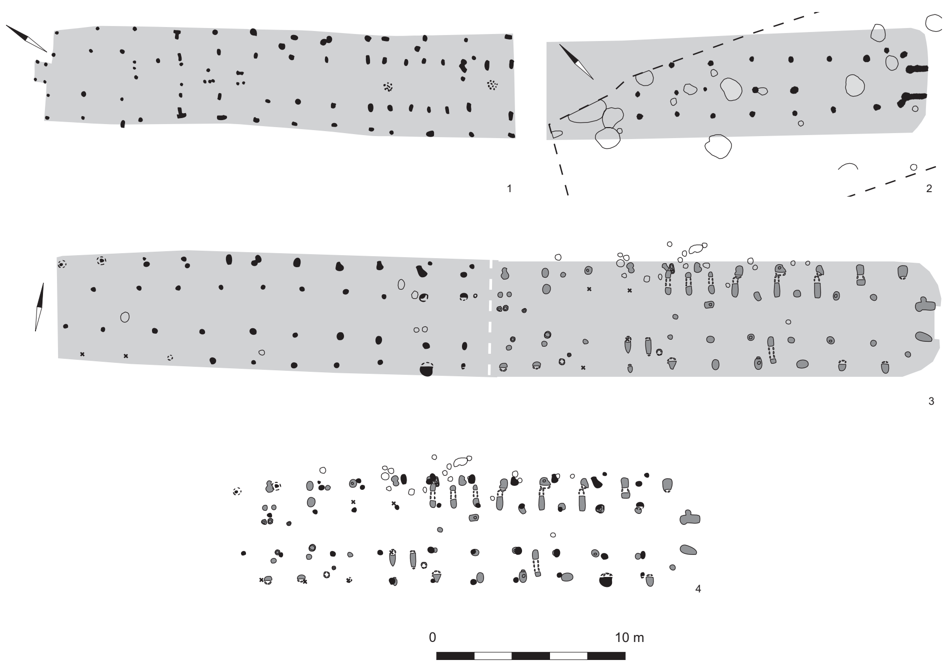


Fig. 5.20 Examples of MBA houses from the eastern Netherlands (1- 2: Margijnen Enk (after Modderman 1955a, 25 fig. 4; 29 fig. 7), 3: Regteren (after Verlinde 1982a, 183 fig. 8)). No. 4 shows an overlay of the two phases of the houses at Regteren to indicate their structural similarities and differences.

Very few radiocarbon dates are available to look at chronological patterns. For the A1 house from Margijnen Enk, two radiocarbon dates from the central pits indicate a *terminus post quem* of *c.* 1500-1210 cal BC.[127] Of the three dates available for the house at Vasse (Verlinde & Theunissen 2001, 167), the date of cereals from a pit may indicate a use-phase around *c.* 1420-1260 cal BC (GrN-7255: 3075 ± 35 BP; *ibid.*). One can only assume the other Middle Bronze Age-B houses from this region to date to roughly the same period as well.

Houses from the northern Netherlands

Several large-scale excavations in Drenthe have resulted in a large data-set on the Bronze Age occupation of this area (*e.g.* Harsema 1997a; Kooi 2008).[128] Unfortunately, two of the sites that have yielded most Middle Bronze Age house plans have not yet been published in full. Accordingly, for the sites Angelslo-Emmerhout and Borger-Daalkampen, only 19 of 67 discovered Bronze Age house plans have been published in detail.[129] Most or all of the Bronze Age houses from Hijken, Elp and Noordbarge have been published, which means that for 51 houses detailed observations could be made.[130]

The length of the houses varies (mean 25.4 m) and ranges between 10 and 34 m for the majority (*i.e.* > 85% of the houses). There is some correlation between the type of the roof-bearing frame and farmhouse length (fig. 5.21).[131] The houses with A1 and/or unclear types of roof-bearing frames are generally smaller (*i.e.* between 12 to

127 GrN-955: 3060 ± 70 BP and GrN-967: 3130 ± 70 BP; Lanting & Mook 1977, 125; Lanting & Van der Plicht 2003, 159.

128 But see also the less well known sites of Emmen - Oude Roswinkelerweg (Drenth 1988) and Dalen - Westakkers (Kooi 1994).

129 For Angelslo-Emmerhout (*c.* 43 Middle Bronze Age houses, 17 published) see Van der Waals 1967; Van der Waals & Butler 1976; Kooi 2008, for Borger - Daalkampen (*c.* 24 Middle Bronze Age houses, 2 published) see Kooi 1991; 2007; Kooi & De Wit 2003; 2005, Hielkema & De Wit 2005.

130 Total number of houses presumably discovered: 93, for 69 of which a typological interpretation is available. Within these 69, 14 houses with no clear roof-bearing frame type could be indicated, but 10 were insufficiently published houses from Hijken and Angelslo-Emmerhout. The remainder concern three houses of 'variant-Elp' type from Emmerhout (Huijts 1992, 62-66; Lanting & Van der Plicht 2003, 159) and house 4 from Elp (Waterbolk 1964, 102 fig. 3).

131 Here, the house-phases of Dalen that can be identified as extension phases (measuring 10-16 m) and all incomplete house(phase)s have been omitted.

18 m), compared to houses with B2b (mostly 15-29 m) and B1b (mostly 17-35 m) roof-bearing types. For the last two types, longer lengths have also been recorded, but these are most likely all houses which have been extended (see below).[132] The longest certain single phase examples may be Elp house 9 (prior to extension; fig. 5.23, no 5; Waterbolk 1964, 104 fig. 5) and Dalen house 3a (prior to extension; fig. 5.22, no 3; Kooi 1991, 114 fig. 4). Farmhouse width is mostly based on the distance between the outer roof-bearing posts and measures between 5 and 6.5 m for over 90 % of the B1b and B2b houses.[133] House 13 at Emmerhout is an exception by preservation of its wall line (single stakes) and documented large width (7.5 m).

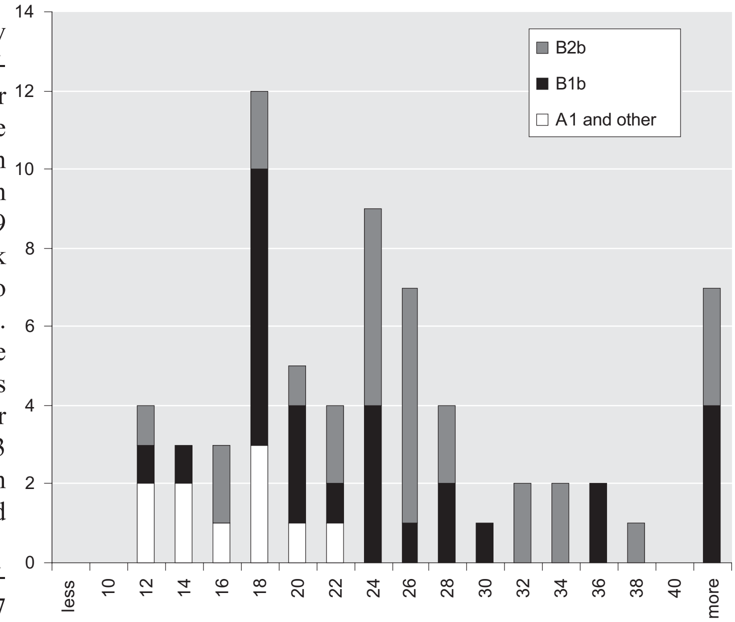


Fig. 5.21 Histogram of frequency (y-axis) of farmhouse length in two meter classes (x-axis) for 66 houses of different roof-bearing frame types in the northern Netherlands.

Farmhouses with four lines of roof-bearing posts dominate. A total of 34 (*c.* 47 %) B1b and 29 B2b (*c.* 40 %) houses have been observed. A1 and unclear roof-bearing frames make up 5 and 8 % respectively. Amongst the B1b houses, a subset (*c.* 15 %) of 'Middle Bronze Age Hijken-type' farmhouses (*i.e.* B1b_W3 houses whose wall posts are invariably coupled with the outer posts on the long sides) may be distinguished. Besides seven of the houses from the eponymous site, also some house-phases at Dalen may be classified as Middle Bronze Age Hijken-types.[134] The less clear roof-bearing structure of the smaller houses, may signify that these served different purposes (*e.g.* were barns/sheds rather than byre-houses) or that they date to another use-phase.[135] The houses with a B1b roof-bearing frame generally have two rounded short sides.[136] The possibly almost straight northwest short side of Elp house 3 is the single exception (Waterbolk 1964, 101 fig. 2). With houses of the B2b type, there is a tendency for rounded short sides (Waterbolk 1964, 100; Butler 1969, 70; *cf.* Kooi 2008, fig. 3.22), although this seems to apply more frequently to the (western) part of the farmhouse, and while indications for straight short sides at that end are also known (*e.g.* fig. 5.23, no 7 or Kooi 2008, 63 fig. 6, no 15). The form of the east (byre?) gable is less clear, and may have been straight, chamfered or rounded.[137]

132 House 36 of Emmerhout (Kooi 2008, 62 fig. 4) consists of a *c.* 28 m long initial building, extended twice with a 21 m and a 19 m long house-phase. Based on Lanting's (1976, 40-41) description, the house phases of the longest B2b composite house (Angelslo 7; 68 m) are unlikely to have exceeded 26 m.

133 For A1 and unclear houses, widths could not be determined with certainty, but both smaller (4 m; Elp house 4; Waterbolk 1964, 102 fig. 3) and large widths (Emmerhout X1; 6.4 m; Huijts 1992, 62 fig. 50) are assumed.

134 Dalen house(phase)s 1,2 and 4c-d (fig. 5.22; Kooi 1991). Recognising Hijken-types remains problematic. On the one hand the incomplete preservation of wall posts aligned to outer posts such as at Dalen argue against an interpretation of a W4 wall type (*ergo* the outer posts carried roof-weight and wall posts were not dug down equally deep; see discussion above), but the fact that rounded short side are frequently created with doubled posts (*e.g.* at Dalen; fig. 5.22, 8-9) *without* outer posts signifies that walls were indeed created by doubled posts, even where none are preserved at the farmhouse's long sides.

135 For instance, the corresponding orientation of B2b house 12 and the much smaller barn 10 at Elp may argue in favour of contemporaneity, while the orientation of barn 4 (with a roof-bearing structure unparalleled at the site) has no counterpart in any of the other Bronze Age houses (*cf.* Waterbolk 1987, 200, see also Lanting & Van der Plicht (2003, 159) on the dating of the 'variant-Elp' types of houses).

136 *E.g.* those at Noordbarge (Harsema 1997a, 147 fig. 6), Angelslo (Kooi 2008, fig. 1; 7; 8) and Dalen (housephases 1-3; Kooi 1991). Building-blocks or compartments with one straight and one rounded short side may also have been current at Dalen (*infra*).

137 Because of the gradual difference and the large number of unpublished house plans, no reliable quantification can be given.

Entrances can be outlined with *c.* 25 % of the houses, but are rarely indisputable. Frequently, (extra) posts placed symmetrically but more closely spaced on the central axis of the short sides of B1b farmhouses are interpreted as short side entrances (*c.* 32 % of the B1b houses).[138] There is some justification for these assumptions based on the wall-ditch interruptions such as that at Emmerhout house 68 (Kooi 2008, 60 fig. 1, no 68), a different nature of the short-side features such as at Hijken house 4 (Harsema 1991, 26 fig. 4) or the presence of possible threshold-ditches (*e.g.* Kooi 2008, 60 fig. no 34; Huijts 1992, 36 fig. 21). With B2b houses, entrances are mostly (but not exclusively) situated in the long-side walls, placed opposed at the transition from assumed living area to the byre section (*infra*).[139]

Several options for wall construction were utilized. Wattle-work walls have thus far only been published for a single house (Emmerhout house 13; see fig. 5.17).[140] Posts of different diameter placed in line with or beyond the outer posts have been found for both B1b as well as B2b type farmhouses. Sometimes, traces of a wall-ditch in which smaller post or stakes (*e.g.* Kooi 2008, 60 fig. 1, no 68), larger posts (*e.g.* Huijts 1992, 36 fig. 23; Kooi 2008, 60 fig. 1, no 9) or planks (*e.g.* Huijts 1992, 38 fig. 24) were placed have been observed. The posts of the Middle Bronze Age 'Hijken type' may have fixed a wall of wattle-work (Harsema 1991, 25). This diversity shows that there was much variability in wall constructions.

Structural additions other than those possibly related to entrances, comprise stalls, dividing walls and ridge-posts. The latter occur with *c.* 50 % of all houses and generally show as lines of three to five posts (*cf.* figs. 5.22 and 5.23). Ridge-posts are also frequently encountered at locations where farmhouses are extended or change in function. It is possible that these served a (temporary?) function as ridge-beam supports when a part was added to the farmhouse.[141] Ditches presumably indicating stall partitions are found with seven B1b houses (*c.* 20 %) and occur predominately in or near the middle of the farmhouses. With three of the Dalen house-phases (fig. 5.22), dividing walls are present at the fourth or fifth truss from the (north)west. This may indicate a functional division, as with two houses an architectural change follows after a division wall (*e.g.* an extension (Dalen house 1; fig. 5.22, no 1) or byre section (Dalen house-phase 3c; fig. 5.22, no 5).

Functional divisions within the house may also be indicated by the presence of hearths or (storage?) pits. A total of 13 hearths have been published or may be assumed for both B1b and B2b houses. With the former, these are frequently situated in the centre aisle at some trusses from the northwest short end.[142] With the latter, hearths are frequently situated in the centre aisle of the assumed living area, near the transition (hall?) to the byre section.[143] Where two hearths are claimed for single houses, there is generally evidence for an extension phase.[144] This may suggest that (extended) houses may have housed only a single (or possibly two) food-producing/consuming social groups. Pits that are interpreted as being part of the houses are found with houses of all types of roof-bearing frames.[145] These occur most frequently in the side aisles, but can also be situated in the centre aisle. Generally no direct indications for their function are available (*e.g.* Waterbolk 1964, 109; Harsema 1991, 25).[146] Where no spatial relation of the pits to the roof-bearing posts is evident, or pit morphology suggests that it belonged to the house (rectangular pits with similar orientation; *e.g.* fig. 5.23, no 4), their contemporaneity should always be critically assessed.

Repairs were undertaken in one third of the houses, but this is not the most typical house alteration. Rather, house-site dynamics in the northern Netherlands can be characterized as a process of extending and

138 With houses Angelslo 5; 12 and 68; Hijken 4 and possibly 7; Elp 3; Dalen 3 and possibly 4c;d and possibly the Middle Bronze Age house from Emmen, EP's may be argued for (all B1b houses).

139 Entrances in the long sides are reliably documented seven times, and short side entrances twice.

140 But see also Kooi 2008, 60 fig 1, no 34.

141 As the Dalen house-phases (fig. 5.22) show that the ridge post(alignment)s also occur more distant from house-phase joints, this cannot have been their only function. Alternative functions suggested include additional ridge-beam support or to support a loft- or attic like construction.

142 *E.g.* Emmerhout houses 9 and 36 (Kooi 2008, 60 fig. 1, no 9; 62 fig. 4, no 36), Dalen house-phases 3a, 3c (fig. 5.22; Kooi 1991) or Hijken house 13 (Harsema 1992, 80).

143 Butler 1969, 71, *e.g.* Emmerhout houses 15 and 22 (fig. 5.23; Kooi 2008, 63 fig. 6).

144 *E.g.* Emmerhout house 36 (Kooi 2008, 62 fig. 4, no 36), Dalen house-phases 3a, 3c (fig. 5.22; Kooi 1991).

145 Documented for 15 houses (*c.* 29 % of 51).

146 One of the two large pits in the NW part of Elp house 12 yielded a grinding stone (Waterbolk 1964, 128 fig. 22), which may reflect (depositions related to) a domestic task such as food-production (*cf.* table 8.1).

compartmentalized building traditions (*cf.* table 7.2). The site of Dalen is a good case in point (fig. 5.22). There, house one displays two building phases: a regular northwest part of six trusses and an added section of three trusses. The break is indicated by an extra ridge-post, the dividing wall and the sharp bend in the orientation of the line of the roof-bearing posts (fig. 5.22, no 1). With house two as well, a ridge-post is present after the six westernmost trusses, although here no sharp bend in the line of roof-bearing posts was observed (fig. 5.22, no 2). It appears that at Dalen,

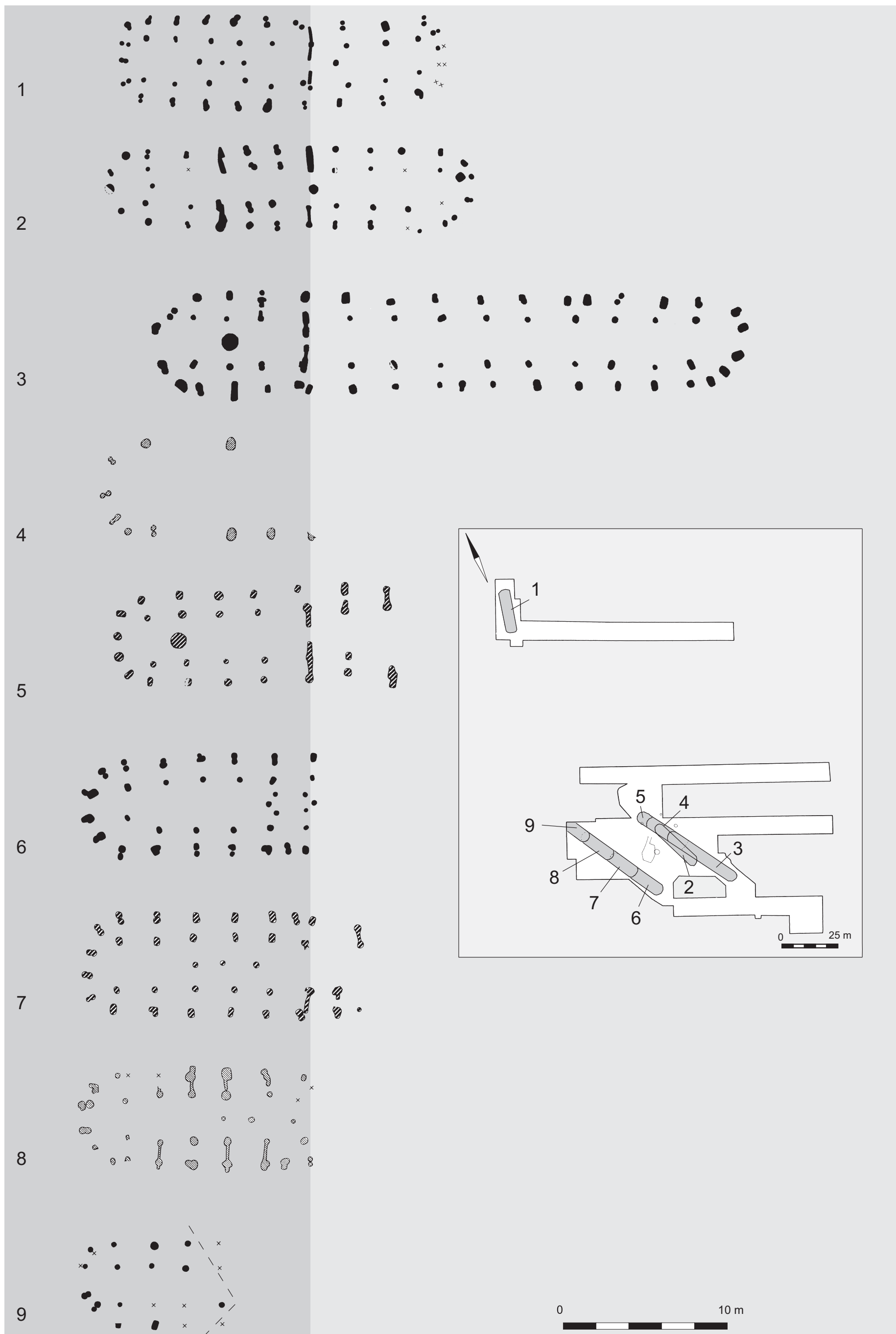


Fig. 5.22 Interpretation of possible house-phases at Dalen. Note that in several cases a break (ridge-post, dividing wall or post-configuration) is discernible after five or six trusses (1: house one, 2: house two, 3: house-phase 3a, 4: house-phase 3b, 5: house-phase 3c, 6: house-phase 4d, 7: house-phase 4c, 8: house-phase 4b, 9: house-phase 4a (after Kooi 1991)).

Bronze Age builders made use of standardized building modules or compartments, that were four (fig. 5.22, no 3), but mostly five (fig. 5.22, nos. 4-5) to six (fig. 5.22, nos 6-8) trusses long. The length of these units is based on the presence of dividing walls, ridge-posts and additional post-configurations at these points. Furthermore, the fact that these compartments start where the rounded short side of the previous phase could be found, indicates that such compartments were indeed a prehistoric reality. Such compartments could presumably be both living areas (*e.g.* fig. 5.22, no 5),[147] or byre-sections (*e.g.* fig. 5.22, no 8).[148] Evidently, extensions could occur in both directions and were quite common as three of the four houses were presumably extended.

Such a system of compartmentalised extensions is not confined to the site of Dalen, nor to type B1b houses.[149] At Elp and Emmerhout, quite another system of compartmentalized construction may have applied to B2b houses. The initial construction phases of several B2b houses at two different sites seem to have been steered by a specific building rule: after a limited number of westernmost trusses (frequently five), a larger spacing or ridge-post is present at the transition to the byre section (indicated by more closely spaced inner roof-bearing posts).[150] Figure 5.23 shows that regardless of the spacing of the trusses in the presumable living area (*i.e.* the length varies), after five trusses a ridge-post or larger spacing (and presumably opposed side entrances) separates the living area from byre. Although for these farmhouses (unlike for those at Dalen?) no significant time is thought to have lapsed between the construction of the different compartments (*i.e.* the living- and byre sections), it illustrates that compartmentalised thinking – and discrete counting – were part of the rule-sets that guided the construction of these Bronze Age farmhouses. The fact that houses from two different sites display a similar pattern, suggest that such building rules must have been shared beyond the local resident group (*cf.* Gröhn 2004, 318; 321).[151]

Compartmentalised construction as depicted in fig. 5.23 is related to the extension of buildings (*cf.* fig. 5.22), as both show that Bronze Age builders had (and shared) specific notions of what a proper structure of a farmhouse (compartment) should be like. In addition, also B2b-types of farmhouses were themselves extended. Houses Emmerhout 15, Elp 9 and Emmerhout 4 have all been extended (fig. 5.23, nos. 1; 5; 7), but only for the latter have the extension phases been depicted. Unlike at Dalen, here no specific number of trusses appear to have been added to the initial construction phase. House 7 at Angelslo (B2b, 68 m) was presumably extended several times, as three possible byre sections and two sections with more widely spaced posts were observed (Van der Waals 1976, 40-41). House 36 at the same site started as a single B2b house, but was extended four times to reach over 75 m in length (Kooi 2008, 66 fig. 8c). At Borger as well (Kooi 1991), some of the B2b-type houses may have been extended (Kooi 1996, 50 fig. 1; Kooi & De Wit 2005, 131 fig. 2).

For the presently published houses, extensions can be indicated with 16 of these (*c.* 31 % of 51). They have been documented more frequently with B2b (*c.* 15 %), compared to B1b (9 %) or 'Middle Bronze Age Hijken' (*c.* 6 %) tpes of roof-bearing frames. As these sixteen cases represent between 25-30 extension phases, it is clear that houses were frequently extended more than once. This repeated extension of houses is a property typical to the Bronze Age communities in the northern, and possibly north-eastern (*cf.* fig. 5.20, no 3) Netherlands.

While extensions occurred frequently, evidence for the rebuilding of houses is less clear.[152] For houses 6 and 7 at Elp, their overlap and structural similarities may hint at farmhouse rebuilding (Waterbolk 1964, 116). Possibly, the same applies to houses 5 and 6 of Hijken, but in both cases the option of overbuilding cannot be ignored.[153]

147 With a possible hearth and stalls constructed in the former living area; *cf.* Kooi 1996, 49.

148 It remains possible that the stall-partitions of phase 4b were not constructed until after the addition of compartment 4c, or in other words, that only 'living area'-compartments were added.

149 Possibly, both houses of Noordbarge also show different construction phases: house 21 has three southernmost (extended?) trusses spaced 2.7-3 m instead of 2.2 mean, whereas with house 28 the decreases and increases in span of the inner roof-bearing posts suggest three construction phases (Harsema 1997a, 147 fig. 6).

150 An addition to this rule may be that the last set of roof-bearing posts in the byre-section had a larger spacing (Waterbolk 1964, 100-108).

151 One may also wonder whether it is coincidental that the B2b house of Deventer - Margijnen Enk show a possible division wall (end wall initial phase?) after five trusses north-west from the byre/living area transition (fig. 5.20, no 1).

152 Accepting three tentative cases of overbuilding would lead to a figure of *c.* 3 % for 93 excavated houses.

153 Harsema 1991, 26 fig. 4. Possibly, houses 11 and 12 of Angelslo are also rebuilt houses (Lanting 1967, 36 fig. 6), but these houses have, like Hijken house 6, not been published in sufficient detail.

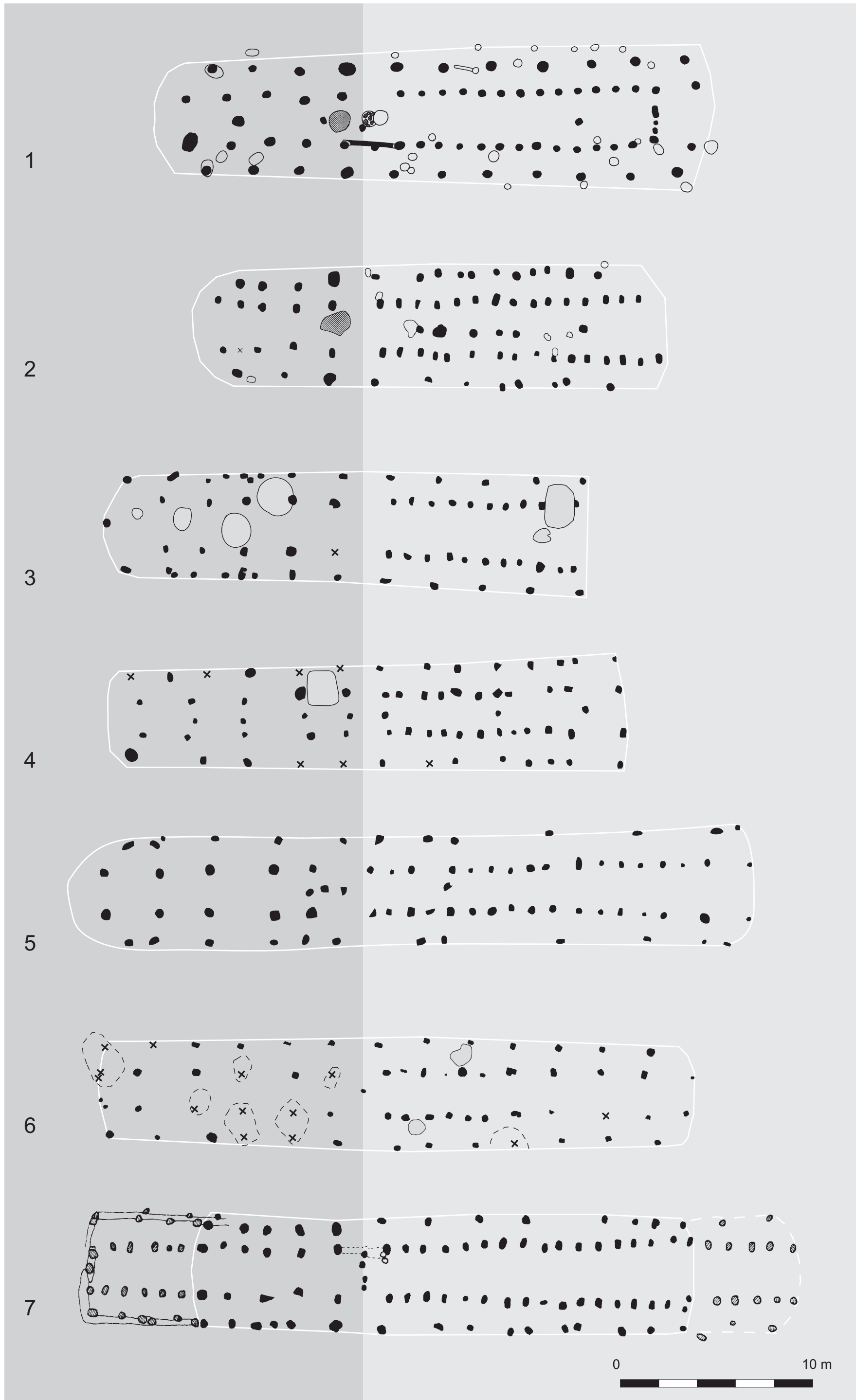


Fig. 5.23 Houses with B2b types of roof-bearing frames ('Elp-houses') aligned on the transition from the area with widely- (living area) and closely-spaced (byre) roof-bearing posts. Note that all 'living areas' consist of five trusses (1: Emmerhout house 15 prior to enlargement, 2: Emmerhout house 22, 3: Elp house 12, 4: Elp house 6, 5: Elp house 9 prior to enlargement, 7: Emmerhout house 4, showing enlargements phases at both sides (after Waterbolk 1964; Huijts 1992; Kooi 2008)).

Ignoring these possibly rebuilt houses, overbuilding of houses is still current with 17 (*c.* 18 %) documented cases.[154] It is noteworthy that no overlapping B1b houses are known but that several B2b houses overlap (*e.g.* Waterbolk 1987; Kooi 2008, 67 fig. 9). This could reflect a different attitude towards the perceptions of former house-sites. Possibly, this difference is related to chronology, but to this end the dating of the different types of houses needs to be discussed.

Huijts (1992, 37; 55) has argued that the dating of 'Emmerhout'-type (*i.e.* B1b) houses lies between 1400 and 850 cal BC, whereas 'Elp-type' (*i.e.* B2b) houses are thought to date between 1200 and 800 cal BC. Unfortunately, only indirect radiocarbon dates are available and the association of these dates to particular houses is sometimes disputed (*e.g.* Lanting & Van der Plicht 2003, 165-166; 183). The dates for charcoal from pits within these houses at the Hijken excavation are in any case consistently significantly older (all prior to 3090 BP), compared to those for the houses with B1b and B2b types of roof-bearing frames. The 'Middle Bronze Age Hijken' houses may have all been erected during or after *c.* 1530-1210 cal BC (fig. 5.24). For the B1b houses, few useable dates are available (*c.* 7; fig. 5.24) and the sample reliability is low. The dates for Emmerhout houses 13 and 5 may be the most reliable and these indicate a construction during or after 1500-1050 cal BC.[155] For B2b-types of houses, more (*c.* 10) useable dates are available but the oldest three are dismissed by Lanting and Van der Plicht (2003, 165-166; 183) on grounds of unclear sample association. The reasonable consistency of the other dates for B2b houses and especially the pottery incorporated into features and pits of houses 5 and 12 at Elp (Waterbolk 1964) does indicate that these houses were erected around the final century of the Middle Bronze Age-B and the first century of the Late Bronze Age.[156]

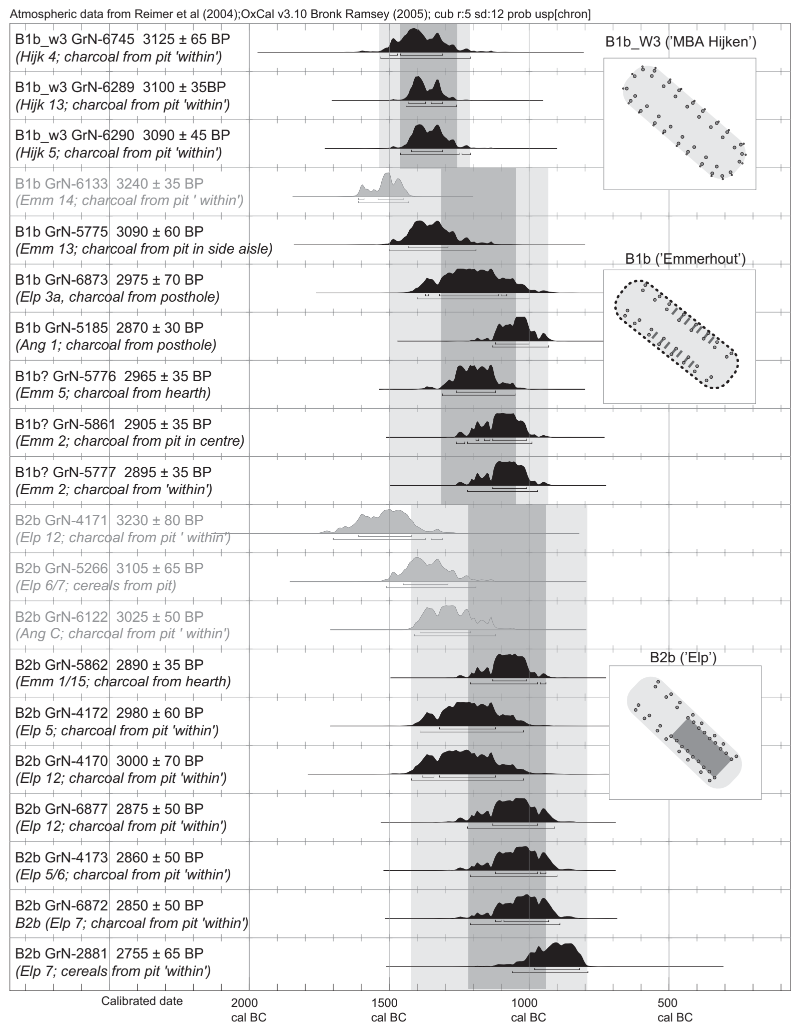


Fig. 5.24 Oxcal plot for dates for 'Middle Bronze Age Hijken' (B1b_w3), 'Emmerhout' (B1b) and 'Elp' (B2b) types of farmhouses in the northern Netherlands from the site of Hijken (Hijk), Emmerhout (Emm), Elp and Angelslo (Ang).

154 As overbuilding could be assessed based on schematic plans, here the total of 93 houses was used. If no rebuilding took place, overbuilding may have been present in *c.* 21 % of the cases.

155 The low feature density provides a more certain association between the pit from which the sample originated and Emmerhout house 13 (GrN-5775: 3090 ± 60 BP; *cf.* Kooi 2008, 66 fig. 8 C), although this still remains a *terminus post quem* date for the pit. The sample of Emmerhout house five originated from a hearth (GrN-5776: 2965 ± 35 BP; Lanting & Van der Plicht 2003, 165).

156 Mean of the other seven *terminus post quem* dates is 2890 BP with a standard deviation of 76 yrs BP.

Houses from West-Friesland
West-Friesland has yielded a rich data-set of Middle Bronze Age houses through numerous and sometimes extensive excavations.[157] At the Bovenkarspel and Andijk excavations a total of 200 house-phases were excavated, but these have only seen preliminary publication. For the Middle Bronze Age use phases of these two sites, at least 120 house-phases were present (IJzereef & Van Regteren Altena 1991, 66-68). Combined, a total of 138 possible Middle Bronze Age house-phases is known, but only 21 (*c.* 15 %) have been published in sufficient detail to comment on the structure of their ground plans.[158]

The farmhouses range in length between 8 and 33 m (mean 18.9 m), with 80 % of the houses measuring between 11 and 25 m. At Andijk and Bovenkarspel, houses measured 5-6.2 m (mean 5.6 m) in width (IJzereef & Van Regteren Altena 1991, 70). Where walls were observed, they were visible as rows of stakes, indicating a wattle-work construction (*op. cit.*, 69). At Hoogkarspel, similar widths were observed, but here not only stake-walls but also a possible wall-foundation trench was observed.[159] The shape of the preserved walls, the almost invariably present entrance portals and the shape of the equally omnipresent house-site ditches, indicate that both house-ends are likely to have all been rounded.[160] All houses had A1-types of roof-bearing frames, although with some the irregularity of their placement may hint at an A2-type (*cf.* IJzereef & Van Regteren Altena 1991, 69 fig. 6).

It is difficult to interpret parts of the house plans in functional terms, as few hearths and no dividing walls, storage pits or stall-partitions have been recognized (IJzereef & Van Regteren Altena 1991, 77; Bakker *et al.* 1977, 208).[161] As two hearths at Bovenkarspel were situated between the third and fourth westernmost trusses, the (north)west part may have been the living area (IJzereef & Van Regteren Altena 1991, 70).[162] Ridge-posts do occur with some houses (*e.g.* Bakker *et al.* 1968, 197 fig. 4), but the frequency of their occurrence cannot be assessed with the present state of publication. The same problem exists for repairs, as IJzereef and Van Regteren Altena (1991, 74) discuss under 'renovations' repairs, extensions, overbuilding as well as rebuilding.

Based on a comparison between the numbers of house-sites and house-phases, some insight can still be gained into house-site dynamics. For a total of 95 known house-sites (with 138 house-phases) in West-Friesland, 44 (*c.* 46 %) are single-phased and 51 (*c.* 54 %) are multi-phased. The latter thus represent 1.8 house-phase per house-site, and a maximum of eleven phases is known (IJzereef & Van Regteren Altena 1991, 74). Preliminary site plans published for Bovenkarspel and Andijk (fig. 5.25; IJzereef 1989, 22-24), suggest that extending (*c.* 10 %), rebuilding (*c.* 16 %) and overbuilding (*c.* 19%) indeed were common.

For the dating of the houses from West-Friesland a fair number of, albeit indirect, radiocarbon dates are available.[163] At Bovenkarspel, 16 out of 19 samples that may serve as a *terminus post quem* for individual houses (and combined as a general *terminus ad quem*) range between 3080 and 2925 years BP, suggesting an occupation period that could have spanned the 14th century to 1000 cal BC (IJzereef & Van Regteren Altena 1991, 64).[164] The

157 Bovenkarspel - 't Valkje and Andijk (IJzereef 1981; IJzereef & Van Regteren Altena 1991), Hoogkarspel - Watertoren (Bakker *et al.* 1977), Medemblik - Schuitenvoerderslaan (Besteman 1974, 51-53), Westwoud (Buurman 1996c), Zwaagdijk (Ufkes & Veldhuis 2003) and Opmeer (Lohof & Vaars 2005), Medemblik - Schepenwijk II (Schurmans 2008.).

158 If this is calculated for the Middle Bronze Age and presumably Late Bronze Age period (*i.e.* 200 house-phases), this figure drops below 10 % (21 out of 218).

159 Bakker *et al.* 1968, 196-197 fig. 3-4; Brandt 1980b, 141 fig. 3; 142 fig. 4. The use of larger posts (W3) at Zwaagdijk as suggested by Ufkes and Veldhuis would in one case lead to improbable house widths (2003, 44 fig. 3.1) and may alternatively represent a less-well preserved additional house-phases (esp. Ufkes & Veldhuis 2003, 51 fig. 3.6). These W3 walls should for the time being be dismissed as erroneous (but see for a possible example Lohof & Vaars 2005, 14 (s28).

160 IJzereef and Van Regteren Altena (1991, 69) estimate that entrance portals and house-site ditches are present with 95 % of the houses at Andijk and Bovenkarspel. They are also present with the houses at Hoogkarspel (Bakker 1997) and at Zwaagdijk (houses 1-3; Ufkes 2003, 44-53). At Opmeer, no roof-bearing posts (nor entrance portals) could be identified for a house-site that was nonetheless evident by its house-site ditches (Lohof & Vaars 2005, 17 fig. 6).

161 The extra posts in the centre-aisle of houses 2a and 2a at Hoogkarspel possibly supported a dividing wall (Bakker *et al.* 1968, 197 fig. 4).

162 IJzereef and Van Regteren Altena (1991, 70) use the observation that houses are frequently extended only towards the (south)east and the more frequent occurrence of short-side house-site ditches in the(north)west as an additional argument for the longitudinally differentiated functions of these houses.

163 Especially Van Regteren Altena *et al.* 1977, 250-256; 1980, 32; Buurman 1996c, 112; Lanting & Van der Plicht 2003, 159; 185-186.

164 Lanting & Van der Plicht 2003, 159; 185-186. The mean value for these is 3005 yr BP with a standard deviation of 45 yrs BP.

other radiocarbon dates from this site indicate that use of the area may have started already a century before this period, and is likely to have continued until the very start of the Early Iron Age.[165] For the latter phase, however, no house plans but only the ditches around (raised) house-sites are known (IJzereef & Van Regteren Altena 1991, 66, *cf.* Bakker & Brandt 1966). The eight samples dated for Andijk were bones which were pre-treated with preservative, which may have resulted in relatively old BP ages. Furthermore, some abnormalities in $\delta^{13}C$ were observed. These samples are therefore best disregarded (Lanting & Van der Plicht 2003, 185). Charcoal from the house-site ditch around house B at Medemblik - Schuitenvoerderslaan, like at Bovenkarspel, provides a *terminus post quem* age of *c.* 1380-1000 cal BC.[166] Five *terminus post quem* dates are available for one single house at Westwoud, that may have been erected after or during *c.* 1380-1120 cal BC (Buurman 1996c, 112; Lanting & Van der Plicht 2003, 186). Finally, two dates on bone from the house-sites ditches of two houses at Zwaagdijk, fit well with the idea that three-aisled houses with house-site ditches were erected during the Middle Bronze Age-B. It should be stressed that at several sites, a prolongation of occupation into the Late Bronze Age may be expected, but that the absence of houses (predominantly related to feature preservation; raised dwelling mounds are more susceptible to later erosion) is the key reason for not discussing relevant dates at this point (but see section 5.2.4).

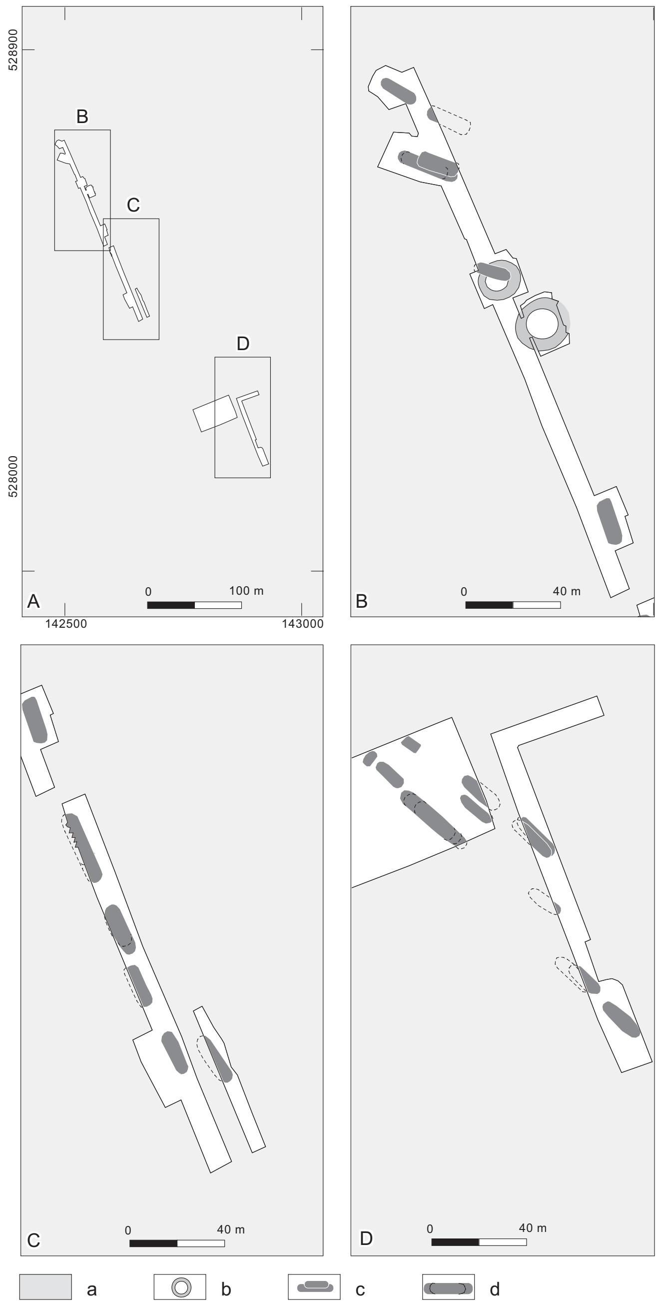


Fig. 5.25 Preliminary schematic overview of the results of the Andijk excavations showing the number of overbuilt and extended houses (after IJzereef 1989, 24, approximate coordinates).

a: not excavated, b: barrows, c: (overbuilt) house, d: house with extension phases.

Houses from other geogentic regions?

In addition to the four most extensive geogenetic regions that have proven to be rich in Bronze Age settlement data, the data from three smaller geogentic regions are now discussed. As fewer numbers of houses from a more restricted number of different sites are known for these areas, questions of representativeness may arise. Nonetheless, the available data can be compared with adjacent areas and studied for similarities or specific differences.

165 Van Regteren Altena *et al.* 1977, 250-256; 1980, 32.

166 GrN-6335: 2955 ± 55 BP; Van Regteren Altena *et al.* 1977, 250.

The ice-pushed hills and associated deposits

The first of these smaller geogenetic areas are the ice-pushed hills and associated deposits directly north of the eastern river area. From this region only two settlement sites that have yielded reliable Middle Bronze Age houses are known: Rhenen - Remmerden and Apeldoorn - Nuon terrein.[167] At the site Rhenen - Remmerden, features from the Early- (Jongste 2001) and Middle Bronze Age have been uncovered, but only for the latter period can four reliable houses be recognized (Van Hoof & Meurkens 2007). They measure between 10.5 and 21.2 m in length and were presumably *c.* 5.8 m wide. House 4 measured 21.2 m in length, but this is the result of an extension phase, as is indicated by a difference in regularity in the spacing of the roof-bearing posts.[168] As no walls proper have been attested, this width is based on the width of the roof-bearing frame and the outer posts or side-entrance of house 2 (Van Hoof & Meurkens 2007, 34-36).

Three houses (and a tentative fourth; Jongste 2001, 30-31) comprise a roof-bearing frame of two lines of posts. The shape of the two lines is relatively straight to tapering or cigar-shaped. With house 5, two features with a more narrow span at the eastern short side may indicate an entrance(portal), but the features have not been sectioned (Van Hoof & Meurkens 2007, 41-42). The other houses have no additional features near their short sides, allowing for both gabled or hipped roof reconstructions. Ditches, closing- or ridge posts, dividing walls or stall partitions are absent. At least one and possibly two houses have pits situated within their ground plans that are interpreted as storage pits.

No direct dates are available for the houses at Rhenen, but house 4 has yielded ceramics from a posthole of a roof-bearing post that was almost identical to pottery from a pit in its centre aisle (that was dated by charcoal to *c.* 1270-1040 cal BC; Van Hoof & Meurkens 2007; Arnoldussen & Ball 2007).[169] From one of the roof-bearing posts in the eastern part of this house, a bronze spearhead datable to the Middle or Late Bronze Age was found (Chapter 3; fig. 3.13, B). As the other houses show similarities in their roof-bearing structure to house 4, a phasing late in the Middle Bronze Age-B may be expected for the three other Middle Bronze Age-B houses.

At Apeldoorn - Nuon terrein, two partial and one complete presumable three-aisled house plans were uncovered (Williams 2007, 19). They consisted of two relatively straight rows of roof-bearing posts, placed 2.45 to 3.1 m apart. For some house plans, outer (wall?) posts were identified, but the depth of these have not been published and they do not show a consistent placement, suggesting that this interpretation may be challenged. No direct evidence on the dating of these structures is available. With the longest (*c.* 21 m) fully uncovered plan, a pit was found between two roof-bearing posts that yielded a large part (*c.* 320 sherds) of a single vessel that was dated to the Late Bronze Age - Early Iron Age transition (Bloo 2007, 29). While these house plan may date to the Middle Bronze Age on the basis of the constructional features, a Late Bronze Age or even Early Iron Age date cannot be excluded.[170]

For a house plan uncovered at Elst - ‘t Woud (Van Tent 1988), a Middle Bronze Age-B date has also been claimed (Huijts 1992, 46-47), but no direct evidence is available. The structure of the house plan, with its narrow span and large, rectangular outer posts, does not fit well within the wider corpus of Middle Bronze Age-B house plans. Van Tent (1998, 13) suggested a Late Bronze Age to Early Iron Age date, but again only on indirectly associated ceramics. Until parallels are available that allow better dating of the house plan from Elst - ‘t Woud, it is best considered not to be a Bronze Age house.

167 Rhenen - Remmerden is situated on the sandr deposits south of the ice-pushed hills of Utrecht (Van Hoof & Meurkens 2007), but see also Lehmann 1969; Hulst 1969; Van Tent 1988; Houkes 2000/2001; Meurkens 2006 on other Bronze Age occupation traces from this area. For Apeldoorn - Nuonterrein see Williams 2007.

168 The less regular northwest part of seven trusses (*c.* 11 m) was extended by five more trusses (or *vice versa*) in the southeast. The transition is visible as a very narrow spacing (*c.* 50 cm; Van Hoof & Meurkens 2007, 38 fig. 5.12). From the eastern part originated the final Middle Bronze Age-B to Late Bronze Age ceramics and a bronze spearhead (*ibid.*; fig. 3.13, B).

169 Poz-14567: 2950 ± 30 BP; Van Hoof & Meurkens 2007, 41.

170 The fact that the span of the rows of roof-bearing posts is relatively wide (3-3.1 m) with houses 1 and 3, might favour a Middle- rather than Late Bronze Age dating (*cf.* section 5.24), but is not an reliable argument. Consequently, the data for Apeldoorn - Nuon terrein have not been integrated into the data set used in sections 5.2.3.4 and 7.3.2.

Coastal areas

The coastal region incorporates settlement sites situated on near-coastal Pleistocene outcrops (Texel - Den Burg; Woltering 2000), coastal barriers such as at Velsen (Velsen - Westlaan; Bosman & Soonius 1990, Velsen - P63; Bloemers & Therkorn 2003; Therkorn 2008) and Den Haag - Statenhal (Meurkens & Hamburg 2007). Of these sites, only Texel - Den Burg and Den Haag - Statenhal have been published in full, which means that the fourteen presently known Middle Bronze Age building-phases are likely to be an under-representation.[171]

The houses from these areas measure 15 to 27 m in length. All houses have A-types of roof-bearing frames and walls are generally not preserved. [172] The only preserved wall-ditch fragment at Velsen may indicate a width of 6.2 m. The shapes of the houses' short sides is generally not visible, but some indirect indications for rounded short sides are available. These are the occurrence of entrance portals (*e.g.* Velsen - Rugbyveld, Velsen - P63 and Texel - Den Burg house-phase E, possibly also F; *c.* 35 %), the more narrow span near the short side of some houses (*e.g.* Texel - Den Burg house B) and the rounded shape of the house-site drainage ditches that girded house-sites at Texel - Den Burg and at Velsen - Westlaan.

Structural additions such as dividing walls, stalls or elaborate entrance portals have not yet been documented. Only the house from Den Haag - Statenhal has six possible ridge-posts. Although one possible hearth has been observed (Bosman & Soonius 1990, 3), its position is not known and it cannot be used to indicate functional divisions within the house(s). Entrances were presumably situated in the short sides, although one rather tentative long side entrance has been suggested (Woltering 2000, 36). Save for the remarkable pit that contained the deposition of a calf and two cow-skulls already discussed earlier (section 3.4.3; fig. 3.13, C), no pits could be interpreted as reliably belonging to the houses.[173] Repairs may have been frequent, as roof-bearing posts have been doubled in at least five houses (*c.* 36 %).[174] Almost as frequently, houses were rebuilt on nearly the same spot. The houses from Den Haag - Statenhal and Velsen - Rugbyveld appear to have been rebuilt in an identical fashion on-the-spot (Meurkens & Hamburg 2007; Brandt 1988, 69). House-phases C-E at Texel - Den Burg are so similar that these proved difficult to disentangle (but see Woltering 2000, 34-38). Such similarities blur the distinction between overbuilding and rebuilding. At Velsen - Westlaan, two very similar buildings (houses or barns?) overlap each other and at Velsen - P63 possibly three very similar house-phases cannot have been contemporaneous.[175] The farmhouse of Velsen - P63 may have been extended, as two entrance portals can be observed (fig. 3.13, C). In more general terms, none of the coastal house-sites appear to be single-phased: all houses are overbuilt or rebuilt.[176] This is a significantly different situation compared to all other regions.

The dating of the houses in this region is purely indirect. The house from Velsen - Rugbyveld is dated on geological grounds and by small undecorated pottery fragments to the Late Bronze Age (Brandt 1988b, 69). It is structurally similar to houses from the two other Velsen sites, which are likely to date to the (middle to end of the?) Middle Bronze Age-B (*infra*). For the house-phases at Velsen - P63, a *terminus ante quem* of *c.* 1040-840 cal BC may be provided by charcoal from the arable layer that covered the house-site remains.[177] Three samples of dated bone from the house-ditches around the unpublished house of Velsen - Westlaan may indicate a general phase of use around *c.* 1390-1130 cal BC.[178] A charcoal sample from the postholes of the house(s) at Den Haag - Statenhal was

171 Especially for the Velsen sites the digitally available excavation plans indicate several possible additional house-phases.

172 A1: 57 %, A1/A2: 14 %, A2: 14 % and three indeterminable roof-bearing structures, *cf.* table 5.6.

173 *Cf.* Woltering 2000, 40.

174 Two not yet published possible house phases at Velserbroek P63 ('brown' and 'green') also both have doubled roof-bearing posts, which would raise the percentage to 43 % (7 out of 16).

175 Although the 'green' and 'brown' phase could have been contemporaneous (*supra*).

176 Some nuance is required as houses G and F at Texel - Den Burg differ in orientation from the houses by which they are overbuilt. With the other house-phases at this and the other sites more correspondence in orientation can be observed, which causes blurring between rebuilding and overbuilding.

177 GrN-14687: 2975 ± 35 BP; stratigraphic observations and two radiocarbon dates suggest that the earliest activities at Velsen - P63 took place during the 14th or 13th century cal BC (Therkorn 2008).

178 Combined (Oxcal 3.10) two sigma ranges of GrN-17783: 2960 ± 70 BP, GrN-17781: 3020 ± 50 BP and GrN-17782: 3055 ± 60 BP (Lanting & Van der Plicht 2003, 187). One of these dates is from a circular ditch, which is a common feature type at settlement sites in West-Friesland. They have also been found at Texel, but are as yet absent from Den Haag (*cf.* Buurman 1996, 206; Ufkes & Veldhuis 2003; Lohof & Vaars 2005), suggesting that the northern part of the coastal areas may have been in close contact with West-Friesland.

dated to *c.* 1270-1020 cal BC.[179] For Texel - Den Burg, radiocarbon dated samples from a pit near – and from the house-site ditches around – houses A to E can only indicate a general occupation period of *c.* 1200-830 cal BC.[180] These indirect dates suggest that in this region the tradition of constructing large three-aisled houses may have continued from the middle of the Middle Bronze Age-B to into, or even throughout, the Late Bronze Age.

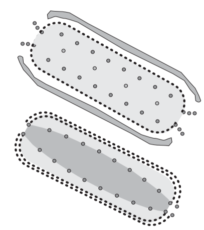
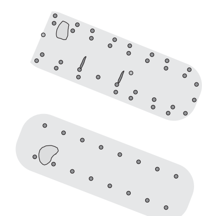
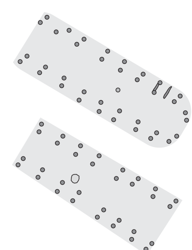
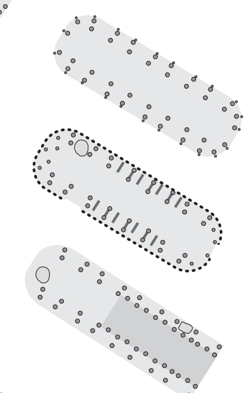
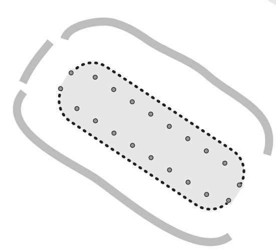
Area	Characteristics	
River area (n = 59)	Type A1 and A2 roof-bearing frames (c. 88 %) Rounded short ends with entrances (1 tentative straight short side), occasional (c. 8 %) long side entrances Type W1 and W2 walls Entrance portals (c. 42 %) and elaborate entrance portals (c. 27 %) Eaves-drip ditches (c. 12 %) and house-site ditches (c. 5 %) No partitioning walls (1 tentative stall) No storage pits, few (4) tentative hearths in w / nw Repairs 37 %, rebuilding 10-17 %, two (c. 3 % extended) No overbuilding by houses Overbuilding by outbuildings (c. 20 %), high feature densities	
Southern Netherlands (n = 26)	Type A1 (c. 46 %) and B1b (c. 35 %) roof-bearing frames Both straight and rounded short ends, some combined Long side entrances (c. 23 %), 1 tentative short side entrance No walls preserved Six tentative entrance portals, one clear No eaves-drip ditches or house-site ditches Some partitioning walls (c. 19 %) Storage pits, in centre or side (c. 19 %), 2 tentative hearths (nw) Repairs 31 %, four houses rebuilt (c. 15 %), two extended (c. 8 %) No overbuilding of houses, low feature densities	
Eastern Netherlands (n = 16)	Type B1b (c. 37 %), B1b/B1c (c. 19 %) and A1 (c. 31 %) roof-bearing frames Both houses with at least one rounded short side (c. 44 %) and houses with two possible straight short sides (c. 37 %) Short side entrances (c. 30 %) and long side entrances (c. 12 %) Wattlework wall and wall foundation ditch both documented Possible EP's, 1 clear EEP (with B2b house); together c. 37 % No hearths, eaves-drip ditches or house-site ditches Almost no partitioning walls (one) or storage pits (three) Repairs 25 %, two houses rebuilt (c. 12 %), one extended No overbuilding of houses, low feature densities	
Northern Netherlands (n = 51 (93))	Type B1b (47 %) and B2b (40 % houses), remainder frequently of varied or unclear types B1b generally has rounded short sides, frequently with entrance, some long side entrances observed B2b living area short side rounded, byre short side varied B2b has entrances opposed in long sides, at transition (hall) of living-area to byre part, some short side entrances Varied wall constructions Stalls in seven B1b houses, possibly in central part Hearths with B1b's possibly more frequently in nw part, possibly near hall with B2b's Pits in side- (common) or main aisle current (c. 29 %). House construction and extensions with house-compartments of preferred nos. of trusses. Repairs c. 33 %, rebuilding absent or infrequent (c. 3%) Extensions frequent (c. 31 %; of which 50 % twice) Overbuilding occurs (c. 19 %), generally low feature density	
West-Friesland (n = 138 (218))	Invariably A-types, majority A1, some A1/A2 Both short sides rounded, indicated by entrance portals Walls of wattle-work, wall-ditches rare No stalls, storage pits or clear dividing walls Few hearths in north-west (living?) part Multi-phased house-site common (c. 54 %), with two to eleven house-phases. Rebuilding (c. 16 %) and extending (c. 10 %) occurs Difference between overbuilding (c. 19 %) and rebuilding not always clear because of lack of detailed publication Moderately high feature densities	

Table 5.6 Comparison of main characteristics for MBA houses in the different geogentic regions.

179 Poz-19510: 2935 ± 35 BP; Meurkens & Hamburg 2007, 26.

180 GrN-18218: 2800 ± 30 and GrN-18233: 2660 ± 140 BP respectively (Woltering 2000, 25). The date and contents of a nearby barrow may indicate a somewhat earlier (14th century BC) start of Bronze Age useage of the area (Woltering 1975, 21; 2000; 22).

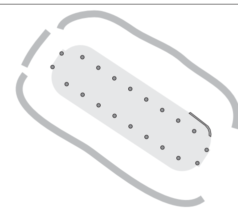
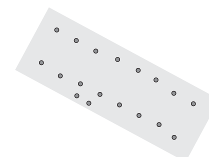
Area	Characteristics	
Coastal areas (n = 16)	Invariably type A1 houses, entrance portals (c. 35%) indicate rounded short sides and the entrances No reliable long-side entrances Functional divisions unclear, no stalls or dividing walls Wall-ditches observed, house-site ditches common Repairs are frequent (c. 36 %) and at least two rebuilt houses and one extended house are known No single-phased house-sites! All overbuilt or rebuilt Moderate to high feature densities	
Ice-pushed hills (sandur) (n = 4)	Type A1 or irregular A1 (n = 4), no wall preserved No direct indications for shape of short sides (weak indirect indication for both rounded and straight) Long side entrances, one possible EP in short side No stalls, dividing walls, ditches or hearts documented Pits in side-aisles or centre Repairs and extensions known, one house overlaps with outbuilding. No overbuilding or rebuilding of houses documented. Generally low feature densities	

Table 5.6 (continued) Comparison of main characteristics for MBA houses in the different geogentic regions.

5.2.3.4 A supra-regional approach to Middle Bronze Age houses

As is clear from the summary of the regional data in table 5.6, regionally specific patterns can be outlined by looking at the (composition of different) roof-bearing types, the presence of regionally specific traits such as elaborate entrance portals or archaeologically visible stall partitions. In addition, variations in the shapes of the houses' short sides (although predominantly rounded) and entrances can be charted regionally. Quite significantly, regional differences can also be indicated when looking at house-site life-histories. For instance, in the Southern Netherlands overbuilding is absent, whereas in the coastal areas all houses are rebuilt or overbuilt. As another example, the extension of houses appears to be a typical pattern for the northern Netherlands. A more detailed discussion of these patterns is undertaken in section 7.3.6.

Despite regional differences, the Middle Bronze Age houses share several characteristics at supra-regional levels. This implies that certain aspects (such as wall options, type of roof-bearing structure and location of entrances) were open to (regional) manipulation, whereas others were not (such as the choice for an other than three-aisled structure, or the mean spacing of the roof-bearing posts). In general, all houses are reasonably clear three-aisled structures, differing only essentially in the number of lines of roof-bearing posts (two or four). Entrances are commonly situated in the short sides, but the southern Netherlands and possibly the area of the ice-pushed hills yield exceptions. Furthermore, no extreme differences in size have been documented. Farmhouses in all areas measure around 20 m mean and are 5 to 6.5 m wide (fig. 5.26).

The histogram data show a distinct decline beyond 28 m in length (fig. 5.26, A). In the more detailed discussions above for the eastern and northern Netherlands it has been argued that houses above 30-35 m in length are unlikely to represent single house-phases. House-length appears to have been a variable open to manipulation, as at several settlement sites both longer and shorter houses occur (*cf.* fig. 8.5). The number of (paired?) sets of (inner) roof-bearing posts is correlated with farmhouse length. A crude approximation can be derived by dividing the recorded farmhouse length by the numbers of trusses recorded, which yields a mean value of 2.11 m for 175 houses.[181] As indeed many houses showed indications that roof-bearing posts were spaced at *c.* 2.2 m interval, the mean spacing for all sufficiently published Dutch Middle Bronze Age houses has been recorded (fig. 5.27, A).[182] As in this data set houses from all geogenetic regions are incorporated, the proper longitudinal spacing of roof-bearing posts was evidently an element of Middle Bronze Age farmhouse construction that transcended regional styles (fig. 5.27 and fig. 5.28). In addition to the general clustering of the span around 2.6-3.4 m and the spacing of 1.9 to 2.3 m (fig. 5.27,

181 The standard deviation is 0.43 meter.

182 Mean values preferably determined by measuring all available longitudinal spacings (feature core to core) and dividing by the number of observations. As sometimes only very large-scale ground plans were available, not all spacings could be recorded with this precision and sometimes descriptions had to be relied on.

B), some regionally different distributions may be outlined. Houses from the north(eastern) Netherlands more often show a smaller span, whereas some of the houses from the southern Netherlands have the widest span.[183]

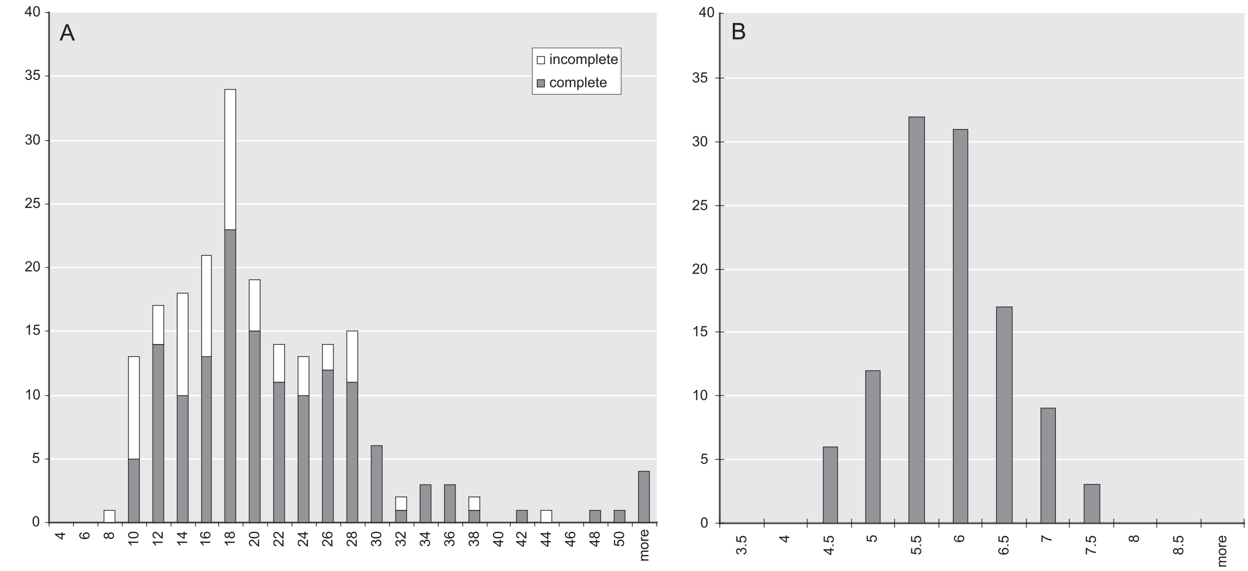


Fig. 5.26 Histograms for the length (A, x-axis in m) of complete (n = 145) and incomplete (n = 58) Middle Bronze Age houses and the width (B, x-axis in m) of 110 Middle Bronze Age houses in meters.

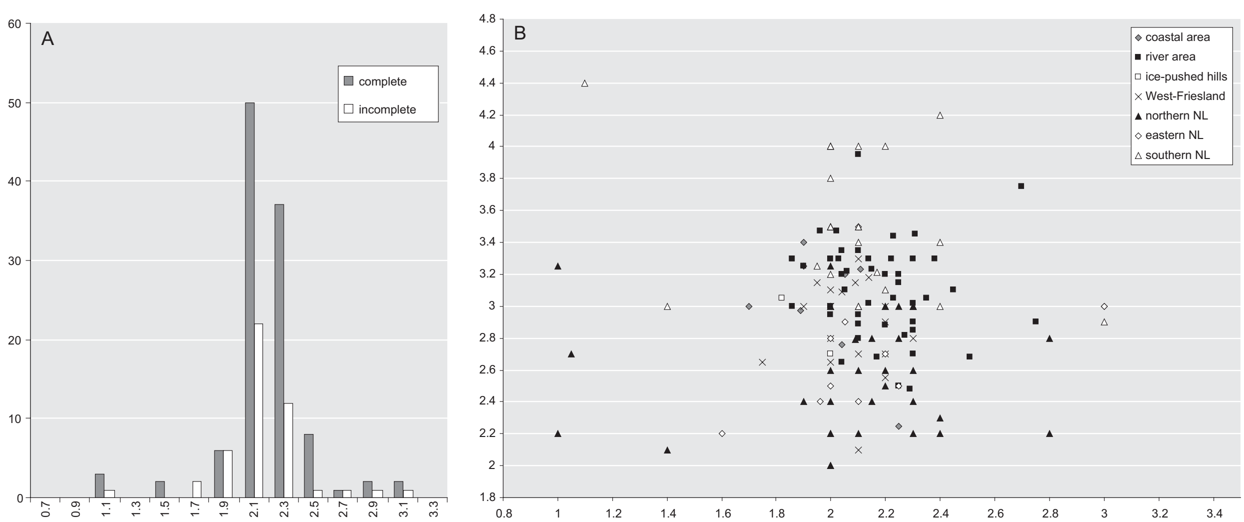


Fig. 5.27 Histogram showing the mean spacing for 111 complete and 58 incomplete reliable Middle Bronze Age houses (A) and a plot for the spacing (x-axis) versus span (y-axis) relation for 149 Middle Bronze Age houses from the different geogentic regions (B). All x-axes and B's y-axis values in meters.

On the spacing of roof-bearing posts with Middle Bronze Age farmhouses

The diagram in the left part of fig. 5.27 shows that 84 % of the reliable Middle Bronze Age(-B) houses has a mean spacing between 1.9 and 2.3 m (*cf.* Gröhn 2004, 325). This justifies looking for constructional arguments why such a particular spacing occurred.

183 The few data-points around 1 m spacing are presumably incomplete (byre?) parts of B2b farmhouses.

It seems improbable that technical constraints necessitated such a spacing. With some farmhouses, the width to be spanned by a cross-beam or portal-construction reached 3.8 to 4.2 m. These dimensions suggest that construction wood and techniques allowed such wide distances to be bridged with sufficient structural stability.

Another explanation for the consistent spacing that may be forwarded is that this dimensioning allowed for the easy stalling of a fixed number of head of cattle in between.[184] The stall-partitions observed with the Regteren farmhouse (fig. 5.20, no 3) indicate that stall partition walls do indeed sometimes occur at and between the roof-bearing posts.

There are, however, two major issues left unexplained by this argumentation. First of all, it has been argued that archaeologically visible stall partitions may have been a Nordic tradition.[185] If stalling and the observed spacing were strongly correlated, one may expect farmhouses from the northernmost area to be the principle, or even exclusive, ones to show such a particular spacing, but this not the case. Most Middle Bronze Age farmhouses from all different geogentical regions seem to conform to this particular spacing (fig. 5.28).[186]

Secondly, there are several indications (albeit weak; *e.g.* hearths, dividing walls, stall-partitions, long side entrances) that Middle Bronze Age farmhouses had a longitudinal functional segmentation. Even if a mean 2.2 m spacing was favoured or considered essential to 'proper' stalling of livestock, there is no convincing argumentation why this particular rhythm of roof-bearing posts should continue into the other functional areas of the house. As is clear from figure 5.28, this rhythm was indeed maintained throughout the full length of the farmhouse building.

To explain why this property of house construction in particular was so widely shared and rigidly adhered to is difficult. Inspired by structuralist approaches such as those of Bourdieu (1973), Cunningham (1973) and Lévi-Strauss (1982; 1987), Gröhn recently (2004, 321; 325) commented on a similar observed rigidity in the construction of Swedish Middle Bronze Age to Early Iron Age houses. She argues that it reflected a normative building tradition that '…put importance on exact measurements, straight lines and conformity between post sizes.' and 'Perhaps it was to honour certain cosmological principles' (Gröhn 2004, 333). Although such an interpretation may be valid, it cannot be tested archaeologically. Moreover, it does not help explain why in the Dutch case some architectural elements (walls, house-shapes) were allowed more variation and other aspects were evidently not open to regional variation.

In any case, ethnographic information suggests that we perhaps need not immediately escape to archaeologically indefinable cosmological influences, as house-building traditions may also be influenced by social processes at a smaller human(ly influenced or influenceable) scale. Besides a generally ascribed strong traditionality in house-construction,[187] construction processes may also be tailored to specific humans or to human scales in general. A very appropriate example is offered by Kerlogue (2003), who discusses the house-construction of Seberang, in central Sumatra. In this area, it was customary for a married couple to:

> *'… live in the bride's mother's house until they can afford to build a house of their own. When this is built, tradition dictates that the armspan of the wife determines the distance between the posts.'* (Kerlogue 2003, 185, *cf.* Waterson 1990, 129-130).

It is possible that when setting out the roof-bearing posts of Dutch Middle Bronze Age houses, some sort of measuring system based on bodily proportions was used (*e.g.* eight feet or two paces), as systems based on bodily proportions

184 Waterbolk's (1975, 392 fig. 5) analysis suggests a mean stall-partition width of 108 cm for Bronze Age farmhouses (*cf.* Tesch 1993, 162; 165; Gröhn 2004, 275). The Late Bronze Age house of Snedbæk (Bertelsen *et al.* 1996, 192) displays stalls regularly spaced at 1 m interval. Based on size estimates, technically up to four animals could be stalled in 2.2 m compartments, but perhaps lower numbers (two) are more reasonable (*cf.* Waterbolk 1975, 386, who considers boxes smaller than 1.2 m in width as single boxes).

185 *Cf.* Harsema 1993b, 107; Willroth 2002, 114; fig. 5.17.

186 Save for individual outliers, the largest coherent group of houses not conforming to this mean spacing are some of the B2b houses at Elp (Waterbolk 1964). There, some houses do conform reasonably well (ignoring the extra inset posts in the byre section) such as houses 7 or 12, but frequently the rhythm is disturbed by a wider spacing at the transition to the byre, by adding more than one extra post at 1 m spacing in the byre section (*e.g.* houses 5, 9 and 12) or by increasing the spacing in the presumable living area (*ibid.*).

187 *E.g.* Denyer 1978, 159; Oliver 1989, 56; Drucker-Brown 2001, 670.

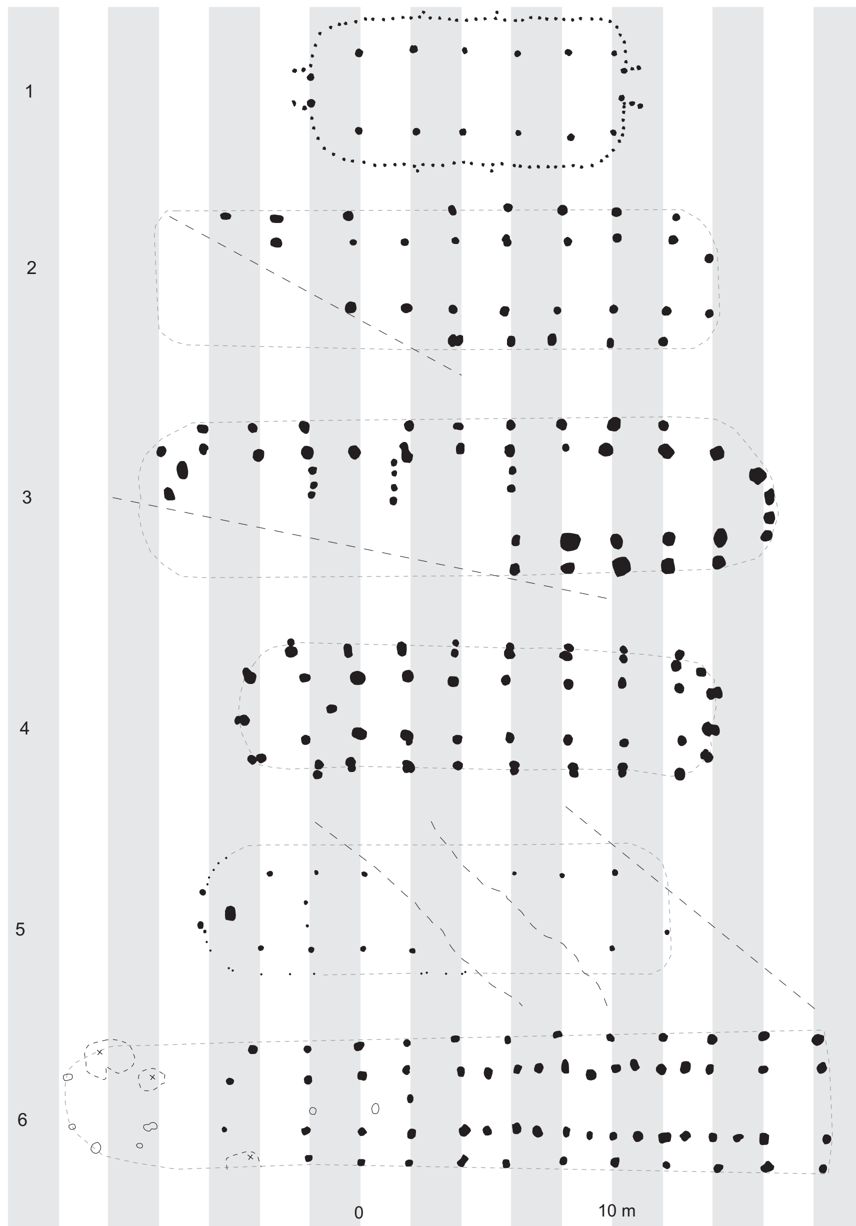


Fig. 5.28 MBA farmhouses with a regular *c*. 2.2 m mean spacing from different geogentic regions and of different types (1: Zijderveld house 2 (river area; Knippenberg & Jongste 2005), 2: Colmschate (eastern coversand; Verlinde 1991a), 3: Venray (southern coversand; Stoepker *et al*. 2000), 4: Hijken (northeastern boulder-clay; Harsema 1991), 5: Hoogkarspel (West-Friesland; Bakker *et al.* 1968), 6: Elp (northeastern boulder-clay; Waterbolk 1987)).

are a common means of measuring in non-industrial societies.[188] It does not explain however why especially the roof-bearing posts, perhaps more than other elements of the house construction(ing), were more persistently and supra-regionally rule-bound. This matter is likely to remain unsolved, but some indications on the nature of such rules may be obtained from anthropological studies.

188 *Cf.* Migeod 1916, 108; Ingrams 1935, 371-372; Smith 1946, 586; Hallowell 1955, 209; Ponulele 1984, 28; Agorash 1985, 105; Waterson 1990, 129; Fox 1993b, 148; Aubry & Sapic 1997; Lubeigt 1997, 560; Kaloni 1997, 600-601; Padma 2001, 24; Kerlogue 2003, 185; Nas 2003, 138-140 and Nas & Brakus 2004.

In cases where house-posts are interpreted within cosmological frameworks, these are frequently interpreted in terms referring to the human body (posts being the bones, spine or nose of the house),[189] or to (gendered) human social relations (husband/wife, mother/father, brother/sister, prince/princess).[190] In some societies, posts are even made to refer explicitly to ancestors through the depiction of ancestral crests, motifs or anthropomorphic resemblances (Waterson 1995, 54; 1997). The Dogon *togu na* often provide explicit examples thereof, with forked posts being identified as the eight ancestral founders and frequently displaying male and female imagery of genitalia or breasts.[191] Another example are the Tanimbar *tavu*, which are wooden panels that were commonly fixed into the roof-bearing structure. They often depicted anthropomorphic ancestral persons, some with arms extending in order to support a house beam (*e.g.* McKinnon 2000, 165 fig. 8.2). Another example is provided by the Lanyü Yami house-posts that were decorated with the ancestral hero *Magamoag* (Waterson 1990, 124 fig. 118). Evidently, (semi-)structural elements of houses may thus provide '… a vehicle for the expressing of relations to the past and connections with the ancestors.' (Waterson 2003, 48).[192] In other societies, the concept and process of house-building in itself is considered an ancestral gift (*e.g.* De Coppet 1985, 80; 83), and as such is not open to manipulation.

Possibly, such associations between house posts and ancestral anatomy and/or genealogy also applied to Bronze Age buildings. If household fertility was (in part) seen as being reliant on the proper relations with (household) ancestors,[193] ensuring proper embedding of the house within cosmic schemes will have been an important property for Bronze Age agricultural communities (*cf.* Wilson 1997, 114-116). Therefore, house posts that could have represented ancestral anatomy or genealogy, may have been less open to manipulation than other house-properties. Archaeologists are perhaps inclined to neglect that besides evident functionality, house posts may have had various additional (or possibly even more crucial) aspects of significance, or in the words of Rapoport:

> *'Meaning is, in some ways, the most important function of the built environment rather than something added to instrumental function'* (Rapoport 1997, 94).

The fact that specific structural properties (*e.g.* three-aisled layout, spacing) were shared across different regions and were not open to manipulation, suggests that the meanings materialized in the three-aisled nature of the farmhouse and the spacing of its roof-bearing posts were also shared. What exactly such meanings entailed cannot be known, but as it was evidently not to be meddled with, it was probably perceived as affecting the well-being of the household and communities at large scales in the long term.

The regularity in ground plans that resulted from such an outspokenly conservative house building strategy, increases their archaeological visibility. This in turn explains why so many are known and have consequently been dated (fig. 5.12). Yet, after this period of relative standardisation and good recognizability of house plans, the nature of houses (and their surroundings; section 7.4.2) seems to change again at the end of the Middle Bronze Age-B. More properties of house construction appear to be open to more manipulation in smaller regions. The details of this development are discussed below.

5.2.4 Late Bronze Age houses; the demise of supra-regional similarities

After a period of four to five centuries during which Middle Bronze Age-B houses were characterized by several supra-regional similarities, the Late Bronze Age brings significant diversification in house structures, forms and

189 *E.g.* Rigby 1973, 270; Kana 1980, 228-229; Van Meijl 1993, 207; Bloch 1995, 78; Gillespie 2000, 143-144; Joyce 2000, 198; Waterson 2003, esp. 43; see also Oliver (1997, 569-598) on examples from Timor, Sulawesi and Cameroon.

190 *E.g.* Bourdieu 1973, 101-102; Cunningham 1973, 211; Kana 1980, 227; Waterson 1990, 126; 1993, 231; Young 1993, 195; Carsten 1995, 111; Gibson 1995, 141; 147; Kirch 2000, 111. This pattern appears especially strong in south-eastern Asia (*cf.* Gillespie 2000, 137), while in meso- and south-American cultures alternative interpretations (posts as mountains that serve as stellar- or sky supports (*e.g.* Wilbert 1981, 47; Hugh-Jones 1995, 234-235; Gillespie 2000, 143)) may be dominant.

191 Here, it is necessary to stress that the *togu na*, or big shelter, is not a house proper, but a low-roofed (male) meeting place (Spini & Spini 1977; Antogini & Spini 1997, 306).

192 Waterson argued already earlier (1990, 124) that house posts '… may be closely associated with house ancestors.'.

193 *E.g.* Waterson 1990, 34; 124; Bloch 1995, 83; Hubert 1997, 168; Morris 2000, 231; Gillespie 2000, 143-145; Gerritsen 2003, 63; Fokkens 2005e, 6.

sizes to the fore. It is striking that for a period spanning at least three centuries (*i.e.* 1100/1050-800 cal BC),[194] the number of house plans is only 32 to 42 % of those known for the Middle Bronze Age-B.[195] This may indicate that in general – much like for the Early and Middle Bronze Age-A (sections. 5.2.1-522) – we face again a period of poorer house visibility.

Moreover, the known Late Bronze Age houses are not evenly distributed over time for the various regions. In the north(-east)ern Netherlands, Elp-type houses may span the 12th to 9th century BC (fig. 5.24), while few other types of houses are known for the Late Bronze Age in that region.[196] From the eastern coversand area and the ice-pushed hills, a few relatively long Late Bronze Age houses are known, of which that from Rhenen (fig. 5.30, no 1) may date to the start of the Late Bronze Age.[197] These observations suggest that in these areas, the constructional properties for Late Bronze Age houses were either derived from, or similar to, those of the Middle Bronze Age-B.[198] In the southern coversand areas and the river area, no relatively long Late Bronze Age houses are known,[199] nor houses that can be reliably dated to the start of the Late Bronze Age period (*infra*). Such observations may indicate that constructing relatively long three-aisled houses may have been more common during the start of the Late Bronze Age, but there is insufficient data as yet to prove this for various regions. In any case, several dates for relatively short Late Bronze Age houses from the southern coversand area and the river area in particular, suggest that these date to the second century and a half of this period (*infra*).

So, several trends may be identified. In some areas, large and three-aisled houses not unlike those of the Middle Bronze Age-B were erected during the first half of the Late Bronze Age, but possibly throughout this entire period. In other areas, houses datable to the first half of the Late Bronze Age are relatively scarce. The various relatively short houses datable to the second half of the Late Bronze Age, show much variation in size, type of roof-bearing frame and constructional details (*cf.* fig. 5.30). It seems that the Middle Bronze Age-B 'template' of house construction, with its invariable three-aisled roof-bearing frame, regular post-spacing, rounded short sides and short side entrances, was – especially in the second half of the Late Bronze Age – no longer a valued or valid construction scheme (*cf.* sections 6.3.11 and 7.4). Many alternative construction schemes were used in different regions instead.

It is tempting to see this as an experimental phase preceding the period of (yet again) more standardized house construction in the Early Iron Age (*cf.* Fokkens 2005d, 76-77; *infra*), but our knowledge on the meaning of the different constructional schemes used, on the regional variations between them and the chronological resolution in general, is at present insufficient to confirm or refute such propositions. What in any case *is* clear, is that the interpretation of the increased house-type variation and an assumed decrease of mean house-size during the Late Bronze Age as reflecting house-hold fragmentation,[200] is not tenable for the Late Bronze Age (section 8.3.2). In order to investigate the validity of the trends suggested above and to gain more detailed insight into the – regionally variable – traditions of house-construction during the Late Bronze Age, several examples from the different physical geographical regions will be presented in the sections below.

The northern Netherlands

Perhaps the houses of the traditional Elp-type (B2b's), exemplify the transition. Several of the available radiocarbon dates from the eponymous site (Waterbolk 1987, 200) and especially the pottery recovered suggest that habitation

194 See section 7.4.1 for a critical approach to the (typo)chronology of the Late Bronze Age.
195 Based on 169 reasonably reliable Middle Bronze Age-B houses, versus 23 Late Bronze Age houses and 32 'Elp' (B2b; fig. 5.14) type houses. The 43 % is reached if a category of 18 'Middle or Late Bronze Age' houses is included.
196 But see fig. 5.29, no 4.
197 Van Hoof & Meurkens 2007, 37-41; Arnoldussen & Ball 2007, 184-185. A bronze spearhead was recovered from one of the postholes of this house; section 3.4.3, fig. 3.11, B. See also Williams (2007) on a possible Late Bronze Age date for the house plans at Apeldoorn - Nuon terrein.
198 See Meurkens & Hamburg 2007, 22-25 for a 15 m long three-aisled house from the coastal dunes with a *terminus post quem* (charcoal from posthole) age of *c.* 1270-1020 cal BC (Poz-19510: 2935 ± 35 BP).
199 See fig. 8.12 for a histogram of Middle and Late Bronze Age house length by period.
200 Fokkens 1997; 2003, 23-31.

(still?) took place during the 11th and 10th centuries BC.[201] If B2b is indeed a house-type that spanned into the Late Bronze Age (fig. 5.24, fig. 5.29, nos. 1-2), occupation datable to both the Middle Bronze Age and Late Bronze Age may also be assumed for several other sites in the Northern Netherlands where B2b-types of farmhouses are known.[202] It is probable that within the northern Netherlands, different house-types were constructed during the Late Bronze Age. The house plan from Roden (fig. 5.29, no 4; Harsema 1993a), is a B1b_W5/6 house for which a possible *terminus post quem* date of 1220-830 cal BC is available (Lanting & Van der Plicht 2003, 183).[203] At Texel - Den Burg, several houses may have been constructed during the Late Bronze Age (*c.* 10th century BC), as is indicated by a radiocarbon dated pit and the ceramics recovered (Woltering 2000, 40-42). For house J at this site (fig. 5.29, no 3; Woltering 2000, 43), a Late Bronze Age date is suggested by the sherds recovered from a pit situated southeast of a possible hearth.[204]

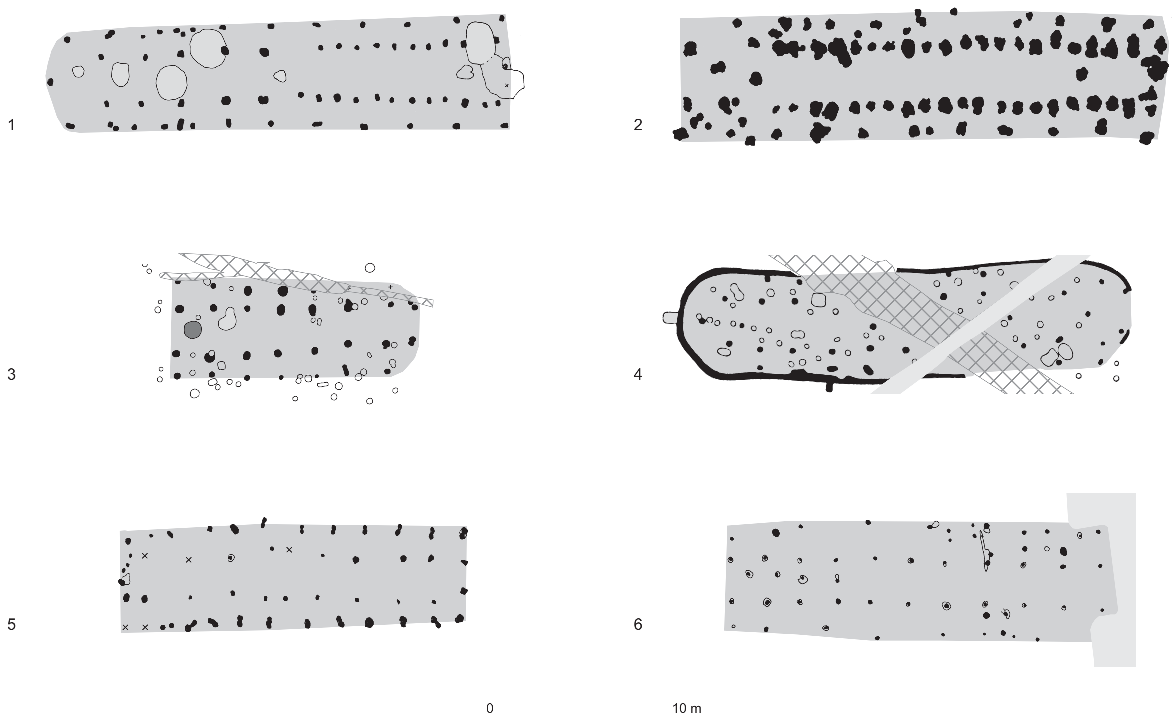


Fig. 5.29 Late Bronze Age houses from the northeastern and eastern part of the Netherlands and adjacent Germany (1: Elp (after Waterbolk 1964, 105 fig. 6), 2: Daverden (D; after Precht 2004, 398 fig. 1), 3: Texel (house J; after Woltering 2000, 43 fig. 25), 4: Roden (after Harsema 1993b, 101 fig. 1), 5: Raalte (after Groenewoudt 1999, 166 fig. 2), 6: Leesten (after Fontijn 1996, 39 fig. 3)).

201 In postholes of the B1b house (house 3) as well as B2b houses 5 and 12 at Elp, ceramics were recovered that clearly must date to the final (two?) century(ies?) of the Middle Bronze Age or to the Late Bronze Age (grooved line decorated, sharply profiled, rows of fingertip impression; Waterbolk 1964, 111-112 figs. 9-10, *cf.* Arnoldussen & Ball 2007).

202 *E.g.* Angelslo-Emmerhout (Van der Waals & Butler 1976), Emmen-Oude Roswinkelerweg (Drenth 1988), Dalen-Westakkers (Kooi 1994), Borger (Kooi 1991; Kooi & De Wit 2003; 2005). The B2b of house of Daverden (D) is likely to have been used around 1120-826 cal BC based on two radiocarbon dates (KIA-12932: 2855 ± 28 (charcoal from posthole) and KIA-8209: 2677 ± 25 BP (charcoal from associated pit); Precht 2004, 398-399; Precht, pers. comm., April 2007).

203 Unfortunately, no ceramics that could support this assumed Late Bronze Age date have been published for this site.

204 Woltering (2000, 43), but see Van Heeringen 2005, 585 who argues for an Early Iron Age date for house J. In any case houses A-E (end Middle Bronze Age-B to Late Bronze Age) and H-J & U (Late Bronze Age-Early Iron Age) do not differ significantly in orientation, which may indicate that (if at all present) the time lapse between these occupation periods did not cause the main axis or orientation to be changed (*cf.* Chapter 6).

The eastern Netherlands

At Leesten, an at least 22 m long farmhouse was excavated of which one of the posts cross-cut a pit with presumably Late Bronze Age ceramics (fig. 5.29, 6; Fontijn 1996, 39 fig. 3; 47). The smaller span of the two inner rows of roof-bearing posts also distinguishes it from Middle Bronze Age-B farmhouses. At Raalte (fig. 5.29, no 5; Groenewoudt *et al*. 2000) a 18 m long farmhouse was excavated that also yielded a Late Bronze Age *terminus post quem* date of charcoal from a posthole.[205] If Late Bronze Age houses in this region were significantly longer than Early Iron Age houses (see figs. 5.29; 5.32, *cf.* Hermsen 2003, 71-72), a Late Bronze Age age could be considered for the house from Colmschate - 't Bramelt (Verlinde 1991a, 32 fig. 32).[206]

The claimed Late Bronze Age houses of Colmschate (Verlinde 1991a, 35 fig. 4; Verlinde 2000, 42) and some at Zwolle (Clevis & De Jong 1993, 37 fig. 3; 43 fig. 5) and Zutphen (Bouwmeester 2008, 71 fig. 4) may date to the Early Iron Age.[207] Only for houses 1 at unit 3 and houses 4a-4b at unit 6 from Zwolle - Ittersumerbroek should a Late Bronze Age date be considered a possibility.[208] The remarkably long (*c.* 30 m) house from Dalfsen-Welsum (Van der Velde, Van Benthem & Bloo 2001), is most likely to date to the Early or Middle Iron Age.[209]

The ice-pushed hills

Few indisputable Late Bronze Age house plans are yet known for the area of the ice-pushed hills. The house from Elst - 't Woud for which a Late Bronze Age to Early Iron Age date has been claimed (Van Tent 1988, 13 fig. 7), has no adequate parallels yet for its roof-bearing structure in either of the mentioned periods. At Rhenen - Remmerden, a house plan was excavated from which pottery was recovered that must be dated to the last two centuries of the Middle Bronze Age-B or the start of the Late Bronze Age (fig. 5.30, 1; Van Hoof & Meurkens 2007, 37-41; Arnoldussen & Ball 2007).

A radiocarbon date of charcoal from the central pit provided a *terminus post quem* date of *c.* 1240-1040 cal BC.[210] With one of the three house plans at Apeldoorn - Nuon terrein, a pit with a large part of a vessel dated to the Late Bronze Age-Early Iron age transition was found (Bloo 2007), but this cannot be used to confidently assume a corresponding age for the three house plans (*supra*; Williams 2007).

West-Friesland

At present, no house plans are known from the Late Bronze Age in West-Friesland, as these were commonly built on raised (few decimeters to a meter) dwelling mounds, that were later levelled and disturbed by (sub)modern agriculture (IJzereef & Van Regteren Altena 1991, 64-65). Nonetheless, occupation may have continued after the Middle Bronze Age-B into the Early Iron Age at several sites in West-Friesland. Radiocarbon dates such as those from wells and ditches at Bovenkarspel (Van Regteren Altena *et al.* 1977, 250-251; IJzereef 1981, 170-171 figs. 111-

205 GrN-24803: 2770 ± 50 BP; Groenewoudt *et al.* 2000, 21. The sample type is not ideal, and the smaller charcoal fraction from the same sample was dated to 2530 ± 150 BP (GrN-24633; *ibid.*). No indisputable Late Bronze Age ceramics were found (*op. cit.*, 60), so that an Early Iron Age date must remain a possibility.

206 Possibly also for Zwolle-Ittersumerbroek unit 2 (Verlinde 1991b, 28-29 fig. 3), albeit that this possible house is only indirectly associated with Late Bronze Age ceramics (*op. cit.*, 26).

207 No radiocarbon dates are available and for several houses the ceramics recovered from the features do not irrefutably point towards a Late Bronze Age date (Clevis & De Jong 1993, 37 fig. 3; 38-43; Van Beek & Wevers 1994, 53; 63; Bouwmeester 2008). In addition, some houses correspond in orientation to nearby better datable Early Iron Age houses. Lastly, the roof-bearing structure of most of these houses does not evidently argue against an Early Iron Age dating (the claimed Late Bronze Age house from Zwolle Unit 7 (Van Beek & Wevers 1994, 52 fig. 11a; 54) has no adequate parallels in Middle Bronze Age, Late Bronze Age or Early Iron Age houses and should be regarded with scepticism).

208 Verlinde 1991b, 26-33. Houses 4a-b (Verlinde 1991b, 39; 45, but see Waterbolk 1995c, 143) display a rather anomalous roof-bearing structure.

209 *Cf.* Lanting & Van der Plicht 2003, 165. A radiocarbon date of *c.* 710-440 cal BC from charcoal in a posthole serves as a *terminus post quem* (AA-43003: 2470 ± 45 BP; Van der Velde, Van Benthem & Bloo 2001, 16-17). In addition, 18 % of the vessels displayed a roughened wall, which is more typical of (Early) Iron Age than Late Bronze Age ceramic traditions (Van den Broeke 1991; Arnoldussen & Ball 2007).

210 Poz-14567: 2950 ± 30 BP. From this house (house 4), also a Bronze Age spearhead was recovered that may be interpreted as a foundation or abandonment deposit (see section 3.4, esp. fig. 3.13, B). Note also the similarities between Rhenen - Remmerden house 2 and the easternmost house of Telgte - Raestrup (Wilhelmi 1974, fig. 46), that overlies a keyhole shaped funerary ditch.

112) and Westwoud (Buurman 1996c, 112) and radiocarbon dated parallels for the pottery recovered (Brandt 1988a, 218) support this.[211]

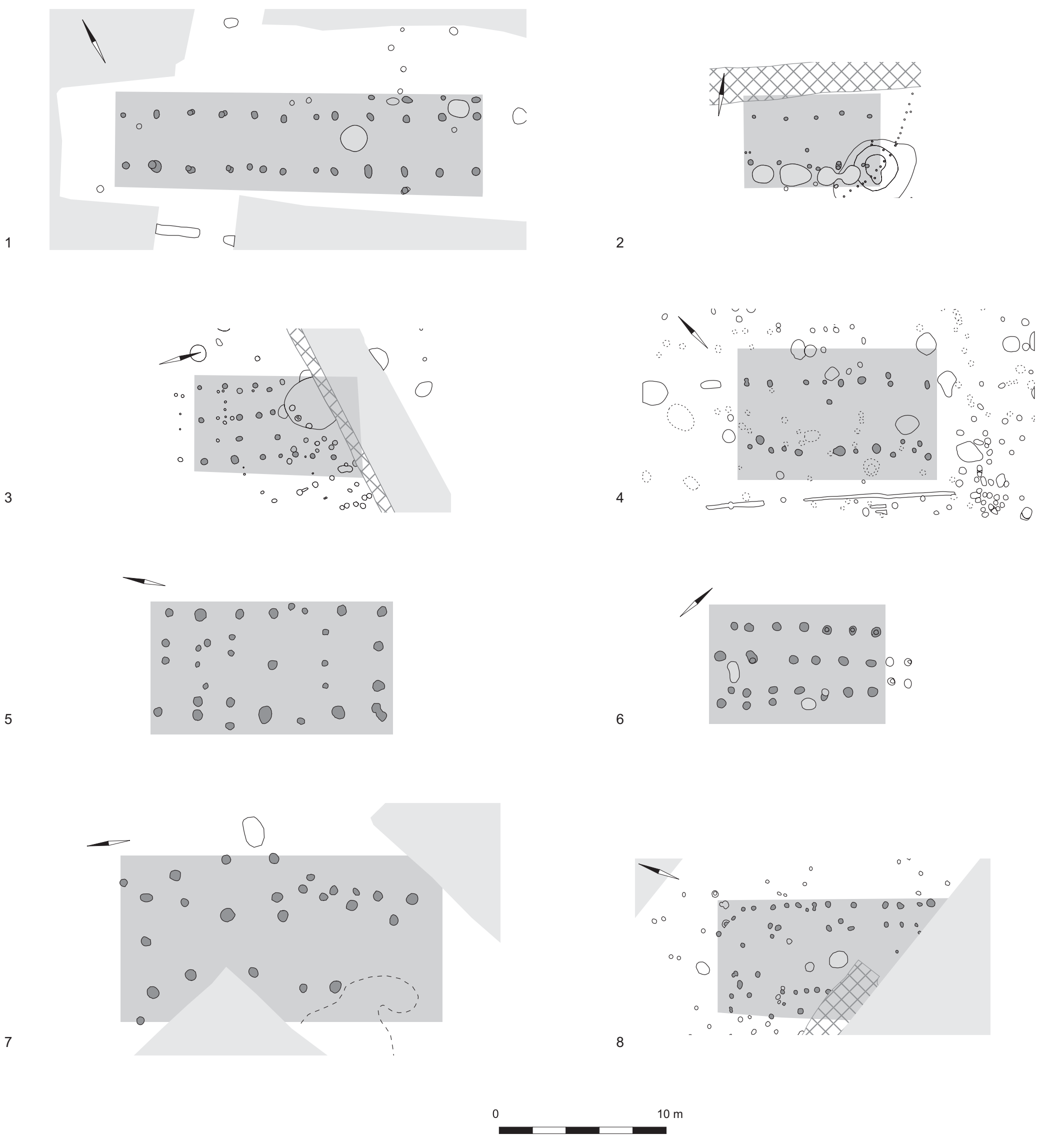


Fig. 5.30 Late Bronze Age houses from the central and the southern part of the Netherlands and adjacent Belgium (1: Rhenen (after Van Hoof & Meurkens 2007, 38 fig. 5.12), 2: Tiel - Medel 8 house 10 (after Van Hoof & Jongste 2007, 77 fig. 5.14), 3: Tiel - Medel 8 house 13 (*ibid.*), 4: Breda (after Berkvens 2004, 103 fig. 6.10), 5: Boxmeer (after Van der Velde 1998, 23 fig. 3.8), 6: Sittard (after Tol & Schabbink 2004, 27 fig. 15), 7: Roermond (after Schabbink & Tol 2000, 16 fig. 2.10), 8: Ekelen (B; after Minsaer 2004, 110 fig. 2)).

211 See also Brandt 1988a, 207-208 for an overview of the dating of the various Hoogkarspel excavations. Fokkens (2005d, 77) has argued that no houses with a 10th century date are known from West-Friesland. While this indeed appears to be the case, it should not be overlooked that the Late Bronze Age habitation did often take place on raised living mounds (*cf.* Bakker *et al.* 1977, 214-215; Buurman 1979, 22; 1996c; IJzereef 1981, 178; Ufkes & Veldhuis 2003), that have been more prone to later erosion than the more lower-lying areas settled in the Middle Bronze Age-B.

The southern Netherlands

From the southern Netherlands only a few probable Late Bronze Age houses are known. One was excavated at Sittard - Hoogveld (fig. 5.30, no 6; Tol & Schabbink 2004, 27 fig. 15) and could be dated by a radiocarbon date and by the ceramics of a probable abandonment deposit (see Chapter 3, section 3.4.3). In an excavation trench at Boxmeer - Maasbroekse Blokken a second possible Late Bronze Age house plan was uncovered (fig. 5.30, no 5; Van der Velde 1998, 23 fig. 3.8). From this trench much Late Bronze Age pottery was recovered, but none directly associated with postholes of the house (*op. cit.*, 28-29). From a cluster of postholes measuring roughly 18 by 8 m at Roermond (fig. 5.30, no 7), Late Bronze Age sherds were recovered (Schabbink & Tol 2000, 15-16 fig. 2.10), but here no clear-cut ground plan could be isolated.

In addition, a Late Bronze Age age has been claimed for various houses uncovered in the extensive archaeological excavations undertaken around the town of Breda (Koot & Berkvens 2004). Unfortunately, the claims are rather unconvincing as no direct dates are available, the houses are frequently associated with Iron Age ceramics,[212] are dated predominantly on typological grounds,[213] or the houses display constructional techniques more related to Early Iron Age houses.[214] For house 12 at Breda - Moskes (fig. 5.30, no 4), sherds from the posthole fills may provide a Late Bronze Age *terminus post quem*, but the irregularities in post-placement, depth and diameter should be noted (Berkvens 2004, 103 fig. 6.10). For an irregular structure cross-cut by an Early Iron Age house at Oss-Horzak, a Late Bronze Age age has been suggested, but datable finds or absolute dates are not available (Jansen & Fokkens 2002, 322 fig. 5). At Beugen, a structure has been discovered that is tentatively dated to the Middle Bronze Age-B or Late Bronze Age, but which through its large spacing (3.2 m) and span (4.8 m) is without Bronze Age parallels.[215]

For adjacent Flanders, a provisional Late Bronze Age date has been suggested for farmhouses at Sint-Dennis-Westrem - Vliegveld, Sint-Andries - Refuge and Sint-Gilles-Waas - Reepstraat, but the two latter sites still await full publication (Bourgeois, Cherretté & Bourgeois 2003, 179).[216] The posthole cluster uncovered at Ekelen - Schriek in Belgium (fig. 5.30, no 8) may represent a Late Bronze Age house plan of unclear superstructure, based on the pottery recovered and a radiocarbon date obtained for the centrally situated pit (Minsaer 2004, 111-112).[217] The ceramics recovered from two houses at Goirle fit better within an Early Iron Age repertoire and conflict with the Late Bronze Age dating proposed for them (houses 2 and 7; Bink 2005, 24; 27). One of these houses displays a typical Early Iron Age building tradition (*cf.* fig. 5.31) and has yielded a *terminus post quem* date on charcoal of *c.* 980-800 cal BC.[218]

In conclusion, only for few houses claimed to date to the Late Bronze Age, is there evidence available to confirm their dating. Nonetheless, the house from Sittard - Hoogveld (fig. 5.30, no 6) and house 10 from Tiel - Medel 8 (fig. 5.30, no 2) indicate that three-aisled as well as other types of roof-bearing frames were current. This larger variation in roof-bearing types is also reflected in some ground plans that could not be dated as precisely, such as those of Breda, Boxmeer, Roermond and Tiel - Medel house 13 (fig. 5.30).

The river area

Some Late Bronze Age houses are known from the Dutch river area, and most originated from the recent excavations at Tiel - Medel 8 (Van Hoof & Jongste 2007). There, at least two – but possibly up to five – Late Bronze Age farmhouses have been uncovered. For house 10 (fig. 5.30, no 2), the Late Bronze Age dating is confirmed by a

212 Moskes house 11 and 15, Steenakker house 7 (Berkvens 2004, 101-103), Goirle house 7 (Bink 2005, 27 fig. 13).

213 Steenakker house 20 (Berkvens 2004, 112 fig. 6.21) and 24 (Berkvens 2004, 116 fig. 6.28).

214 Moskes house 11 (Berkvens 2004, 111; 102 fig. 6.8), Goirle house 7 (Bink 2005, 23 fig. 10).

215 Hissel, Parlevliet & Flamman 2004, 43 fig. 17, *cf.* fig. 5.27.

216 The claimed Late Bronze Age date for building A at Deinze (B; De Clerck 2000, 24 fig. 3) cannot be backed-up by sufficient arguments yet as the pottery was not very precisely datable typologically and the similarities with the references quoted may be questioned (*ibid.*).

217 Charcoal from pit: *c.* 900-805 cal BC; KIA-20896: 2690 ± 25 BP (Minsaer 2004, 112).

218 GrA-27885: 2730 ± 40 BP. A *schräghals* pot from a posthole of this house is interpreted as an abandonment deposit (Bink 2005, 27 figs. 12-13). House 2, which is dated by ceramics to the Early Iron Age (> 15 % sherds with roughened walls; Bink 2005, 24), yielded a possible Late Bronze Age *henkeltasse* pot from a posthole that was also interpreted as an abandonment deposit (*op. cit.*, 27).

radiocarbon date of cereals from a posthole and the typology of the ceramics recovered from the four pits in the southern side aisle.[219] House 13, at the same site, has a different type of roof-bearing structure, but for this house a Late Bronze Age age is also probable.[220] At Beuningen - Hogewald II, four possible Bronze Age house plans have been uncovered (Huis in 't Veld 2006). These lack the regular longitudinal spacing of posts typical for Middle Bronze Age-B houses and some of the ceramics recovered seem a-typical for the Middle Bronze Age-B (Ufkes 2006, 45 fig. 4.3; 46 fig. 4.4). As some Late Bronze Age sherds were recognized (*op. cit.*, 33), a Late Bronze Age date for some of the structures recognized remains a possibility.

Late Bronze Age houses: regional diversification in house construction

In the previous sections it has been shown that after the Middle Bronze Age-B, characterized by the supra-regionally shared similarities of some construction properties (*i.e.* predominantly the mean longitudinal spacing of roof-bearing posts) a diversification in house construction techniques occurred during the Late Bronze Age. In the northern and north-eastern parts of the Netherlands, longer three-aisled farmhouses were common during the (start of the?) Late Bronze Age.[221] The house from Roden and several of the houses at Elp, may be characterized by their smaller mean span, compared to the preceding periods.[222] Although it cannot be proven that B2b ('Elp-type') farmhouses were erected as late as the 10th century BC (see fig. 5.24), this is suggested by the pottery fragments incorporated into postholes of houses at Elp and the dating of the German Harsefeld house (Waterbolk 1964; 1987; Precht 2004). The latter house plan (fig. 5.29, no 2) and the westernmost house from Telgte - Raestrup (Wilhemi 1974, 223 fig. 46) indicate that the distribution of B2b types of houses extended during the Late Bronze Age into the low-altitude (< 80 m D.O.D.) parts of adjacent Germany. Presumably, this region is bordered to the north-east by an area extending from Daerstorf to Seddin in which two-aisled houses, frequently with wall-foundation trenches, were erected during the Late Bronze Age.[223]

In the eastern coversand areas and the areas of the ice-pushed hills of the Netherlands, a building tradition of three-aisled relatively long (> 15 m) houses presumably continued. There are some indications that entrances were now more frequently (also?) present in the farmhouse's long sides. Furthermore, some houses show a relatively smaller span compared to farmhouses from the preceding Middle Bronze Age-B, such as those of Raalte (*c.* 2 m mean; fig. 5.29, no 5), Leesten (*c.* 2.25 m mean; fig. 5.29, no 6) and Deventer (*c.* 2.4 m mean; fig. 5.20, no 1). The houses at Rhenen (Van Hoof & Meurkens 2007) and Colmschate (Verlinde 1991a, 35 fig. 4) illustrate that houses with wider spans were also current.

In the river area, a building tradition not unlike that of the Middle Bronze Age-B, is visible in the houses of Tiel (fig. 5.30, no 2) and possibly at Beuningen (Huis in 't Veld 2006, 21-25), although the dimensioning – and especially the spacing of posts – seems no longer to have been as standardized.[224] Perhaps more importantly, radically new types of roof-bearing frames are introduced, such as the configuration (essentially three rows?) of roof-bearing

219 Cereals from posthole; Poz-16714: 2850 ± 35 BP (Van Hoof & Jongste 2007, 182), for the ceramics see Arnoldussen & Ball 2007, fig. 6-7). A *terminus post quem* date is provided by a wooden ladder (GrN-30174: 3030 ± 35 BP) from the well that is cross-cut by the house (*ibid.*).

220 The house has yielded a single sherd of possible Late Bronze Age ceramics, and is cross-cut by a well with Late Bronze Age ceramics dated to *c.* 1010-830 (Poz-16711: 2770 ± 35 BP; Van Hoof & Jongste 2007, App. I).

221 Fig. 5.29; see also Strahl 2004 (first phase 21 m), the discussion on the dating of Telgte-Wöste (25 m; section 5.2.2), Telgte-Raestrup (*c.* 22 and 24 m; Wilhelmi 1974), Großseelheim (*c.* 20.5 m; Meyer 1997) and several contributions in Assendorp 1997 for examples of (long) German Late Bronze Age houses (see also the Late Bronze Age option suggested for Hesel house 5; Schwarz 1996, 39; 45; Bärenfänger 1998, 38).

222 *E.g.* Roden (*c.* 2.3 m mean; fig. 5.29, no 4), Borger-Daalkampen (*c.* 2 m mean; Kooi & De Wit 2005, 131 fig. 2), Emmerhout houses 1 & 4 (span varies from 2 to 3 m; Huijts 1992, 54 figs. 41-42), Elp houses 6, 7, 9, & 12 (span varies from 2 to 2.6 m; Waterbolk 1964).

223 *E.g.* Daerstorf (Thieme 1997; 2004), Marmstorf (Först 1997), Ochtmissen (Gebers 1997), Bahlburg (Gebers 2004), Hitzacker (Assendorp 1997b) and Seddin (Schwarzländer 2005).

224 Perhaps house 12 at Tiel - Medel 8 (Van Hoof & Jongste 2007, 77 fig. 5.14) is better interpreted as two houses consisting of two lines of roof-bearing posts placed 2.4 m apart. For the excavations at Beuningen, the thinness of pot walls, pot morphology (more pronounced (inward curved) morphology) and frequency of chamotte temper (Ufkes 2006, 45-46 figs. 4.3-4.4; Huis in 't Veld 2006, 129-157) could indicate that the houses uncovered at this site may date to the final century of the Middle Bronze Age-B-Late Bronze Age transition or the Late Bronze Age (*contra* Huis in 't Veld 2006, 125).

posts with Tiel - Medel 8 house 13 (fig. 5.30, no 3, *cf.* fig. 5.30, no 6). For the river area, long (> 15 m) three-aisled structures with a clear Late Bronze Age date are not known (yet).

In the southern Netherlands, shorter houses are also common, but the post-configurations from Roermond (fig. 5.30, no 7) and Ekeren (fig. 5.30, no 8) indicate that lengths could range between 12 to 18 m. The diversity in roof-bearing structure is striking for this region, which can account for the low numbers of house plans recognizable for this period in this area. The house from Breda (fig. 5.30, no 4) essentially displays a three-aisled roof-bearing structure, but for the other houses this is less clear. The roof-bearing frame of the house plan from Sittard (fig. 5.30, no 6) may be based on three lines of roof-bearing posts, a technique that is also used for some Early Iron Age houses from this region.[225]

The increased diversity in constructional solutions to carry the roof-burden during the Late Bronze Age may very well be an important factor in explaining why so few reliable Late Bronze Age houses are known altogether and why individual claims frequently spark debates on the dating and constructional details. Both three-aisled houses and houses based on multiple (generally three) lines of roof-bearing posts, as well as houses of yet very ill-understood superstructure (*e.g.* fig. 5.30, no 5) were current during the Late Bronze Age. Yet, some of the regional distribution patterns that could be outlined for the Middle Bronze Age-B, may also be reflected by some Late Bronze Age house-properties. Beside the plausible option that B2b ('Elp') types of houses (that are confined to the north(eastern) Netherlands) may have been constructed during the first part of the Late Bronze Age, long (> 15 m) houses seem to be confined to the north and north-eastern Netherlands in the Late Bronze Age as well. In the river area and southern Netherlands, smaller rectangular post-settings appear to be standard during the Late Bronze Age. Unfortunately, the data-sets are as yet too small to outline or interpret regional differences for the Late Bronze Age in more detail.

5.2.5 The return of house-visibility: Early Iron Age houses

While a detailed analysis of Early Iron Age houses is well beyond the scope of the present study, some important characteristics should be indicated at this point. It does appear that from the late 9th century BC onward, another period of good archaeological visibility of houses is reached. From nearly all geogentical regions, Early Iron Age houses are known in significant numbers and display much more internal coherence in types of roof-bearing frame, sizes and constructional details across the various regions (fig. 5.31).[226]

By and large, houses are now exclusively rectangular in plan, measure between 5 to 9 m in width and between 9 to 17 m in length. The few noteworthy longer examples consist of presumably doubled houses, such as those from Breda, Loon op Zand, Oss and Someren (fig. 5.32, B).[227] The walls are frequently set in wall-foundation trenches and opposed entrances are almost invariably present in the long sides.[228] The roof-burden is carried combinedly by posts placed outside the walls and by roof-bearing frames that can be essentially three-aisled (*i.e.* types 'transitional Hijken'; Huijts 1922, 67-72 or 'Een/Kleuvenveld'; Lanting & Van der Plicht 2003, 166-168) or (in the southern and eastern Netherlands) partly three- to four-aisled (type 'Oss-Ussen 2a/2b'; Schinkel 1998, 186). For both types, the available radiocarbon dates suggest that these houses were current from the last quarter of the 9th century BC, but mostly date to the 8th to 6th centuries BC (Lanting & Van der Plicht 2003, 166-167, *cf.* Bink 2005, 81).

Two lines of explanation have been offered for the shortening of houses in the Early Iron Age in comparison to the Middle (and Late; sections 5.2.4; 8.3.2) Bronze Age houses. The first is that towards the Early Iron Age, sheep husbandry gained in importance at the cost of cattle.[229] Assuming that sheep were stalled in outdoor pens rather than in indoor byres, Roymans argues that the shortening of houses may that reflect a decreased byre size (Roymans 1991, 68, *cf.* Schinkel 2005, 540). While indeed an increase in the importance of sheep is visible in livestock spectra for the

225 Van Hoof 2002, 75-80, *cf.* Tol & Schabbink 2004, 31 fig. 18 for an example with possibly four lines of roof-bearing posts.
226 Nonetheless, clear regional variation is discernible, but the analysis of such variation lies beyond the scope of the present study. Starting points may be the larger variation in roof-bearing structure of the houses from the southernmost parts of the Netherlands (*e.g.* Tol 1999, 120 fig. 20, Tol & Schabbink 2004, 31 fig. 18), the confines of the partly four-aisled roof-bearing structure and the different nature of houses in the westernmost peat areas.
227 Number six in fig. 5.32 (A) refers to the presumably Early- or Middle Iron Age farmhouse from Dalfsen-Welsum, for which originally a Late Bronze Age date was claimed (Van der Velde, Van Benthem & Bloo 2001).
228 *Cf.* Gerritsen 2003, 51-54.
229 Roymans 1991, 68; Roymans & Fokkens 1991, 10; Louwe Kooijmans 1993a, 88; Gerritsen 2003, 255-256.

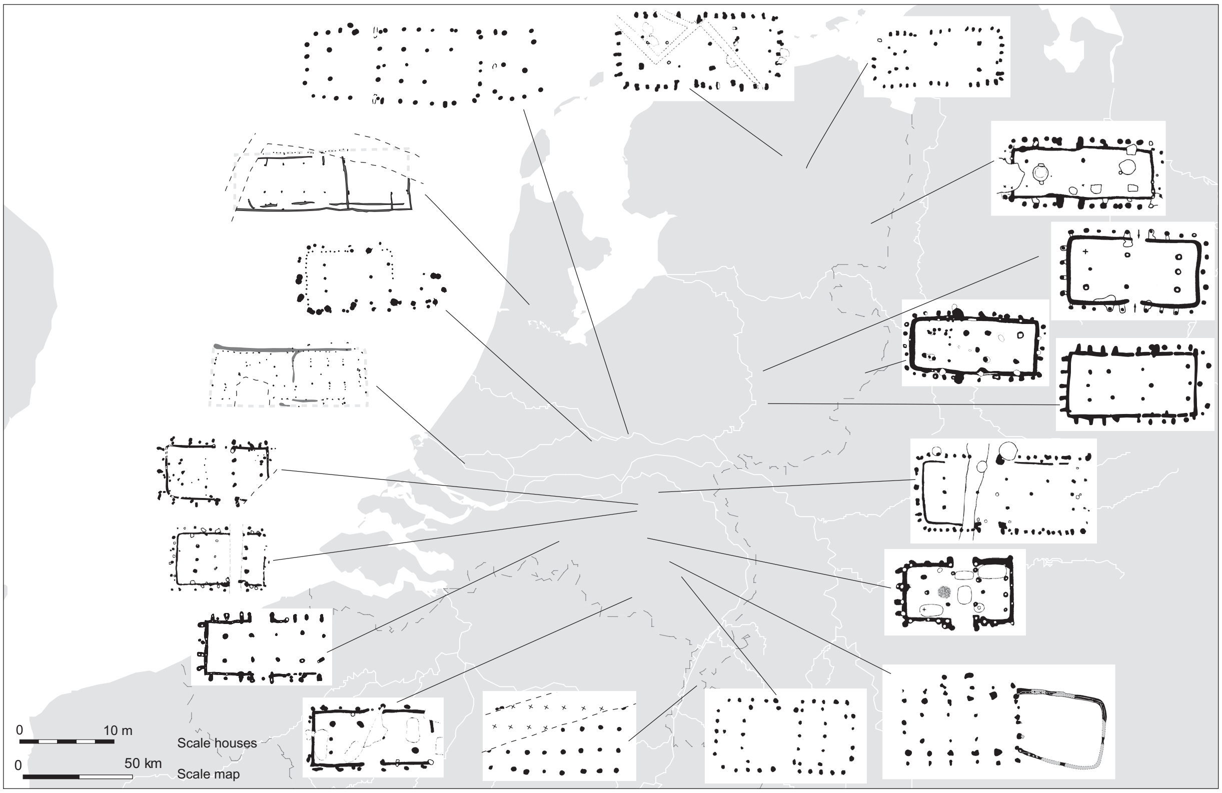


Fig. 5.31 Early Iron Age houses from different parts of The Netherlands.

Clockwise from top-centre: Een (Huijts 1992, 68 fig. 61), Peelo (Huijts 1992, 68 fig. 58), Emmerhout (Huijts 1992, 70 fig. 63), Enschede (Hermsen 2003, 72 fig. 38), Colmschate (Hermsen 2003, 14 fig. 7), Zutphen (Bouwmeester 2008, 72 fig. 5), Oss (Fokkens 1991, 104 fig. 9), Sint-Oedenrode (Hermsen 2003, 73 fig. 39), Mierlo-Hout (Tol 1999, 120 fig. 20), Someren (Kortlang 1999, 177 fig. 20), Sittard (Schabbink & Tol 2004, 31 fig. 18), Riethoven (Slofstra 1991, 144 fig. 3), Breda (Berkvens 2004, 101 fig. 6.7), Den Dungen (Verwers 1991, 165 fig. 3), Rosmalen (De Koning & Vaars 2003, 23 fig. 9), Spijkenisse (Van Heeringen 2005, 588 fig. 26.10), Zijderveld (Hulst 1975a, 104 fig. 2), Assendelft (Van Heeringen 2005, 589 fig. 26.12, Wijk bij Duurstede (Hessing 1989, 302 fig. 5a).

Early Iron Age, Fokkens (1997, 366) has argued that – even if increased – the role of sheep remains comparatively low compared with that of cattle. Various livestock spectra for Dutch Iron Age settlements do indeed not show a tremendous decrease in importance of cattle.[230] In light of the poor archaeological visibility of which species were actually stalled indoors,[231] the shortening of the houses can presently not be explained unproblematically as reflecting changes in animal husbandry. The second line of explanation focuses on the smaller size of Early Iron Age households. In contrast to the multi-family (Fokkens 1997, 367) or extended family (Fokkens 2002, 138) households that are thought to occupy the longer Bronze Age houses, Fokkens sees Early Iron Age houses as shelters for smaller, nuclear family, households (Fokkens 1997, 367; 2002, 138-140; 143). While this is not an improbable option, I have argued that factual information on the composition of prehistoric households is scarce (section 3.4.1), which means that archaeologist should be hesitant in using such assumptions in interpretative narratives (*cf.* section 8.3.2). Moreover, this line of explanation calls for more detailed study of the backgrounds to such assumed household fragmentation, which however lies beyond the scope of the present study.

Nonetheless, in all areas the Early Iron Age houses represent a categorically different type of house than that of the preceding Middle- and Late Bronze Age periods. The overall length of the houses is much shorter (fig.

230 *E.g.* Brinkkemper & Van Wijngaarden-Bakker 2005, 494 fig. 22.4; 500 fig. 22.11; 503 fig. 22.14.

231 But see (Nielsen 2002, esp. 7-9) for an example showing the diversity in animals possibly stabled in indoor byres of longhouses. A Danish Iron Age farmhouse destroyed by fire at Nørre Tranders 5 yielded the burned skeletal remains of seven cows, two horses, five sheep, two lambs, a pig, a dog and three adolescent as well as two adult humans from the (7 by 5 m) byre section.

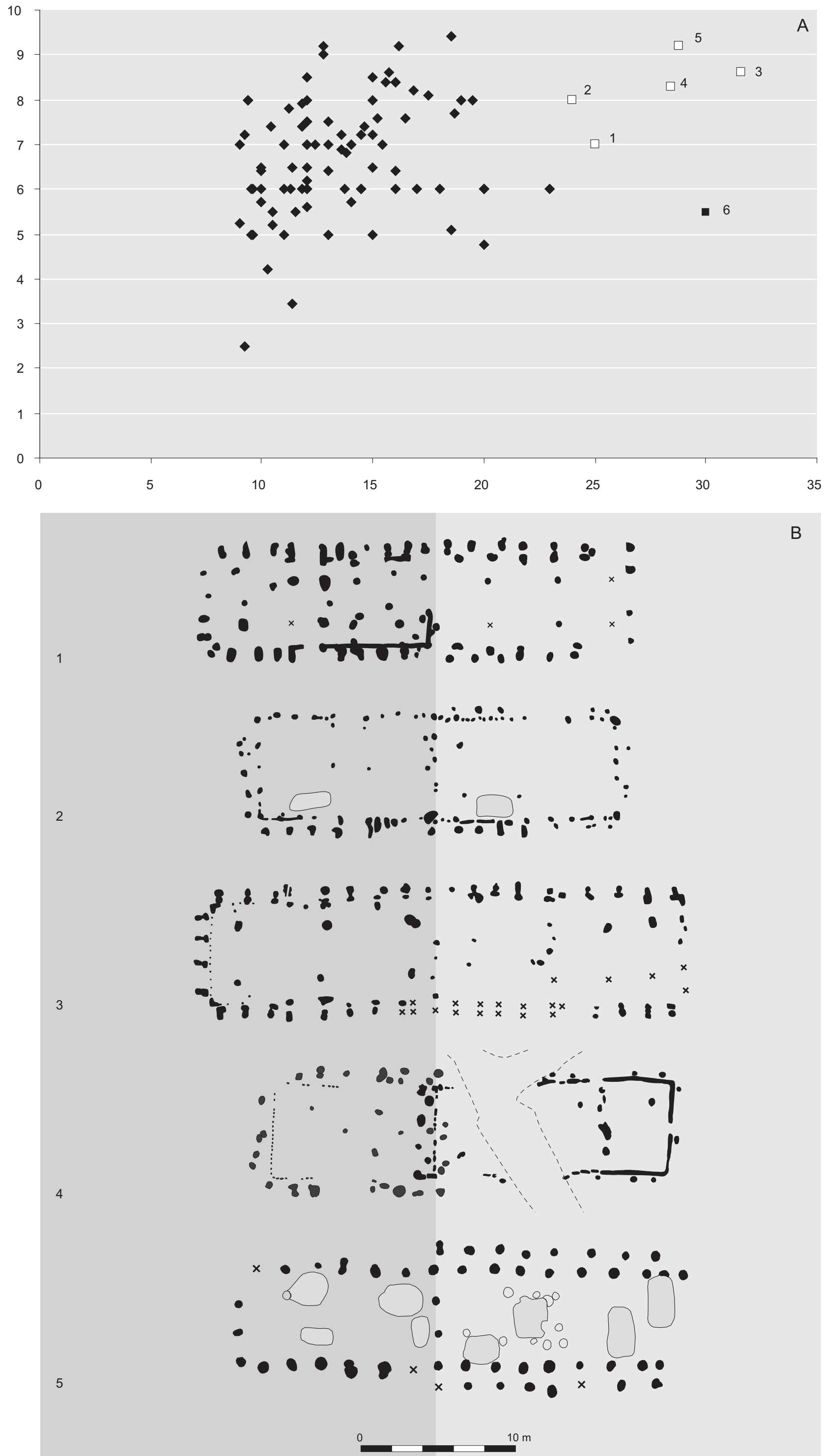


Fig. 5.32 Table (A) showing the length (x-axis) and width (y-axis) in meters of 87 Early Iron Age farmhouses from the Netherlands. The numbers 1 to 5 correspond to the house-plans depicted in B (1: Breda (after Berkvens 2004, 100 fig. 6.6), 2: Loon op Zand (after Roymans & Hiddink 1991, 117 fig. 8), 3: Oss-Horzak (after Jansen *in prep.*), 4: Oss-Mettegeupel (after Mietes 1998, 51 fig. 31), 5: Someren (after Kortlang 1999, 174 fig. 18). Number 6 in table A represents a presumably Early- to Middle Iron Age house from Dalfsen - Welsum for which a Late Bronze Age date has been claimed (Van der Velde, Van Benthem & Bloo 2001).

5.32, *cf.* figs. 5.26; 8.12) and houses are invariably rectangular in plan. The straight short sides suggest a hipped roof, whose weight was supported by beams placed on the posts outside the wall. These walls were now frequently placed in foundation trenches and may have contained sleepers for wattle-work panels. The entrances are generally placed halfway the long sides. It seems that Bronze Age construction traditions, centred on longitudinal segmentation and compartmentalization by well-spaced trusses – as well as their traditional significances – no longer applied. Presumably, the way in which farmhouse space was used also changed significantly, but functional areas can, like with earlier periods, hardly be indicated with certainty. In many areas, a new but similar constructional scheme was introduced. This scheme was however not adopted in all areas, and there appears to have been – like in the Late Bronze Age – more variation between houses from several (geogentic) regions (fig. 5.31).

5.3 Barn- or shed-types of outbuildings

Barn- or shed-types of outbuildings are an ill-defined and ill-understood settlement site component. The etymology of the word shed offers no functional clues other than to provide shade or shelter, but with the former the storage of agricultural products is implied.[232] In present-day definitions, these may be characterized as covered undivided buildings for the storage of (agricultural) tools, cereals and other produce of the earth, which in some cases served (additionally) as byres (*cf.* Weller 1997). While these structures may have had such functions in the Bronze Age, there is no factual evidence to hint at their former function or functions.

From an archaeological perspective, barn- or shed-types of outbuildings can only be defined as outbuildings that are complementary to the better definable granary-types of outbuildings (section 5.4). Whereas granary-type outbuildings are characterized by an above-ground functional area that does not – or only minimally – exceed the area defined by its supporting posts, barn and shed types of outbuildings are thought to have had a functional surface that is situated at ground-level and that exceeded the area defined by its roof-bearing posts. Barn- and shed-types can thus have been aisled constructions, of which frequently only the roof-bearing posts have been preserved. For some barn- or shed-types of outbuildings, their roof-bearing structure is rather unclear (fig. 5.33).

Moreover, it is frequently not fully clear whether indeed the former surface area extended beyond the roof-bearing posts. Several of the possible barn- or shed-types of outbuildings may in fact have been longer versions of granary-type outbuildings (see section 5.4), but there are three indirect arguments to the contrary. Some of the outbuildings have more closely set entrance-portals, not unlike Middle Bronze Age-B houses (*e.g.* fig. 5.33, no 7). This suggests that these structures had a wall that connected to these entrance portals which was – like that of the houses – situated at some distance from the roof-bearing posts. A second indication may be found in the span between the posts of some of the outbuildings. Several of these (*e.g.* fig. 5.33, nos. 5-9; 18; 20-21) show a span exceeding 2.5 m, whereas 90 % of the granary-types outbuildings has a span that is smaller (fig. 5.40). A third and final indication is the fact that outside the river area, some barn- or shed-type outbuildings are known that display identical properties (*i.e.* wide span, sometimes an entrance portal) and for which sometimes parts of the line of wall stakes is preserved.[233]

Barn- and shed-type outbuildings are common Bronze Age settlement site components, but do not appear to have been an essential or defining element of Bronze Age house-sites (Chapter 6).[234] In the river area, barn- or shed-type outbuildings have been uncovered at all sites, but vary significantly in their structure between as well as within settlement sites. The large number of irregular barn- or shed-type outbuildings from the Eigenblok excavations is striking (fig. 5.33, 10-17). While their variability in post-placement and overall-structure may diminish their

232 The English word shed may originate from IE **skotwōs* , Germanic **skađwoz* and OE *scead(u)we*, all pertaining to shade or providing shade (Oxford English Dictionary Online, 2007(1989)), like the Dutch *schuur*, that may derive from the PIE root **(s)keu(H)-* that relates to providing shelter (Phillipa, Debrabandere & Quak 2003, 'huis'). The word barn is interpreted as deriving from OE *bereærn*, being a contraction of *bere* (barley) and *aern* (place; Weller 1997, 702; Oxford English Dictionary Online, 2007(1989)).

233 *E.g.* Emmerhout building 31, for which a radiocarbon date on charcoal from a posthole (*t.p.q.*) of 3240 ± 35 BP (GrN-6133; Kooi 2008, 66 fig. 8) is available, the ancillary building at Roden (Harsema 1993c) and structure 50 at Texel - Den Burg (Woltering 2000, 54; 56).

234 For instance, for the ten Bronze Age settlement sites (*c.* 42 house-sites) in the Dutch river area (Chapter 1, table 1.1) a total of 24 barn- or shed-types of outbuildings are known and 325 granary-types of outbuildings.

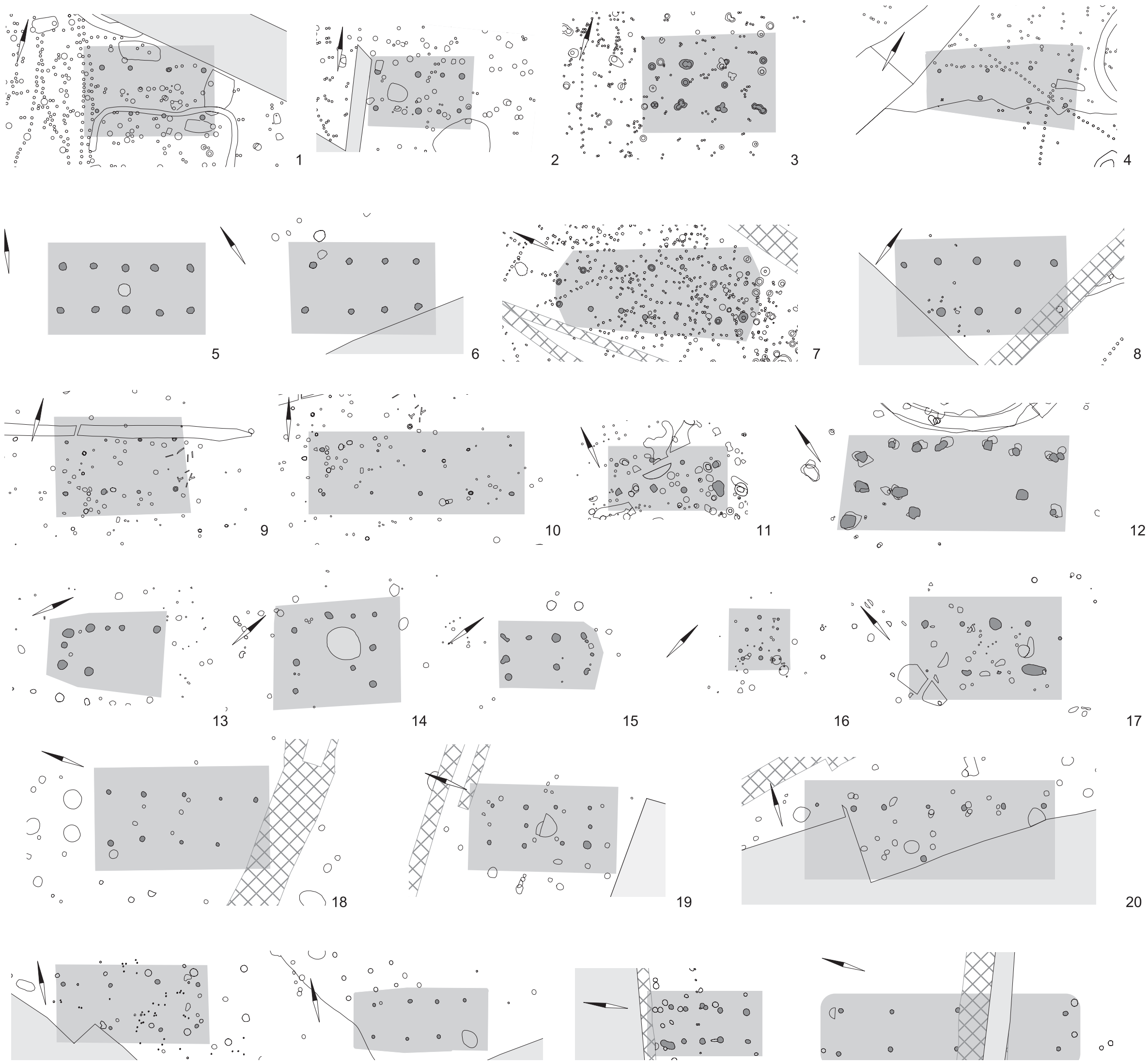


Fig. 5.33 Possible barn- or shed-types of outbuildings from Zijderveld (1-4; Knippenberg & Jongste 2005; Appendix I), Wijk bij Duurstede - De Horden (4-5; Hessing 1991; Appendix IV), Dodewaard (7-8; Theunissen & Hulst 1999a; Appendix VI), Meteren - De Bogen (9-10; Meijlink & Kranendonk 2002; Appendix III), Rumpt - Eigenblok (10-17; Jongste & Van Wijngaarden 2002; Appendix II), Lienden (18-19; Schoneveld & Gehasse 2001; Appendix V), Enspijk (21; Ter Wal 2005b) and Tiel - Medel 8 (22-24; Van Hoof & Jongste 2007).

credibility, they were reconstructed from an area of moderately low feature density and comprise posts of substantial depth. The obvious conclusion should not only be that the validity of some the reconstructions proposed may be questioned, but especially that Middle Bronze Age settlement sites may have supported many post-built constructions that archaeologists often fail to identify.

Only two barn- or shed-type outbuildings have yielded direct dating evidence. A willow post of granary 10 at Zijderveld (fig. 5.33, no 4) was dated to *c.* 1430-1270 cal BC and an alder post of the irregular structure (fig. 5.33, no 12) at Eigenblok to *c.* 1400-1260 cal BC.[235] Charred cereals from a posthole of the eight-post structure at Meteren - De Bogen (fig. 5.33, no 9) provide a *terminus post quem* age of *c.* 1390-1120 cal BC (AA-37510: 3010 ± 40 BP;

235 GrN-28931: 3090 ± 30 BP; Knippenberg & Jongste 2005, 17 and GrN-23837: 3060 ± 20 BP; Jongste 2002a, 35.

Meijlink 2002a, 47). The outbuilding at Wijk bij Duurstede - De Horden (fig. 5.33, no 15) was not dated, but Middle Bronze Age pottery originated from (or near) the postholes (Hessing 1985, fig. 14). Furthermore, several of the outbuildings of this type are located close to houses and conform to them in orientation (figs. 5.34; 5.35). Combined, these arguments suggest that barn- or shed-type outbuildings occur during the Middle Bronze Age-B.

In the river area, these types of outbuildings do occur both closer to the houses (*c.* 70 % within a 30 m radius from a Middle Bronze Age-B farmhouse), but are also occasionally situated more remotely from houses (fig. 5.35).[236] A slight clustering to the (western) short side of the farmhouses is discernible, but the low overall numbers do not allow to suggest a preferred location for these outbuildings.

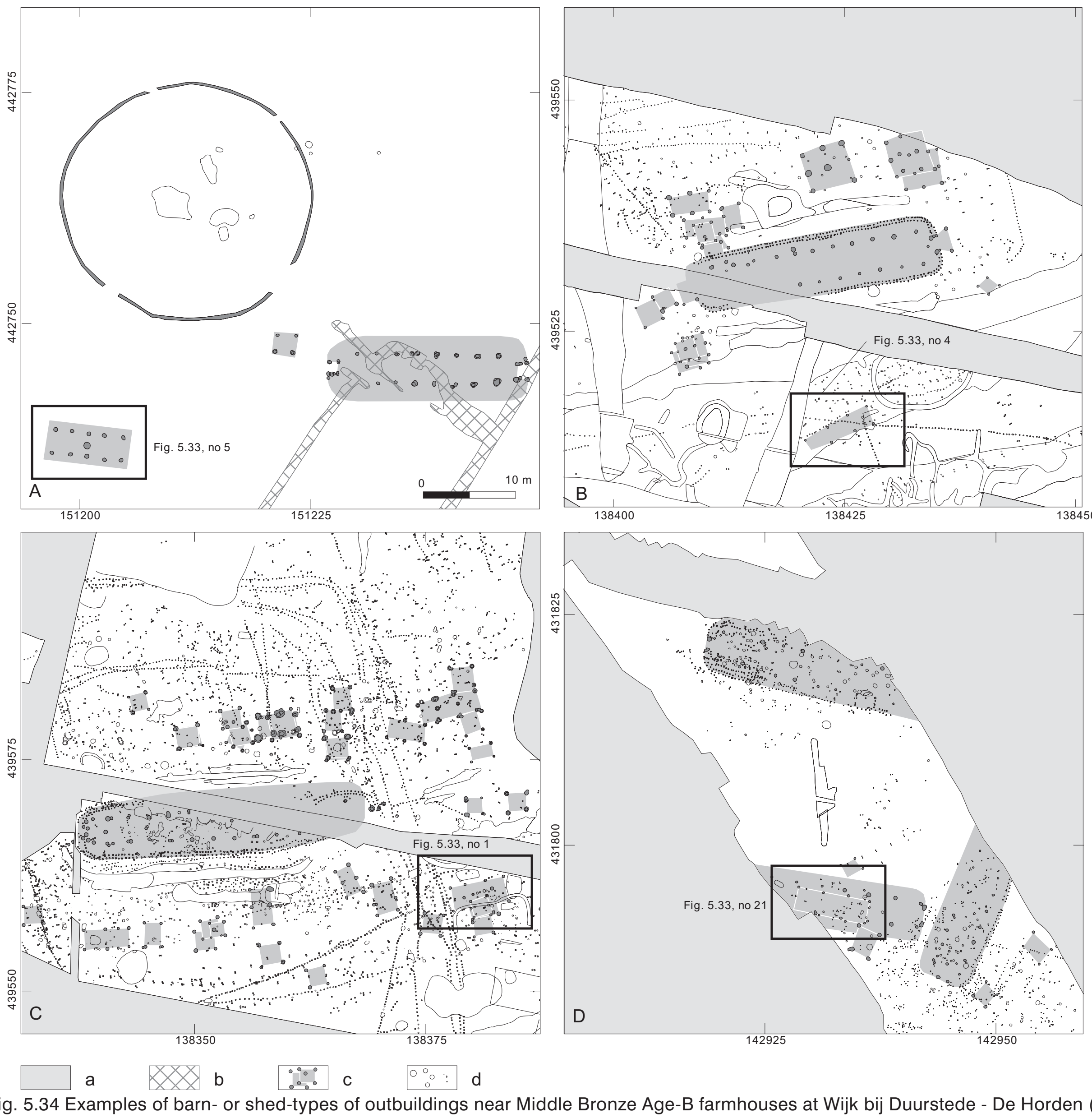


Fig. 5.34 Examples of barn- or shed-types of outbuildings near Middle Bronze Age-B farmhouses at Wijk bij Duurstede - De Horden (A; Appendix IV, coordinates by approximation), Zijderveld (B, C; Appendix I) and Enspijk (D; Chapter 4, Section 4.3.4), all to same scale.

a: not excavated, b: post-Bronze Age disturbances, c: Middle Bronze Age houses and outbuildings, d: other features.

236 Mean distance to a Middle Bronze Age-B house is 21.6 m, the standard deviation is 23 m.

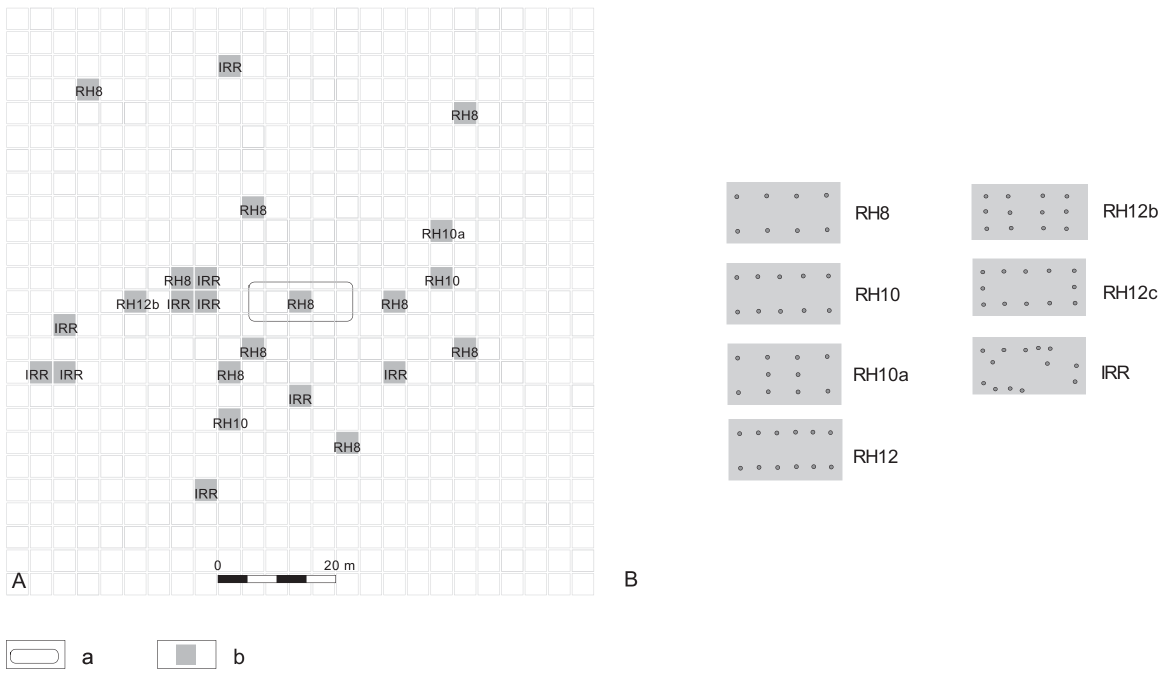


Fig. 5.35 Schematic distribution (A) and typology (B) of barn- or shed-types of outbuildings in 4 m grid cells around Middle Bronze Age-B farmhouses in the Dutch river area (for methodology see Chapter 6).

a: MBA-B farmhouses, b: one barn- or shed-type of outbuilding.

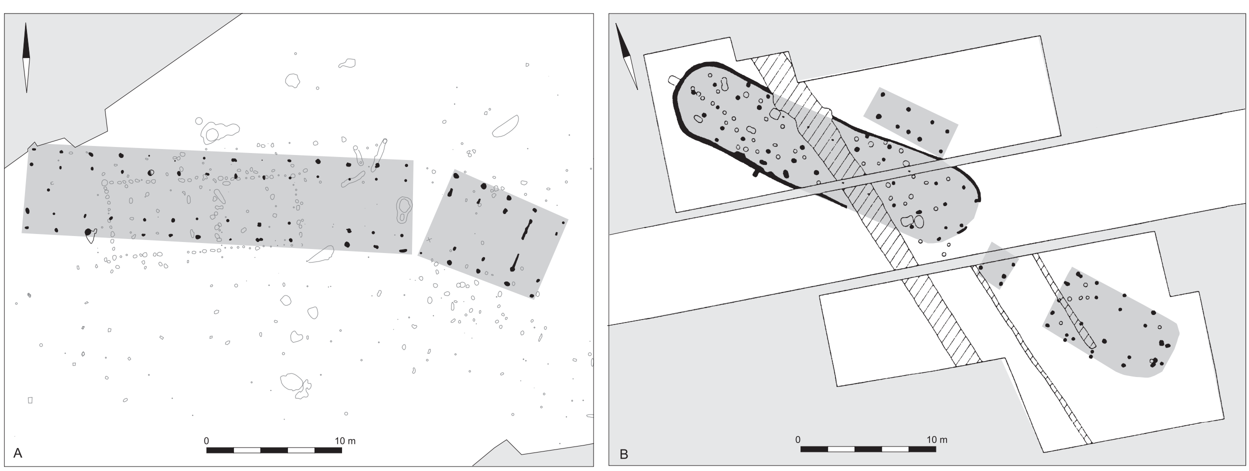


Fig. 5.36 Middle (A: Oss-Ussen; after Fokkens 1991, 100 fig. 6) and Late Bronze Age farmhouses (B: Roden; after Harsema 1993c, 47 fig. 2) with outbuildings of comparable widths.

Barn- or shed-type outbuildings are also frequently encountered outside the river area. With some of these, such as those of Breda (Berkvens, Brandenburgh & Koot 2004, 64 fig. 4.9), Regteren (Harsema 1997a, 154 fig. 11) and Colmschate (Verlinde 1991a, 36 fig. 5), the span and spacing between the roof-bearing posts is not unlike that of the houses, suggesting that these too were three-aisled constructions.[237] In addition, a group of outbuildings can be identified that are structurally so similar to the houses proper, that the (arbitrary) distinction lies solely with the length of the structures (fig. 5.36, possibly also Dalen (Harsema 1993b, 105 fig. 5)). Their association with houses

237 Possibly also with Hijken structure 7 (Harsema 1991, 24 fig. 3).

wherein no byre could be outlined, has led Harsema (1993b, 105; 1997a, 153) to argue that these are separate byres. I have argued above that archaeologically visible byres are by no means common (fig. 5.17) and Fokkens (2003, 13) has already pointed out that these outbuildings themselves almost never display traces of stalls.[238] The function(s) of both smaller and larger Bronze Age barn- or shed-type outbuildings, therefore remains essentially unknown. The storage of crops, agricultural tools, but also the stalling of smaller or larger livestock are all plausible, albeit unproven, options.

5.4 Granary-type outbuildings

Granary-types outbuildings are the most commonly encountered outbuildings on Dutch later prehistoric (*i.e.* Bronze- and Iron Age) settlement sites.[239] Their name suggests that their primary function was to serve as a storage facility for cereals, or agricultural products in a wider sense.[240] Such an etymological approach to their function is perhaps supported by analogy with North-west European historic examples such as those of rural England (McCann 1997) or the hórreo of Galicia (Gomez-Tabanera 1981; Garcia Grinda 1997) and contemporary African examples in Mali, Guinea and elsewhere (fig. 5.37; many examples in Gast & Sigaut 1979; 1981). In addition, raised storehouses are also known from classical sources, such as Columella's *De Re Rustica* (Book I, 6.9-12).

Fig. 5.37 Granaries: examples from 17th century Sussex (top left, photo courtesy of Weald & Downland Open Air Museum), contemporary France (top right; after Schamp 2001, 75 fig. 4.14), Mali (bottom left; photo courtesy of Colin Wilson) and Guinea (photo courtesy of Stephanie Chasteen).

Four-post outbuildings or granaries? Evidence for possible functions

Actual archaeological evidence of the function of granary-type outbuildings is modest.[241] From three postholes of a five post granary-type building at Eigenblok, *c.* 100 grains of wheat were recovered (Hielkema, Prangsma & Jongste 2002, 92). Another, albeit much less clear, ancillary structure also yielded significant amounts of barley and some wheat (*op. cit.*, 134; Brinkkemper *et al.* 2002, 489; 536). These samples may indicate that indeed cereals were stored in these structures, although the relation between the sample from the feature and the structure remains uncertain.[242] Some confirmation of the assumed cereal storage function of these structures may derived from the exceptional finds at the French La Tène-D1 period

238 Outbuilding 37 at Angelslo-Emmerhout however shows stall partitions (Kooi 2005, 118 fig. 3), suggesting that in this region, barn- or shed-type outbuildings may sometimes have been used as byres.

239 According to Louwe Kooijmans (1985, 50), a four-post outbuilding from the Vlaardingen Culture period (*c.* 3500-2500 cal BC) at Haamstede may be a granary, but this is disputed by Verhart (1992, 86). The oldest plausible granary-type outbuilding presently known from the Netherlands may thus be a four- (or six?) post structure at Ottoland - Kromme Elleboog (Wassink 1981, fig. 56).

240 Presumably derived from Latin *grānum* or *grāna*, meaning grain and seed respectively (Oxford English Dictionary Online, 2007(1989)). The Dutch and German words *Spieker* and *Speicher*, presumably both derive from late Latin *spīcāreum*, whose root derives from *spīca*, meaning literally a spike (possible IE root *spei*; 'sharp, pointed'; *cf.* Wood 1920, 230), but which is generally used to identify an ear of grain.

241 Alternative functions suggested comprise storage of fodder, haystacks, livestock pens, religious structures, watch-towers, privies, fighting-stages or exposure platforms (*cf.* Gent 1983, 247; Woltering 2000, 282). From the Late Bronze Age onwards, four-post structures comparable to granary-type outbuildings occur occasionally in funerary contexts (*e.g.* fig. 8.7, B; Hessing 1989, 340 no. 58; Verlinde 2001, 171).

242 At Lienden, a pit 'within' a six-post granary yielded some (< 10) possible fragments of sweet-grasses, but the numbers are too low and the relation between the pit and the granary is too dubious to postulate the storage of wet meadow grasses in this structure (De Roller, Korf & Mook-Kamps 2002, 183; 187).

site of Jaux - Le Camp du Roi. There, a six-post granary next to a ditch presumably burned down, after which its contents naturally slid and/or were scooped by hand into a nearby ditch. In this ditch, over thousands of burned grains of emmer wheat and some hundreds of grains of barley were preserved (Matterne-Zech 1996, 101). As no other structures appear to have been present and no other similar concentrations of burned cereals were recovered from the ditch, it is justifiable to interpret the cereals from the ditch as the remains of the cereals once stored in the six-post structure.

For the situation across the channel, Gent (1983) has summarized the available arguments. There too, several Iron Age four-post granary-type outbuildings have been excavated around which distributions of cereals and/or legumes could be identified (Gent 1983, 248 fig. 3). In the case of some of them, the soil was not trodden within the structure's ground plan or the dug-out soil from the structure's postholes was still present at the former surface level there. Both observations indicate that the structures may have been raised from the ground, and at two sites, rectangular frames still attached to the uprights were discovered (Gent 1983, 247). The shapes of some Bronze Age northern European and Scandinavian 'hut-urns' (fig. 5.38), that appear to represent raised granaries rather than huts Bradley 2002c, 232), also suggest that raised (storage) structures did occur commonly from the Bronze Age onwards.[243]

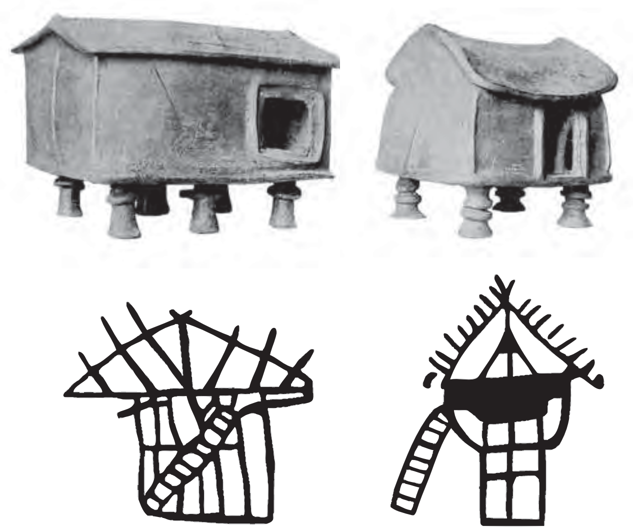


Fig. 5.38 Late Bronze Age granary-shaped 'hut'-urns from Germany (top-left; Obliwitz, top-right; Woedtke (after Behn 1924, pl. 12) and rock-carvings from Valcamonica that may represent raised (storage) structures (from Bradley 2005, 97 fig. 3.7).

There are several benefits to having a raised granary. First, it ensures free air-circulation which aids in preventing rotting processes. Second, it makes the contents of the granary less vulnerable to animal and insect attacks. Furthermore, if capping stones or wooden discs are fixed between the top of the posts and the superstructure (fig. 5.37), mice and other rodents may be prevented from climbing up the posts. Such devices are most likely represented by the widening of the posts of the granaries depicted in fig. 5.38.

The contents of the granaries could be accessed by making use of raised stepping stones (of wood or other materials) or by using (log) ladders (*cf.* 5.41). Such constructions are generally built in front of, and freestanding from, the granary's access point so as not to provide vermin with a pathway (*cf.* Oliver 1997, 56). Presumably, the postholes sometimes found in association with granaries at Bronze Age (*e.g.* Van Hoof & Jongste 2007, fig. 5.3, D) and Early Iron Age sites (De Koning & Vaars 2003, 41-42 figs. 19-20; 61 fig. 31) were part of such 'stepping stone' constructions.[244]

In short, the available iconographic, anthropological and archaeological evidence supports a function of these structures as raised storage facilities for agricultural products. This need not, however, have been their sole function, yet possible additional functions are not archaeologically visible.

243 But see Fröhlich (1985, 113-114) for a possible German free-standing four-post structure dated indirectly to the Funnel Beaker (*c.* 3400-3000 cal BC) or Single Grave Culture period (*c.* 3000-2600 cal BC). A five-post (VK5a) granary from the German site of Wittenberg - Schwarzen Berg was dated to the Funnel Beaker culture period by association (Zimmermann 1997, 417, reference to Schirnig 1979). See also Verhart (1992, 83 fig. 10) for a possible Vlaardingen period four-post structure at Haamstede in The Netherlands.
244 At Tiel-Medel, a log ladder was recovered from a well that may have had precisely such a function (Van Hoof & Jongste 2007, fig. 6.16).

Granary-type outbuildings from the Netherlands

A relatively large number of granary-type outbuildings are known (> 500), of which the majority (n = 325) originate from the river area. Of the remaining 176 granary-type outbuildings, 90 originate from the various excavations at Zwolle-Ittersumerbroek, for which there is no consensus on their reliability and dating (*supra*; note 122). Certain types of outbuildings, such as triangular and round to oval post-settings in particular, have been recognized for these excavations in larger numbers than known for the river area.[245] While the validity of some outbuildings from Zwolle - Ittersumerbroek may be questioned, this site is incorporated in figure 5.39 for the sake of providing a complete overview. It is however set apart from the river area and the other regions.

For analytical purposes, an inventory of different types of granary-type outbuildings has been made (fig. 5.39). As this was the first time that a quantitative comparison was undertaken of different types of outbuildings by ground plans on a regional scale,[246] a wide range of possibly distinct ground plans was scored. This is – like the approach adopted with the Middle Bronze Age house typology (section 5.2.3.2) – a wholesale etic approach, and does not *a priori* inform us on what 'types' Bronze Age farmers themselves distinguished. It is, however, a very useful strategy if one wants to outline the variation in types present and their frequency of occurrence. Consequently, some of the morphological types classified in the top part of figure 5.39, such as the rectangular (RH4), or trapezoidal (TP4) four-post outbuildings, can be argued to be too analytical categories, [247] as their metric parameters show that these form a continuum rather than distinct clusters (*infra*; fig. 5.40).

To put it more simply, Bronze Age farmers did not seem to mind that their four-post outbuilding had a slightly rectangular, skewed or trapezoidal ground plan instead of a more precise square post-placement. For other types scored in figure 5.39, their low occurrence suggest that they either were extremely rare (*e.g.* types RH5a; RH5b, RH12a) or that their credibility must be doubted entirely (*e.g.* types 'round' and 'indet').[248] Based on the frequency of occurrence, four 'main' types can be put forward: more of less square four-post outbuildings (VK4, RH4, TP4), four-post outbuildings with an added centrally placed post (VK5a, RH5a), six-post outbuildings (RH6) and more or less square nine-post outbuildings (VK9, RH9). Presumably, these were most likely categories also recognised by Bronze Age farmers themselves.

The histogram in fig. 5.39 shows that square (VK4, RH4, TP4) and rectangular (RH4) four- and six-post (RH6) granaries are most prominent in all areas. In the river area, square (VK9) to rectangular (RH9) nine-post granary-type outbuildings rank second. As theoretically different post-configurations may be constructed with ground plans of identical size, some details are provided on the dimensions of the granary-type outbuildings from the river area (fig. 5.40). From the measurements in figure 5.40 it is clear that four-post granary-types of outbuildings (RH4 and VK4) are part of a single population that clusters between 1.7 and 2.7 in length and between 1.3 and 2.5 m in width. Within this population, dimensions between 1.7 and 2.3 m are common (*i.e.* ranging between 56 and 76 %).

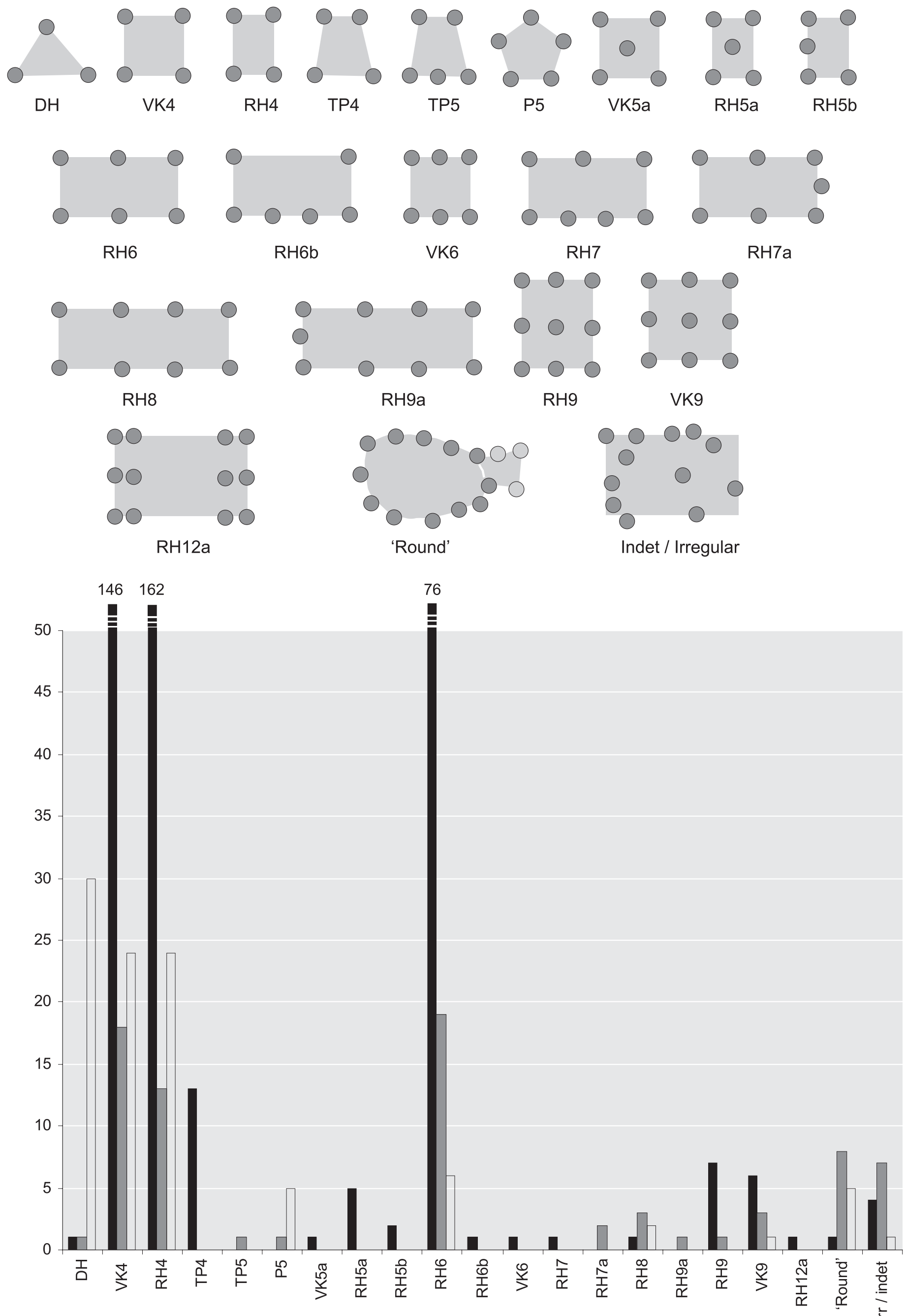
While this may have parallels in the 1.9 to 2.3 m mean spacing used for Middle Bronze Age-B farmhouses (suggesting a comparable set of building traditions?), the variation with the outbuildings is significantly larger compared to the houses. However, in the dimensioning of the six-post (RH6) rectangular outbuildings some confirmation of an assumed use of somewhat standardised inter-post distances may be found. The length of six-posts (RH6) outbuildings clusters around 4.2 m (fig. 5.40, B) which is presumably not coincidentally twice the general distance between posts in square four-post structures (VK4, *ibid.*). Evidently, the building traditions steering the construction of six-post outbuildings were comparable or derived from that of four-post outbuildings. Possibly, the (rule of thumb) dimensioning of the four-post granary-type outbuildings was simply repeated once for six-post types.

245 An argument that argues against the credibility of the triangular structures is the large variation observable in their dimensions (as defined by their bounding rectangle). Triangular structures range from 0.8 by 0.8 m to 3 by 3.2 m, and the standard deviation is 0.6 m for the mean 1.66 m length and 1.61 m width.

246 See Woltering (2000, 52-59) for an earlier example undertaken for the granary-type outbuildings at Texel - Den Burg.

247 The difference between rectangular and square was determined by a maximum 10 % variation in length versus width. If the inter-post distance at one side was less than 90 % of the opposite side, these were classified as trapezoid. The exclusive occurrence of trapezoid granaries in the river area is caused by the fact that these have all been measured in detail, whereas this has not been done for granary-type outbuildings from other areas.

248 See section 5.8 for a discussion of 'round structures'.



	DH	VK4	RH4	TP4	TP5	P5	VK5a	RH5a	RH5b	RH6	RH6b	VK6	RH7	RH7a	RH8	RH9a	RH9	VK9	RH12a	Round'	irr / indet
■ river area	1	104	125	13	0	0	1	5	2	51	1	1	1	0	1	0	7	6	1	1	4
■ other regions	1	18	13	0	1	1	0	0	0	19	0	0	0	2	3	1	1	3	0	8	7
□ zwolle	30	24	24	0	0	5	0	0	0	6	0	0	0	0	2	0	0	1	0	5	1

Fig. 5.39 Typology (top) and frequency of occurrence in numbers (middle) for Bronze Age granary-type outbuildings in the river area (black fill), all other areas (middle grey fill) and Zwolle - Ittersumerbroek (no fill). Numbers listed in table at the bottom.

Consequently, the surface area of six-post outbuildings peaks at 8 square meters (fig. 5.40, B), twice that of four-post granary-type outbuildings.[249]

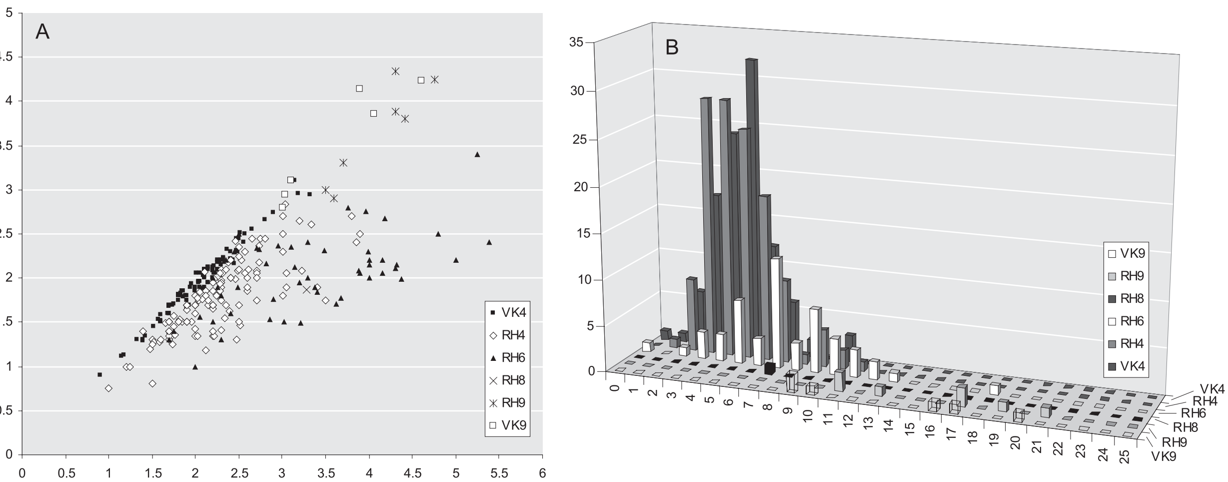


Fig. 5.40 Length (x-axis) and width (y-axis) in meters (A) and frequency of surface area classed by meters (B) for Bronze Age granary-type outbuildings from the Dutch river area.

Moreover, from the diagram of the surface areas it is clear that the nine-post granary-type outbuildings are a discrete group. Whether this observation also indicates a functional division is unclear. The rectangular nine-post granary-types of outbuildings (RH9) may be situated more distant to the houses, but the square variants (VK9) are situated as close-by as the other types (fig. 5.42). Nine-post granary-type outbuildings are also rebuilt and repaired in manners and frequencies comparable to the four- and six-post granary-type outbuildings. For the Bronze Age granary-type outbuildings from the river area, repairs took place in *c.* 11 percent of the cases, while in 8 to 12 cases rebuilding of the outbuildings as a whole may be argued for (see Chapter 6, fig. 6.17).[250]

A final point to be discussed are the different options for the granary's superstructure (*cf.* fig. 5.41). The examples shown as figure 5.37 indicate that they could comprise a wide range of materials (amongst others wattle-and-daub, wood, loam, wickerwork, coiled grass ropes and combinations

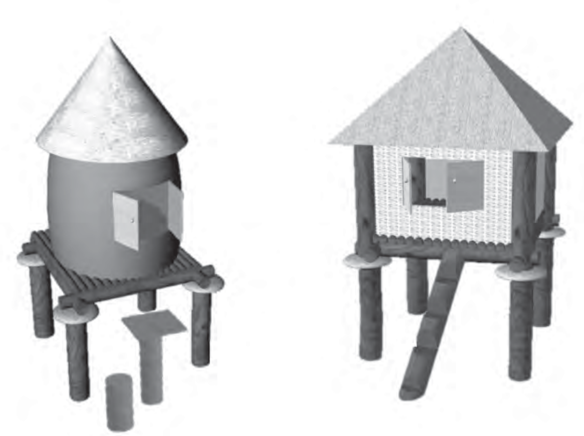


Fig. 5.41 Simplified 3D visualisation of granary-types of outbuildings interpreted as a platform supporting a circular to ovoid loam storage structure (left) or as a square to rectangular wood and wattle-and-daub superstructure (right).

249 With mean surface areas of 4.18 (RH4/VK4), 6.84 (RH6) and 19.46 (VK9/RH9) square meters, they could have held between 2.2 and 35 tons of cereals, which is well above the assumed 0.4 to 2.2 tons thought necessary for a (6-7 person) household for a year (for calculations see Woltering 2000, 286-288).

250 This seemingly low frequency of rebuilding (*c.* 2.5 to 3.7 %) is presumably an under-representation, as outbuildings very frequently overlap with the ground plans of other outbuildings in the river area (n = 73, *c.* 22 %). In the latter case, the superimposed structures differed sufficiently in type, dimensions and/or orientation that these have not been classified as being rebuilt, while rebuilding may very well have been the case in reality.

of these materials) and shapes (square, cylinder, pyramidal, beehive). Whereas the available analogies all suggest rectangular superstructures for the Bronze Age, it cannot be excluded that some of the Dutch rectangular post-settings (also?) supported platforms on which round to ovoid storage structures were built from loam, as suggested by Woltering (2000, 282).

Distribution and dating

Granary type outbuildings are nearly always encountered on extensively excavated Bronze Age settlement sites. It is remarkable that in the southern Dutch coversand areas, granaries appear to be less well represented and do not seem to cluster close to the farmhouses like in the river area (section 6.4.2). The reasons behind this are unclear, but it may be of relevance that in this region, underground storage of cereals (silos; see section 5.7) may have been a chosen alternative. In the eastern and north-eastern coversand areas, granary-type outbuildings appear to be somewhat more common, but do not show an evident correspondence to, and clustering near, the farmhouses like those from the river area (fig. 5.42). The interpretation of (the distribution) of the granary-type outbuildings from this region is somewhat hampered by the fact that several large-scale excavated (*e.g.* Angelslo-Emmerhout, Borger) have not yet been published in full. Granary-type outbuildings are very scarce in the West-Friesland inverted creek ridge landscapes, although two examples are known.[251] Presumably, in West-Friesland the storage of agricultural products took place by different means, in which circular structures such as ring-ditches and pit-circles played an important role (Buurman 1996a). From the coastal areas and directly adjacent areas, no Bronze Age granary-type outbuildings are yet known or published.[252]

Clear-cut granary-type outbuildings have not been recognized at settlement sites from the Early Bronze Age or Middle Bronze Age-A, although some tentative structures recognized during post-excavation analysis have been forwarded.[253] This scarcity may be related to different building traditions that also caused the low visibility of houses from these periods (section 5.2) or perhaps they were simply not common components of the agricultural strategy in those periods. The fact that only few reliable settlement sites dating to the periods in question are known, needs also to be taken into account. Perhaps granary-type outbuildings with a certain Early Bronze Age or Middle Bronze Age-A date will be discovered in due time, but the similarities in post-spacing discussed above may alternatively suggest that these were part and parcel of a building tradition that did not became widespread until after the start of the Middle Bronze Age-B. At Eigenblok, three rectangular, one possible round and a tentative triangular outbuilding were reconstructed for the lowermost occupation layers, that are likely to date prior to the 17th century BC.[254] These structures all comprise posts of generally smaller diameter than those of the later Middle Bronze Age(-B) occupation period and are much smaller in size. It remains therefore unknown whether these structures should be ascribed a similar function (*i.e.* raised storage structure).

The oldest direct dates for Bronze Age granary-type outbuildings are the dendro-chronological and radiocarbon dated posts from Zijderveld (table 5.7). From Eigenblok as well, several dates on construction wood of granary-type outbuildings of different nature could be obtained (*ibid.*). These dates all point to a Middle Bronze Age-B age. From this period onwards, granary-type outbuildings are elements that are invariably present at prehistoric settlement sites in most regions. During the Late Bronze Age, the types listed in fig. 5.39 remain dominant, although some types seem to occur more frequently.[255] Furthermore, the outbuildings seem no longer to cluster as closely to the houses compared to the Middle Bronze Age-B period (*cf.* Chapter 6, esp. fig. 6.57-6.58) and conform less frequently to them in orientation.[256] With the advent of the Early Iron Age, several new types of granary-type outbuildings are introduced or become much more common, such as outbuildings with two rows of very-closely spaced posts

251 Hoogkarspel - Medemblikker Tolhuis (RH6; Bakker & Metz 1967, 207-208 fig. 3) and Medemblik - Schuitenvoerderslaan (RH6 and RH 4; unpublished).

252 Excluding the site Texel - Den Burg, which is near the present-day coast, but situated on a Pleistocene outcrop (Woltering 2000), where both Late Bronze Age granary-types of outbuildings, as well as pit-circles and circular ditches have been found (*ibid.*).

253 *E.g.* Louwe Kooijmans 1993a, 84 fig. 6.10a, 4; Ball, Heirbaut & Peters 2005, 23 fig. 4.1; Van der Velde 2008, 165 fig. 2.

254 Hielkema, Prangsma & Jongste 2002, 131 fig. 3.26; 150 fig. 3.35; Appendix II, Figs. II.5 and II.7.

255 Possibly especially type RH7a (*e.g.* Fontijn 1996, 41 fig. 8; Woltering 2000, 254, 300 fig. 196; Berkvens 2004, 104 fig. 6.12).

256 I will argue later-on that this may signify a less strictly (conceptually) defined house-site (sections 6.5 and 7.4.2).

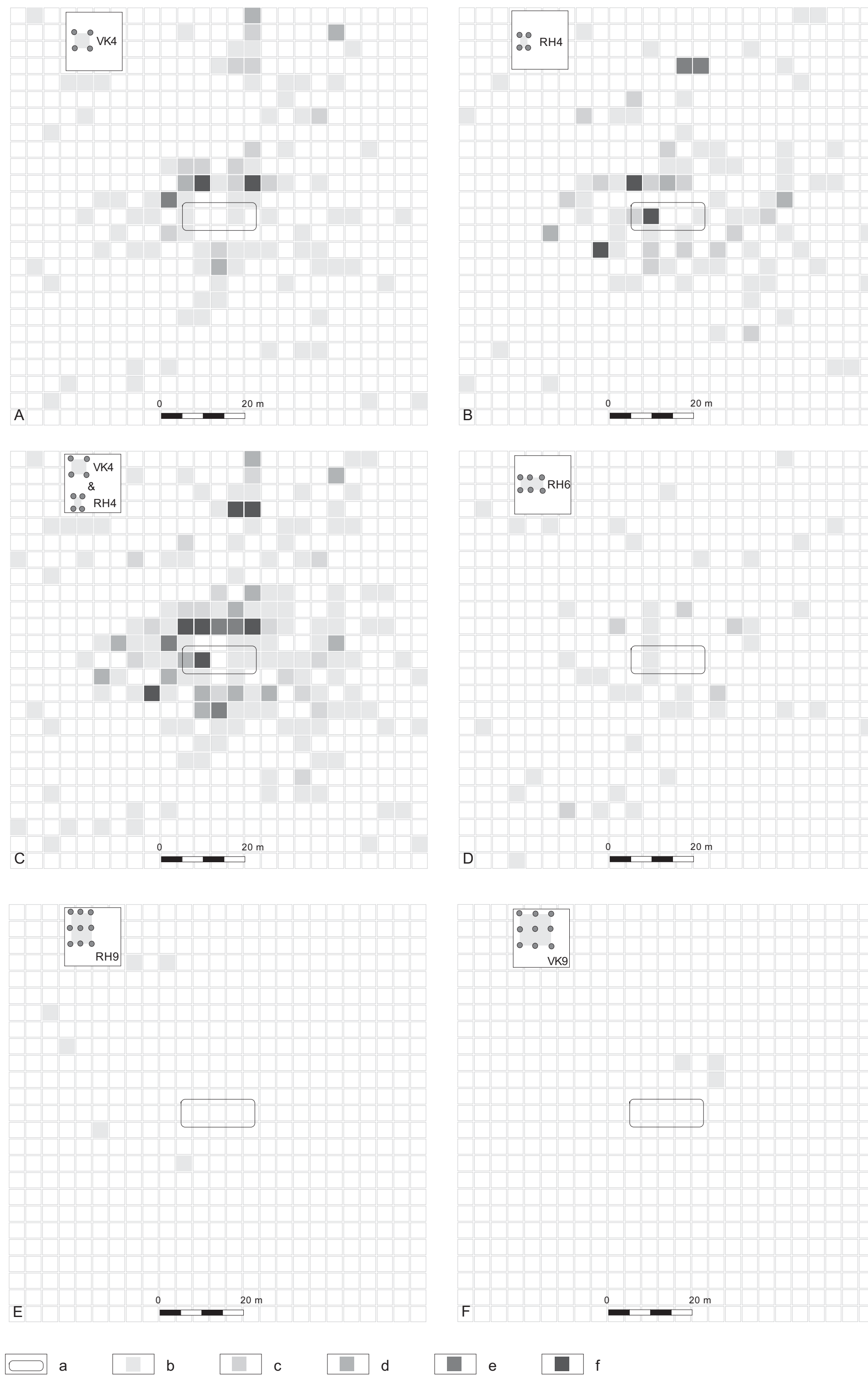


Fig. 5.42 Schematic distribution of granary-types of outbuildings in 4 m grid cells around MBA-B farmhouses in the Dutch river area (A: VK4, B: RH4, C: VK4 and RH4, D: RH6, E: RH9, F: VK9; for methodology see Chapter 6).

a: MBA-B farmhouses, b: 1 granary-type of outbuilding, c: 2, d: 3, e: 4, f: 5 or more granary-types of outbuildings (max. 9).

and 'RH9/VK9' types of outbuildings without the centre posts.[257] Yet by and large, four- and six post granary-type outbuildings predominate for centuries beyond the Bronze Age.

Site	Label	Type	Dating	Remarks	Reference
Zijderveld	sp 19	VK9	t.ad.q. MBA-B	Wood (oak) dendro dated to RING-1472: 1483 ± 6 BC	Knippenberg & Jongste 2005, 17
Zijderveld	sp 21	VK9	t.ad.q. MBA-B	Wood (oak) dendro dated to RING-1487: > 1374 ± 5 BC	Knippenberg & Jongste 2005, 17
Zijderveld	sp 18	RH6	t.ad.q. MBA-B	Wood (alder) dated to GrN-28933: 3110 ± 30 BP	Knippenberg & Jongste 2005, 17
Zijderveld	sp 20	VK9	t.ad.q. MBA-B	Wood (alder) dated to GrN-28927: 3080 ± 30 BP	Knippenberg & Jongste 2005, 17
Zijderveld	sp 27a	RH9	t.ad.q. MBA-B	Wood (alder?) dated to GrN-6406: 3065 ± 55 BP	Theunissen & Hulst 1999b, 158
Zijderveld	sp 32	VK5	t.p.q. MBA-B	Sloe prune dated to GrA-27191: 3085 ± 35 BP	Knippenberg & Jongste 2005, 17
Eigenblok	1ST07	RH6	t.ad.q. MBA-B	Wood (alder) dated to GrN-25345: 3160 ± 20 BP	Jongste 2002a, 35
Eigenblok	1ST11	VK4	t.ad.q. MBA-B	Wood (alder) dated to GrN-25340: 3085 ± 25 BP	Jongste 2002a, 35
Eigenblok	5ST01	RH9	t.ad.q. MBA-B	Wood (alder) dated to GrN-23838: 3070 ± 20 BP	Jongste 2002a, 35
Eigenblok	6ST07	RH8	t.ad.q. MBA-B	Wood (alder) dated to GrN-23837: 3060 ± 20 BP	Jongste 2002a, 35
Enspijk	sp 5	RH4	t.p.q. MBA-B	Charcoal from posthole Utc-13614: 3019 ± 43 BP	Ter Wal 2005b, 32 (also many sherds of single pot)

Table 5.7
Dated granary-types of outbuildings.

5.5 Fences and palisades

Fences and palisades are, from an archaeological perspective, (curvi-)linear posthole alignments. The differences between fences and palisades, mainly in feature sizes and distances between the features, are of gradual rather than categorical nature.[258] Fences are connected at above-ground level. This may have been effectuated by adding wattle work, brushwood or connecting beams. The most common interpretation of fences is that these could have served to define particular plots of different function (*i.e.* crop fields or house-sites) and to confine or to ward-off livestock. The function of palisades is enigmatic and frequently it is unclear whether an above-ground connection must be assumed. In some cases the spacing between the posts is so narrow that some of the assumed functionality (defensive barrier, cattle pen), may have been provided without additional constructional elements. An overview of fence- and palisade types current in the Dutch river area is offered by fig. 5.43. It is important, however, to indicate that – especially for the palisades – a Bronze Age date cannot be assumed for all examples depicted there.

Fences

Fences are frequently recognized at Bronze Age settlement sites where feature preservation is adequate for traces of these to have been preserved. This dependency on preservation conditions hampers interpretations of the presence, absence or numbers of fences recovered on Bronze Age settlement sites. Only at a limited number of Bronze Age settlement sites in the Dutch river area (table 5.8) were fences so comparably preserved that they allow some interpretation above the particularistic level. Therefore, the discussions of fences in this section are predominantly qualitative.

257 *E.g.* Fokkens 1991, 107 fig. 11; Van Bodegraven 1991, 134 fig. 5; Verwers 1991, 169 fig. 8; Stoepker 2000, 28 fig. 18; Berkvens 2004, 113 fig. 6.23; 115 fig. 6.26 and Roymans & Hiddink 1991, 121 fig. 13; Verwers 1991, 167 fig. 5; Dautzenberg, De Koning & Vaars 2002, 19 fig. 19; Tol & Schabbink 2004, 31 fig. 18; Meijlink 2006, 205 fig. 8.3).

258 Fences rarely comprise postholes of features with a diameter > 10-15 cm, whereas palisades generally have an inter-post spacing of 0.25 to 1 m, yet rarely more that 2 m (*cf.* fig. 5.43).

site	tot nos. fences	type 1a	% 1a	type 1b	% 1b	type 2	% 2	other types	bundles (n > 3) ? 1a	1a & 2	1b & 2	2	house sites (hs)	fenced hs?	remarks
Zijderveld	642	436	68	1	<1	202	32	3	10	10	1	1	4	pos. 1	bundles close-by and more distant from houses. Orientation possibly related to morphology of fluvial deposits.
Eigenblok	128	113	88	-	-	12	10	3	4	-	-	2	5	pos. 1	type 1and type 2 fences spatially separated and different orientation
Dodewaard	64	60	94	-	-	3	5	1	-	-	-	-	2-3	-	dense cluster of stake holes yet no clear fence lines
De Bogen	202	112	56	-(1?)	-	72	40	18	1	2	-	3	9-11	-	type 1 and type 2 fences spatially separated. 17 of 'other' are palisade fragments
Enspijk	73	52	70	-	-	21	30	-	++	++	-	1	3	-	type 1 and type 2 fences spatially separated. Orientation possibly related to morphology of fluvial deposits.
Tiel - Medel 8	16	10	63	-	-	4	25	2	-	-	-	-	5-7	-	parallel lines of fences, with single lines comprising different types

Table 5.8 Types, numbers and associations of fence-types for several Bronze Age settlement sites in the Dutch river area.

Theunissen (1999, 167-168) distinguishes closely-spaced single-stake type fences (type 1a: fig. 5.43 nos. 1-6), widely-spaced single stake types of fences (type 1b: fig. 5.43 no 8) and widely-spaced double stake types of fences (type 2: fig. 5.43 nos. 9-14). Type-1a and type-2 fences are the most and second most common types of fences encountered on Bronze Age settlement sites (table 5.8). Furthermore, they seem to differ only marginally in construction details (post diameter, inter-post spacing) between the different settlement sites, which suggests a similar former outlook. Remarkably, Theunissen's type-1b has not been uncovered in significant numbers at any other Bronze Age settlement site yet.[259]

A limited number of fences have been dated directly by construction wood, and the dates indicate that type-1a fences were in any case current between *c.* 1430 and 920 cal BC.[260] The type-2 fences were presumably current between *c.* 1390-1210 cal BC.[261] Judging by association rather than by direct dating, the presence of type 1a fences at Noordwijk (Van Heeringen, Van der Velde & Van Amen 1998, 15 fig. 5) and on several Early Iron Age settlement sites (*e.g.* Fokkens 1991, 102 fig. 7; De Koning & Vaars 2003, 30 fig. 12), indicates this type of fence may date from the Early Bronze Age to (and after) the Early Iron Age.[262] The distribution of type-2 fences seems more restricted in both time and space: they occur predominantly on sites dated to the Middle Bronze Age-B and are presently known mostly from the river area (but see Fokkens 1991, 98 fig. 4).[263] Regardless of their type, fences do (if preserved and archaeologically recognizable) occur in greater numbers compared to palisades and have a more even spatial distribution across settlement site space. Put more simply: if preserved, fence lines can be recognized in all parts of a settlement site.

259 Yet note similarities to the palisade at the same site (fig. 5.43, no 22) and that from Tiel - Medel 8 (fig. 5.43, no 16). The fact that a type 1b fence was only recovered at Zijderveld, and moreover in a part of the settlement site where Iron Age structures were recognized (Appendix I, figs. I.15 and I.21), may suggest an alternative (IA?) dating for this type. In addition, of the two possible palisades from Zijderveld (*e.g.* fig. 5.43, no 22; Knippenberg & Jongste 2005, 57) which are both comparable in post-spacing to the type 1b fence, one is associated with a ditch system that presumably post-dates the Bronze Age occupation (*op. cit.*, fig. 6.6 and fig. 6.18).
260 Eigenblok: GrN-25343: 3090 ± 30 BP, GrN-25341: 3100 ± 25 BP and GrN-25348: 3060 ± 20 BP (alder stakes; Jongste 2002a, 35), Zijderveld: GrN-28924: 3060 ± 35 BP (willow stake) and GrN-28926: 2890 ± 50 BP (poplar stake; Knippenberg & Jongste 2005, 17).
261 Eigenblok: GrN-24103: 3030 ± 20 BP (alder stake; Jongste 2002a, 35).
262 See Louwe Kooijmans (1985, 125) for an early Vlaardingen culture period fence line surrounding (part of?) the foot of the Hazendonk. Some Single Grave Culture period (*c.* 3000-2600 cal BC) sites have also yielded possible type-1 fence lines (Van Heeringen & Theunissen 2001a, 135, *cf.* Van Ginkel & Hogestijn 1997, 92 fig. 55). See also Waterbolk 1960 for a Funnel Beaker period palisade enclosure.
263 Yet see Hamburg & Louwe Kooijmans 2006, 53-60 for an Middle Neolithic example of a type-2 fence and Berkvens 2004a, 97 for a possible Late Bronze Age-Early Iron Age parallel.

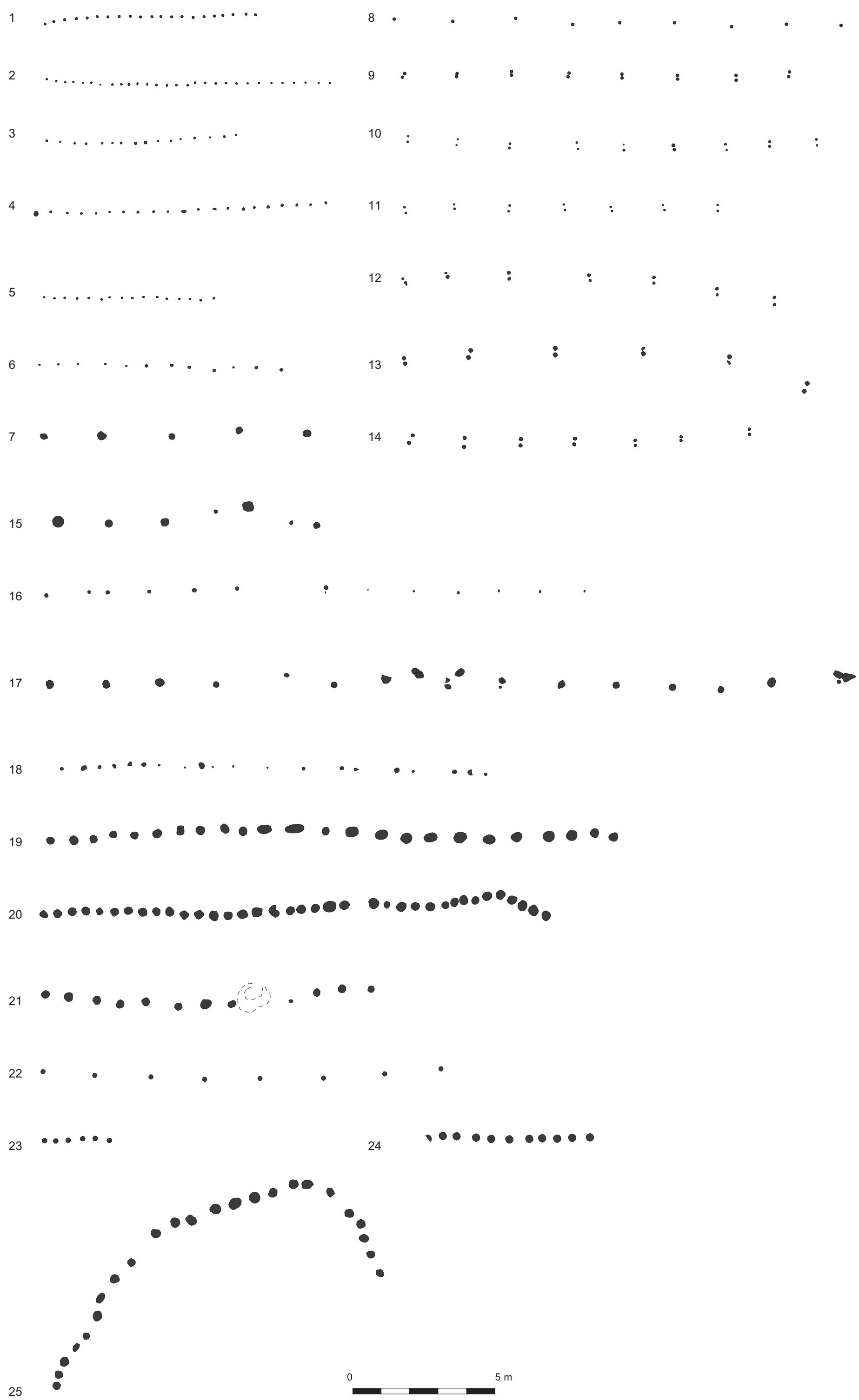


Fig. 5.43 Fences and palisades discovered at possible Bronze Age settlement sites in the Dutch river area: examples from Zijderveld (nos. 1, 8, 9, 22), Eigenblok (nos. 2, 7, 10, 15), Enspijk (nos. 5, 6, 11), De Bogen (nos. 3, 4, 12, 17-20), Wijk bij Duurstede - De Horden (nos. 23, 25), Dodewaard (no 13), Tiel - Medel 8 (no 16), Ottoland - Kromme Elleboog (no 21) and Driel (no 24). For contexts see Chapter 4, Van Hoof & Jongste 2007, Deunhouwer 1986 and Van den Bel & Hamburg 2004.

This is more that a casual observation, as it goes against the grain of commonly held opinion that Bronze Age fences predominantly, or even primarily, delimited Bronze Age farmsteads (*cf.* Chapter 4, fig. 4.1). As I will deal with these problems in more detail below (see section 6.4.3), it suffices here to outline the problems of fence interpretations. The common and extensive occurrence of fences on settlement sites indicates that these served a purpose that applied to settlement site space in its entirety. Whereas in a few cases house-sites may have been bound by systems of fences,[264] I will argue that delimiting house-sites was not the primary function of the majority of fences.

Firstly, the distribution of fences is not spatially clustered or focused on the location of Bronze Age houses (see section 6.4.3 for a detailed analysis). This is clear from examples like Meteren - De Bogen, where fences seem spatially almost unrelated to the Middle Bronze Age-B houses (fig. 5.44). There, poor preservation cannot be assumed to explain this, as indeed fence lines were recognized quite close to, or even overlapping houses. The fences essentially seem to belong to another mode (possibly phase) of landscape structuring. Rather than surrounding house-sites, the fence lines seem to indicate two phases of landscape parcelling (see Chapter 4, fig. 4.19). The construction of the houses at De Bogen may very well have been integrated or executed within the spatial (and social or conceptual) framework provided by such landscape parcelling, as these rarely overlap. Alternatively, these may represent discrete use-phases of the settlement site.

Fig. 5.44 Overview of the distribution of different fence types at Meteren - De Bogen plotted against the distribution of possible Middle Bronze Age-B houses (for context see section 4.4.3).

a: not excavated, b: possible Middle Bronze Age-B structures, c: type 1 fences, d: type-2 fences, e: palisades.

264 *Cf.* fig. 5.47; sections 6.4.3; 8.2.1 and see also Bakker, Woltering & Manssen (1968, 196 fig. 3) and Fokkens (1991, 98 fig. 4; 99) for possible other examples.

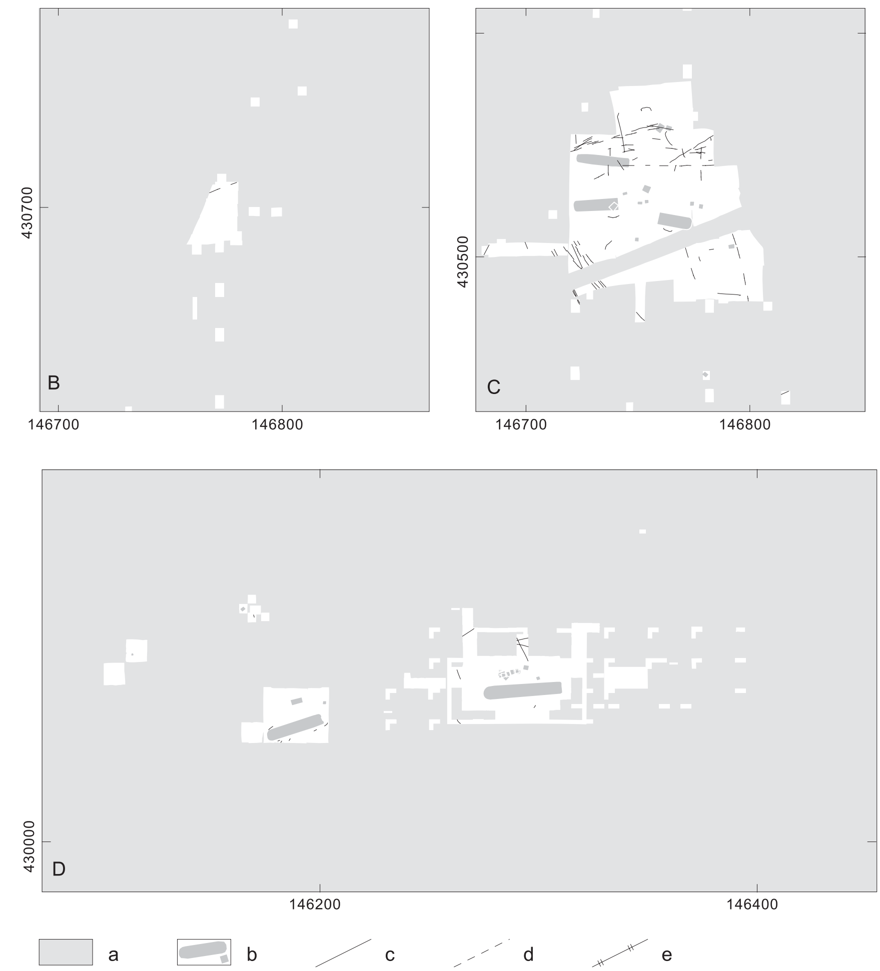


Fig. 5.44 (Continued) Overview of the distribution of different fence types at Meteren - De Bogen plotted against the distribution of possible Middle Bronze Age-B houses (for context see section 4.4.3).

a: not excavated, b: possible Middle Bronze Age-B structures, c: type 1 fences, d: type-2 fences, e: palisades.

Secondly, it is important to realize that the archaeological reflections of fence-systems belie their possibly long, intermittent, construction histories. In many cases, the frequent rebuilding of fences has led to bundles (*i.e.* three or more fences with a very comparable orientation or trajectory) which reflect a continuity in the placement of such structures. This rebuilding of fences may have been necessitated by the limited use-life of unsheltered wood (if not of oak, presumably not exceeding 13 yrs; *cf.* Chapter 3, table 3.7; note 62). In such a scenario, the rebuilding of fences at the same spot with the same trajectory reflects a desire to maintain a pre-existing settlement site ordering (*cf.* Chapter 6).[265] Yet, bundles of fence lines may also indicate palimpsest situations. This may be illustrated with the Zijderveld fences, which have been preserved over much of the settlement site (fig. 5.45, see also fig. 6.27 for a more detailed example).

265 However, where fence lines do not cross-cut, the possibility remains that they are partly duplicated rather than rebuilt structures. Archaeologists should keep an open eye to such ‘illogical practices’, as these may have been socially prescribed. For instance, in the graveyard of San Juan Chamula (Guatemala), double and triple (same colour) crucifixes are placed at graves in cases where several relatives are socially obliged to provide the cross.

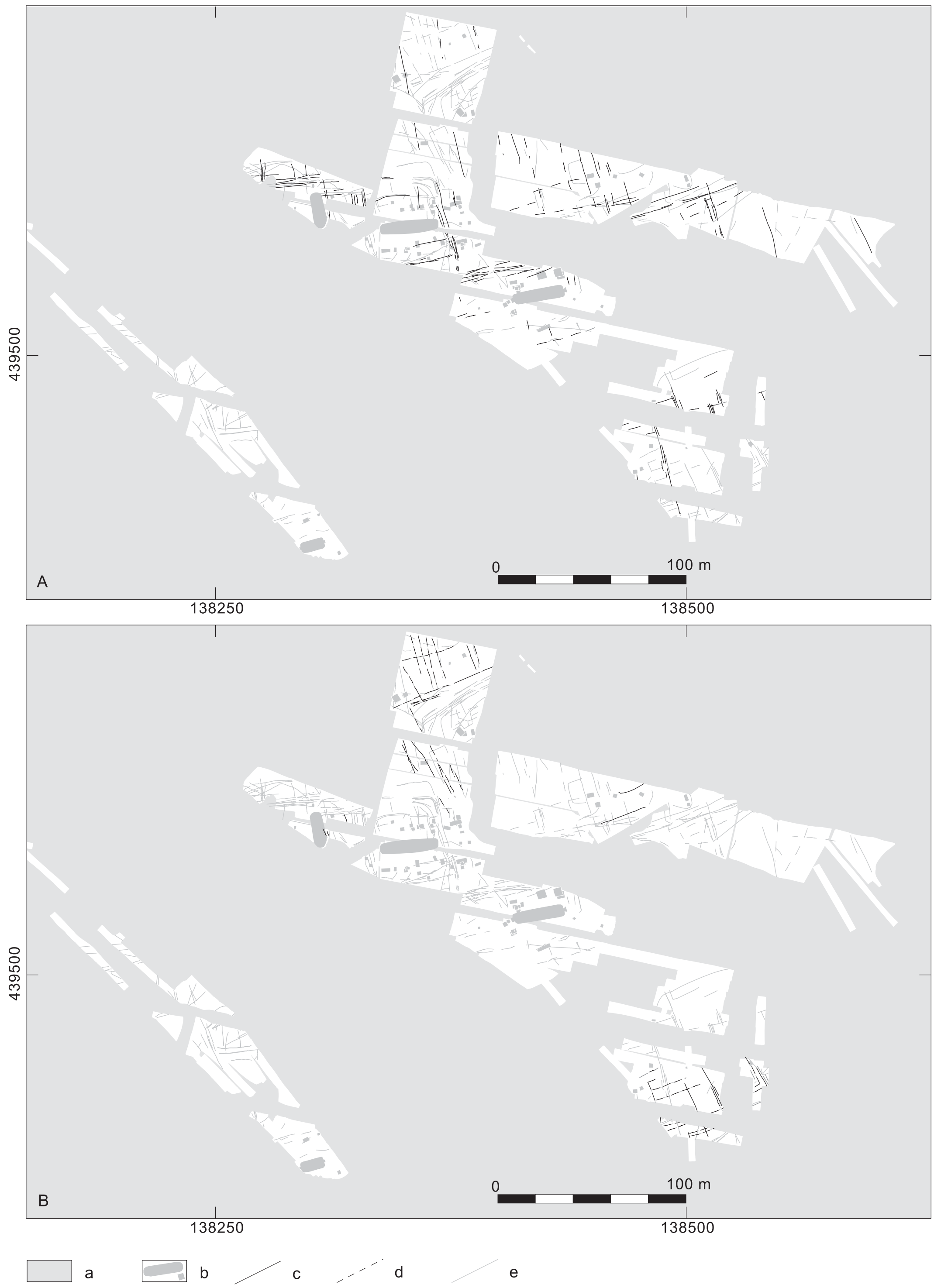


Fig. 5.45 Interpretation of the various (systems of) fence lines at Zijderveld (A: fence system 1 ('north of NNW'), B: fence system 2 ('NNW'), C: curvilinear fences possibly belonging to either phase).

a: not excavated, b: Middle Bronze Age-B structures, c: type 1 fences, d: type 2 fences, e: all fence lines.

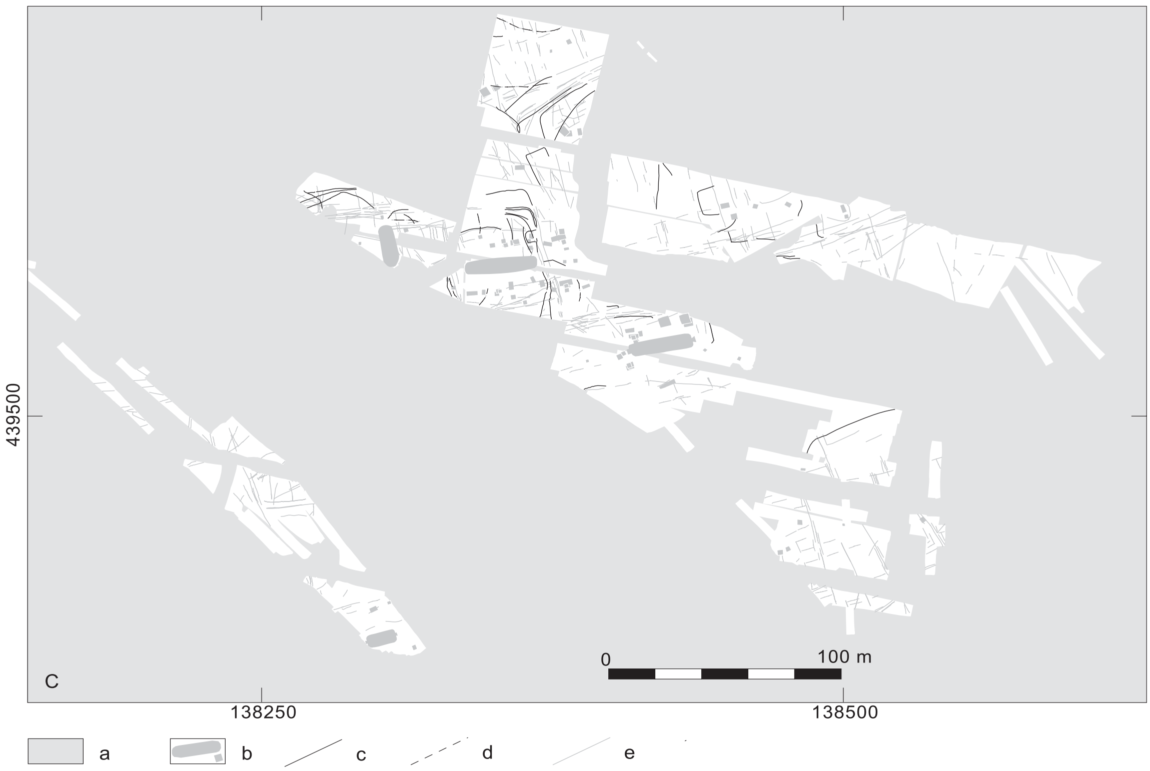


Fig. 5.45 (continued) Interpretation of the various (systems of) fence lines at Zijderveld (A: fence system 1 ('north of NNW'), B: fence system 2 ('NNW'), C: curvilinear fences possibly belonging to either phase).

a: not excavated, b: Middle Bronze Age-B structures, c: type 1 fences, d: type 2 fences, e: all fence lines.

In the composite fence bundles, at least two phases of fence orientation (presumably related to two distinct use-phases of the settlement site) can be outlined (fig. 5.45, A-B). The relation between two phases and the occupation of the houses is unclear. In any case, only few fence lines cross-cut the houses and fences (for whatever reason) cluster between houses. The latter observation suggests that the fence systems in any case respected the position of the houses, whose orientation they roughly share. But this does not mean that these fences were erected in order to define house-sites. The fences may just as plausibly have marked particular plots, of which some were (already, or afterwards) used for habitation. Put otherwise: the fences may have *de facto* surrounded house-sites, but these were never constructed with the *intent* to solely gird a given house (see also sections 6.4.3 and 8.2.1 on fence systems). The fact that fence lines can only very rarely be shown to have a trajectory related to a house (*e.g.* suggesting a fenced-off area of corresponding shape), but rather more frequently continue straight across the suspected 'corners' of house-sites, is in support of this (*e.g.* fig. 5.46, A; B).

Nonetheless, I do not want to argue that no Middle Bronze Age-B house-site was ever delimited (by intention, or by *de facto* spatial association) by fences. For example, house-sites 1 at Zijderveld and Eigenblok have yielded several fence lines whose trajectory (rectangular, with rounded corners, around the houses) suggests that they were intended to surround the houses (fig. 5.47). Yet even here, if studied in detail, there are some complications. At Zijderveld, two crucial corners are not unearthed while the southeast one is more an intersection rather than a corner of fence lines (fig. 5.47, A, *cf.* Gerritsen 2003, 74). At Eigenblok (fig. 5.47, B), the fence lines intersect with many granary-type outbuildings also thought to have been part of the same house-site (section 4.3.4; Appendix II). More important, however, are issues of representativeness. Even if we accept the tentative examples depicted in figure 5.47 as fenced house-sites, 93 % of the house-sites that could have shown similar fenced-off areas, in reality have not yielded these. This supports the interpretation that most fences were not erected with the intent to surround house-sites (see section 6.4.3).

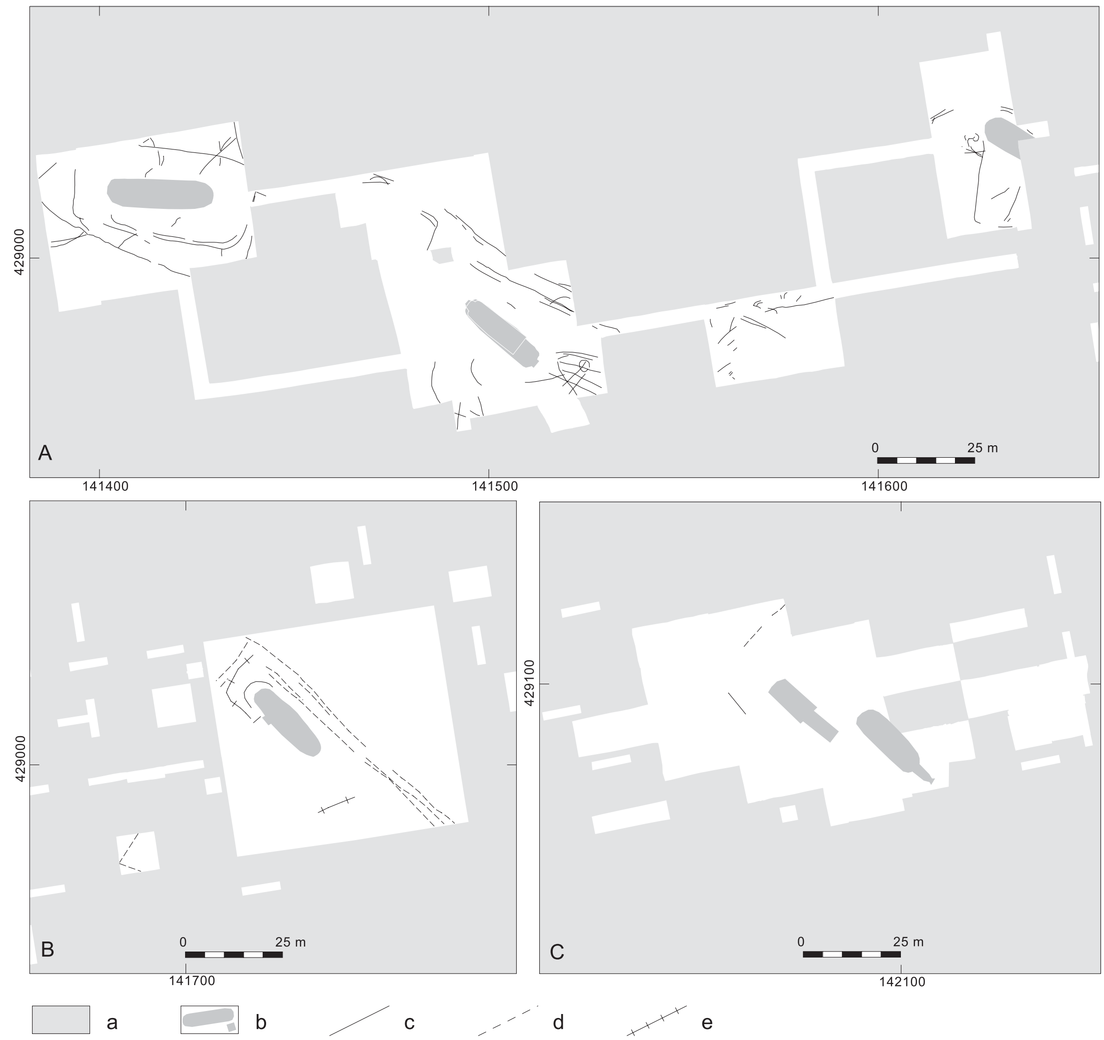


Fig. 5.46 Location of the various (systems of) fence lines at Rumpt - Eigenblok (A: site 1-4, B: site 5, C: site 6, for context see section 4.3.5).

a: not excavated, b: Middle Bronze Age-B structures, c: type 1 fences, d: type 2 fences, e: other types of fences.

As the limited plausibility of fences representing house-site boundaries has been discussed above, some speculation as to their function(s) is justified. Assuming an agricultural strategy of true mixed-farming (Louwe Kooijmans 1993c, 104), the occlusion of animals (both wild and domestic) from gardens and crops-fields may have been of chief importance. Additionally, fences may have served to pen livestock in particular plots in order to have these naturally fertilized with dung, prior to future use of the plots as crop-fields. The fact that the distribution of cattle hoof-imprints at Eigenblok site 5 (see fig. 6.7, B) appears to be bound by fences, suggests that these were also used to keep cattle from the direct vicinity of houses. Cattle were however not permanently banned from house-sites as in two cases, fences have been interpreted as having provided drove ways to lead cattle to and from houses to meadows (Theunissen & Hulst 1999b, 169; Hielkema, Prangsma & Jongste 2002, 105). Alternatively, or additionally, it has been suggested that they materialized claims of use or 'ownership' of specific plots for specific social groups (be it households, kin groups or local communities; *cf.* Vellinga 2000, 62-63; Field 2001, 60; Padma *et al.* 2001, 11).

Probably, fences had multiple and convertible functionalities, and the fact that bundles of fences frequently comprise fences of different types, and that single fence lines sometimes consist of different types of fences (see table 5.8), indicates that such multi-functionality spanned constructional types. Nonetheless, type-2 fences seem to

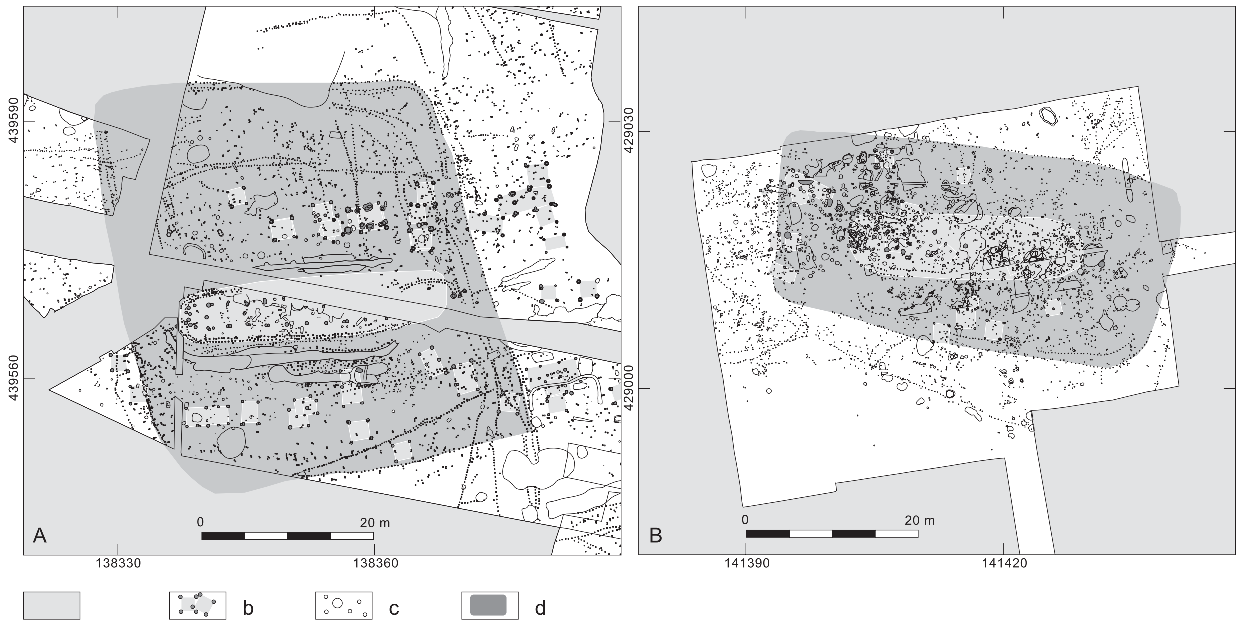


Fig. 5.47 Tentative fenced-off house-sites at Zijderveld (A) and Eigenblok (B).
a: not excavated, b: possible MBA-B structures, c: other features, d: tentative house-site as indicated by curvi-linear fences.

present themselves more frequently as longer and straighter trajectories (*e.g.* fig. 5.44, d), whereas curved trajectories were more frequently executed as type-1a fences. Furthermore, the fact that at Eigenblok and Enspijk type-2 fences dominate in some parts of the excavation while they are conspicuously absent from others (see sections 4.3 and 6.4.3), suggests that different types of fences may have been appropriate in different parts of the settlement site.[266]

Regardless of placement and type, fences may have been considered to have had more than purely practical functions. In anthropological literature there are many examples documented where fences both physically as well as conceptually delineate funerary locations or important ancestral sites, or serve to distinguish (parts of) the settlement site as places that are clean, predictable and inhabitable – in contrast to what lies beyond.[267] In some cases, the physical property of such a boundary may become increasingly irrelevant to even notional (*e.g.* Rapoport 1990, 189; Van Meijl 1993, 214; Gillespie 2000, 157). The architecture of Bushman camps is of limited physical extent, yet of ample significance (Douglas 1966, 85; Rapoport 1990, 145; Whitelaw 2003, 255). Another example is the former tradition of marking the outer (conceptual) limits of Asante villages by a low barrier consisting of logs (Anderson & Kreamer 1989, 31). This barrier (called *pampim*):

> *'...was not intended to prevent entrance or egress of people or beasts – it was too low for that; it was intended instead as a mystical protection for the village against the dangers and powers which dwelled in the bush, and as such it represented the end of the village, the realm of man, and the beginning of the wild.'* (McLeod 1981, 40).

The cosmological significance of fences as boundary makers in Bronze Age settlement sites may be criticized. Fences could and did serve practical means such as managing livestock movement. An overly functionalist interpretation of fence lines may however be inappropriately guided by the functions and roles of fences in sub-modern and present-day agricultural and domestic landscapes,[268] where besides practical functions these may communicate '… attitudes

266 The available evidence suggests that type-2 fences are more current in locations with more limited sand depth (possibly to prevent easy ruination by cattle looking for scratching posts), whereas in more clayey areas type-1 fences dominate (section 6.4.3, fig. 6.29).
267 *E.g.* Denyer 1978, 16; Rapoport 1990, 130; Küchler 1999, 59; Padma *et al.* 2001, 9-11; Gillespie 2000, 156-157.
268 Rapoport 1990, 130-131; 189; Abrahams 1991, 154; Voorhorst 1996, 52-53.

about privacy, interaction and boundary control..' (Rapoport 1990, 130). We interpret fences predominantly in functionalist modes for the reasons that (a) by their structural properties these could serve practical purpose in the agricultural system reconstructed for the society under study and (b) the sub-modern and present-day rural Dutch landscape offers various analogies for such uses. But what about structures that do not seem intuitively logical in an agricultural strategy? The palisades discussed next are a case in point. Frequently, these post alignments, sometimes with impressive proportions, start and stop in settlement site space without ever enclosing, or fully shielding-off a particular plot. This limited and un-joined spatial extent, as well as the sometimes larger inter-post distances, argue against practical functions such as defensive structures or livestock 'enclosures'. For these, symbolic functions may have prevailed:

> *'By definition, the boundary marks the beginning and end of a community. But why is such marking necessary? The simple answer is that the boundary encapsulates the identity of the community and, like the identity of an individual, is called into being by the exigencies of social interaction. Boundaries are marked because communities interact in some way or other with entities from which they are, or wished to be, distinguished.'* (Cohen 1985, 12).

Such boundaries are by nature oppositional and relational, as these mark out communities only in relation to others (Cohen 1985, 59).[269] They thus serve predominantly as a mark of (communal) identity, possibly partly created or reinforced by the cooperative labour necessary for their construction. That both sides of such a 'boundary' appear (archaeologically) very similar to identical, does not conflict with this, but may even be the very reason of its existence (*op. cit.*, 110).[270]

Palisades

In an archaeological sense, palisades are post-alignments comprising posts of diameters exceeding 10-15 cm in width, and with frequently small inter-post distances (*e.g.* fig. 5.43, nos. 7; 15-24). They are frequently encountered on Bronze Age settlement sites, but need not all have been constructed during the Middle Bronze Age.[271] For instance, one of the palisades of Wijk bij Duurstede - De Horden (fig. 5.27, no 25), was situated stratigraphically lower than a nearby Middle Bronze Age-B house (*cf.* Hessing 1991, 45 fig. 3). However, one of the posts of a palisade at Eigenblok (fig. 5.43, no 15), was radiocarbon dated to *c.* 1430-1310 cal BC, indicating that in any case some palisade-type post-alignments were constructed during the Middle Bronze Age-B.[272] The palisade of the Bogen site 30 (fig. 5.43, no 20; Hielkema, Brokke & Meijlink 2002, 157) yielded Bell Beaker and Barbed Wire-stamp decorated sherds that provide a *terminus post quem* for the construction during or after the Early Bronze Age. The southernmost of the two curved palisades north of houses 29B2/3H (Chapter 4, fig. 4.17), yielded a possible Early Bronze Age or Middle Bronze Age-A sherd from one of its postholes (Hielkema, Brokke & Meijlink 2002, 185; Ufkes & Bloo 2002, 342 fig. 4.52). This find, combined with inter-post spacing that was much like that of the Middle Bronze Age-B houses (*cf.* fig. 5.43, no 17; Gröhn 2004, 242 fig. 46), suggests that these palisades at De Bogen site 29 could date between the Late Neolithic to the Middle Bronze Age-B. For the other palisades, definitive arguments for their dating are lacking. The palisade that extends north from De Bogen site 29 to enclose part of the floodbasin (fig. 5.48), may have been (re)created in several phases. Two of these may be classified as palisades (fig. 5.43, nos. 18-19), and one of these was a type-1 fence (see Appendix III, fig. III.28). This again suggests that fences may occasionally have had more than purely practical functions.

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269 See also examples offered by Denyer (1978, 17), who discusses invisible, yet often strongly enforced boundaries that separate in-laws (Kaonde, present-day Zambia) or age-sets (Tullishi, present-day Sudan) in African villages (see also note 96 on page 329).

270 Perhaps the Annelöv palisade (Arcini & Svandberg 2005, 339-359, esp. 358 fig. 48) should also be interpreted along such lines.

271 For other possible Bronze Age palisades at settlement sites see: Bakker *et al.* 1977, 221 fig. 14; Brandt 1988b, 69; Harsema 1991, 27; Beex & Hulst 1968, 121; Waterbolk 1964; 1987, 198; Barrett, Bradley & Green 1991, 89; Stäuble 1997, 145; Andersson *et al.* 1999, 16-28; Evans & Knight 2001; Bourgeois, Cheretté & Bourgeois 2003, 220; 283; Klomp 2003, 29; Gröhn 2004; 218; 242; Arcini & Svandberg 2005, 339-359.

272 GrN-24385: 3105 ± 20 BP (alder posts; Jongste 2002a, 35).

The palisades of Eigenblok (fig. 5.43, nos. 7; 15), Ottoland (fig. 5.43, no 24) and De Bogen site 30 (fig. 5.43, no 20) have all been uncovered fully and proved to be of a limited spatial extent. The palisade to the north of De Bogen site 29 (fig. 5.48), the possible example along the ditch south of Wijk bij Duurstede - De Horden (fig. 5.43, no 22) and that to the south of the houses in the west of Tiel - Medel site 8 (fig. 5.43, no 16; *cf.* Chapter 6, fig. 6.54) all mark the transition from a more lower-lying area in the floodbasin to an area where several Middle Bronze Age-B houses were situated. Possibly, this was an expression of communality at the level of a neighbourhood or the settlement site as a whole, rather than of individual households.[273] Were palisades to have had more relevance to the (physical or conceptual) definition of individual households or house-sites, one would have expected their numbers to be higher at settlement sites with multiple houses and to be more frequently situated between or near houses. This is, however, not the case (see also Chapter 6, section 6.4.3).

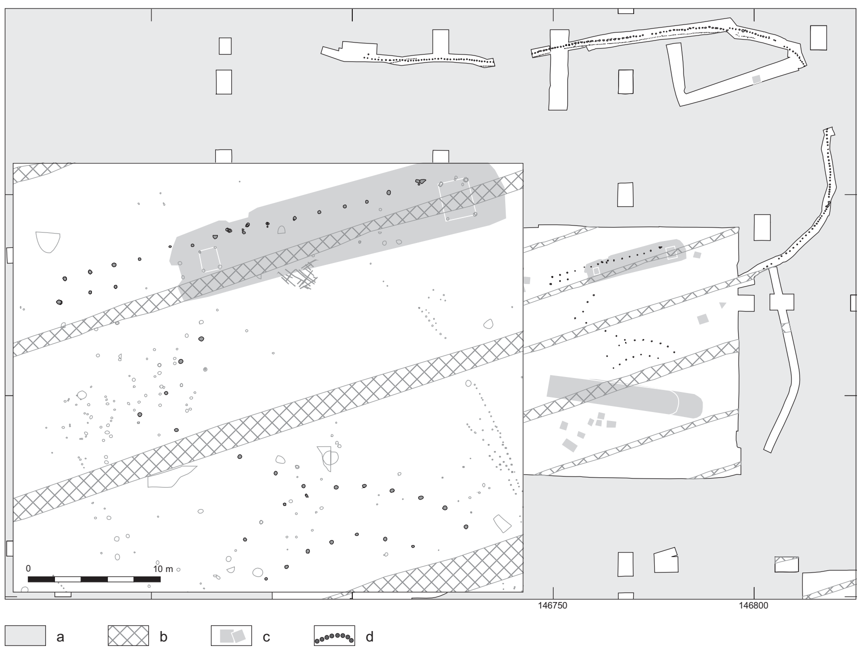

Fig. 5.48 Possible palisades at De Bogen site 29.
a: not excavated, b: recent disturbances, c: possible MBA-B structures, d: palisade posts, e: other features.

5.6 Ditches

Ditches are recurrent, yet not common elements of Bronze Age settlement sites in the Dutch river area. Within this wider group, four uses of ditches may be outlined based on their spatial (and presumably functional) relation to houses or the absence of evident relations to houses. Within close (< 10 m) range of Middle Bronze Age-B farmhouses, two types of ditches can be encountered.

273 Neighbourhood here being loosely defined in archaeological terms as a spatially confined number of house(sites), that are thought to have felt and expressed a sense of communality, within a larger agglomeration of contemporaneous house(site)s (*cf.* Heringa 1985, 69). Possibly the very extensive (continuing for nearly 100 m) and multiple palisade discovered at Werkhoven by mr. A. Veenhof (posts of *c.* 25-30 cm diameter, placed 30-50 cm apart in a foundation trench) and for which a Late Bronze Age age is suspected, should also be interpreted along these lines. In any case, it seems unlikely that such extensive structures were constructed with the intent to enhance or reflect prestige at the village level, as has been suggested for the enclosed Iron Age sites of Britain (*contra* Hingley 1990, 97, *cf.* Thomas 1997, 213), although the construction of such a structure may very well have been a prestigious undertaking.

Eaves-drip ditches?

The first group of ditches can be classified as eaves-drip ditches, that keep the water coming from the roof away from the wall, thus increasing the wall's use-life. Possibly, such ditches – when first dug – supplied clay for the daubing or sods for creating or insulating the walls, and served afterwards as eaves-drip ditches (*cf.* Modderman 1955e, 17; Bakker & Metz 1967, 218). Some of these ditches are however situated at such a large distance from the roof-bearing posts, that it is unlikely that the roof eaves extended out into these. In the river area, the walls are situated at a mean 1.38 m (range 1.13 to 1.7 m) from the lines of roof-bearing posts. By assuming a height of the walls in the side-aisles of 1.05 m (based on cattle height estimates; IJzereef 1981, 66) and a tie-beam height of 2.3 or 1.8 m (fig. 5.49, A; right and left side; the former resulting in a more realistic roof-pitch for drainage purposes; Huijts 1992, 23), the centre of eaves-drip ditches is most likely to be situated at 2.1-2.3 m from the centre of the roof-bearing post. This is almost never the case (but see Chapter 4, fig. 4.8, no 7 and fig. 4.37, A), as such ditches may be situated between 2.9 m (Wijk bij Duurstede; section 4.5.3) and over 4 m (*e.g.* Zijderveld house 3; river area mean of 3.3. m) from the roof-bearing posts.

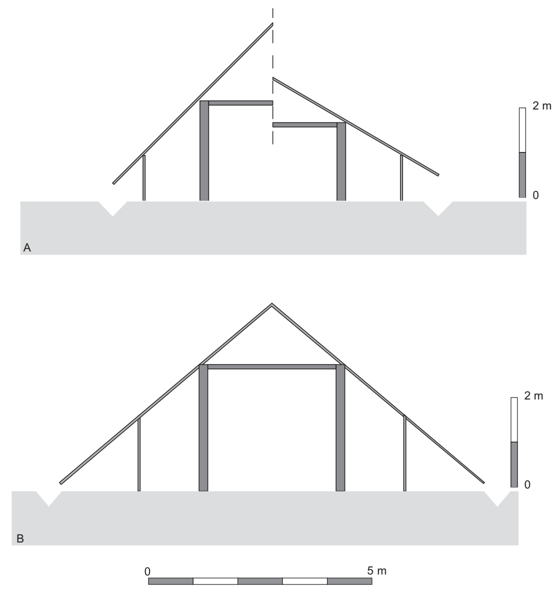

Fig. 5.49 Reconstructions of Bronze Age houses and their relation to nearby ditches as influenced by roof-pitch, tie-beam height and placement and height of the walls (A: tie-beam at 2.3 (right; roof-pitch 45 degrees) or 1.8 m (left; roof-pitch 50 degrees), wall at 1.38 m and 1.05 m height. B: wall at 1.5 m and 1.76 m high, roof-pitch 50 degrees; leading to a tie-beam height of 2.8 m).

The morphology of these ditches nonetheless suggests that several of them were related to the shape and particularities (*e.g.* side entrances) of the houses. There are thus two ways to view these ditches. In the first scenario, they may be regarded as house-site ditches that drained the immediate vicinity of the houses, but did not serve as true eaves-drip gullies (*e.g.* those of Wijk bij Duurstede - De Geer (section 4.5.3). In the second scenario, these ditches are interpreted as true eaves-drip ditches. To this end, the assumption used in the calculations suggested above needs to be adjusted. In order for the ditches at mean 3.55 m from the roof-bearing posts to be effectively used as eaves-drip ditches, walls had to be 1.76 m high and the tie-beam fixed at 2.8 m height (fig. 5.49, B). These figures appear large, but are by no means unrealistic or constructionally unfeasible.

Furthermore, some observable patterns may be in support of the use of such (more distant ditches) as eaves-drip ditches. First, it would explain the strong connection between the location (or morphology) of the ditches and the morphology of the house.[274] Second, it would explain the generally lower feature density of the surface area between location of the assumed eaves-drip as suggested by the first set of assumptions and their location in reality. Put more simply: no construction took place in these zones because they were not accessible. Lastly, the observed re-digging of the ditches as observed at Zijderveld (section 4.2) makes more sense if we assume that the water supplied from the roof's watershed actively contributed to their silting-in. Based on these combined arguments, in this study ditches situated within 3 m from the roof-bearing posts are considered possible eaves-drip ditches. However, some of these, may in reality (additionally) have served to drain the house-site (see below). In both scenarios, however, the ditches are still intimately related to the presence and shape of houses, which is their most salient property.

274 Additionally, the models of fig. 5.49 assume a preserved surface level and ditches with 45 degree sides. If the surface level was originally situated much higher (*e.g.* 50 cm) than the excavation level, the ditches may at the surface level have been situated much closer to the houses – even if not allowing for more shallow angles of the ditch sides.

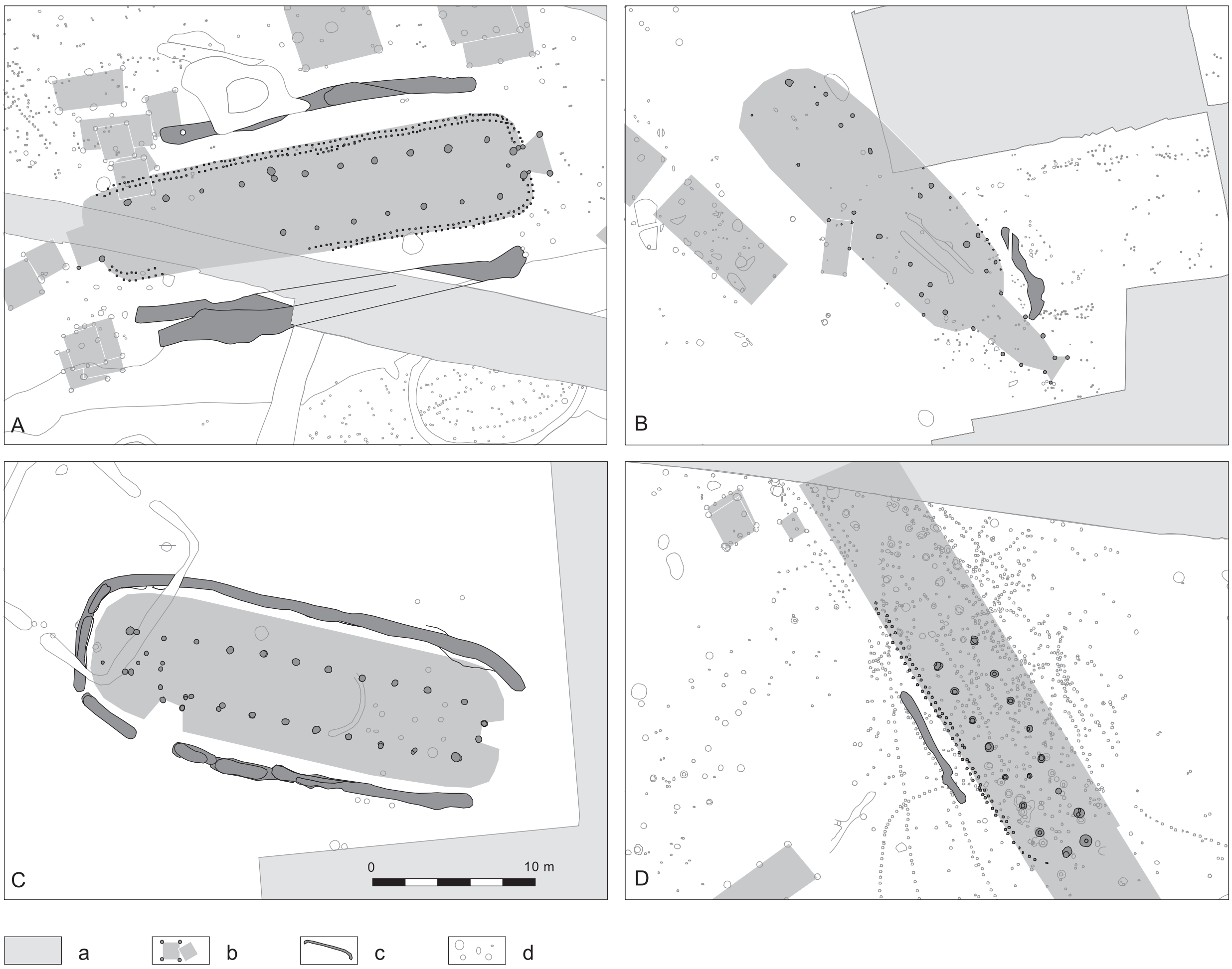

Fig. 5.50 MBA-B farmhouses with tentative eaves-drip ditches (A: Zijderveld house 3, B: Eigenblok house 6-2, C: Wijk bij Duurstede - De Horden house 8, D: Dodewaard house-phase 1b, all to same scale (see C)).

a: not excavated, b: mba-b structures, c: possible eaves-drip ditches, d: other features.

House plot drainage ditches

Some ditches are evidently situated beyond the eaves-drip of the roof, but are still situated close-by to the houses. For these ditches, a function as house-site boundary might be considered. There is, unfortunately, little supporting evidence. As I will argue later (section 6.4.2), granary-type outbuildings may be the best indicators of Middle Bronze Age-B house-site location and size in the Dutch river area. However, in the cases where an interpretation of present ditches as house-site ditches may be suggested by the larger distance from the roof-bearing posts (*supra*), the associated outbuildings are generally still situated beyond them (fig. 5.51, B).

Therefore, it seems unlikely that these ditches are farmyard boundaries. Rather, they may be house-sites elements instead of house-site delimiting features. It is quite plausible that their capacity to drain moisture away from the house location was the reason that they were situated relatively close to the houses (*cf.* Brandt in Bakker *et al*. 1977, 215). In the settlement of Velserbroek - Westlaan (Bosman & Soonius 1990, 2 fig. 2), ditches are situated similarly close to presumed Middle Bronze Age-B houses. In various other Bronze Age settlement sites in the coastal area and in West-Friesland, ditch systems are frequently present with Bronze Age houses.[275] They are almost invariably situated at such large distances from the reconstructed roof edge, that a function as eaves-drip ditches is impossible (fig. 5.52).[276] Such ditches are thus best defined as house plot drainage ditches. With such a definition, their function is indicated whilst terminological confusion over whether these served as farmstead boundaries is avoided. From figure 5.52 it is clear that the mean width of these rectangular ditched enclosures is too wide to have served as eaves-drip ditches. For comparison, the general dimension range of the majority of the houses in West-Friesland and the river area are also indicated. Note that during the later (end- Middle Bronze Age-B and Late Bronze Age) occupation of West-Friesland raised dwelling mounds of larger dimensions were constructed. In these cases, the shape and location of the surrounding ditches was no longer determined by the shape and location of the houses, but by that of the raised dwelling mounds.

While some ditches in the Dutch river area may have been house plot drainage ditches not unlike those in West-Friesland, there are some additional differences. In West-Friesland, unlike in the river area, ditches may very well have been used to structure settlement site space and possibly even have acted as farmstead boundaries. Unfortunately, several excavations in West-Friesland where such patterns may be observed and analyzed have not yet been published in full. However, some preliminary interpretations show that (the ditches associated with) some houses, such as some at Andijk (fig. 5.53), Hoogkarspel (Bakker *et al.* 1977), Bovenkarspel (IJzereef & Van Regteren Altena 1991) and Zwaagdijk - Oost (Ufkes & Veldhuis 2003) are situated within, and integrated within, wider systems of ditches.

Some of these dicthes may very well have bounded an area used exclusively or predominantly for the execution of various domestic and agricultural tasks by the occupants of a single associated house. As such, they may support an interpretation as farmstead

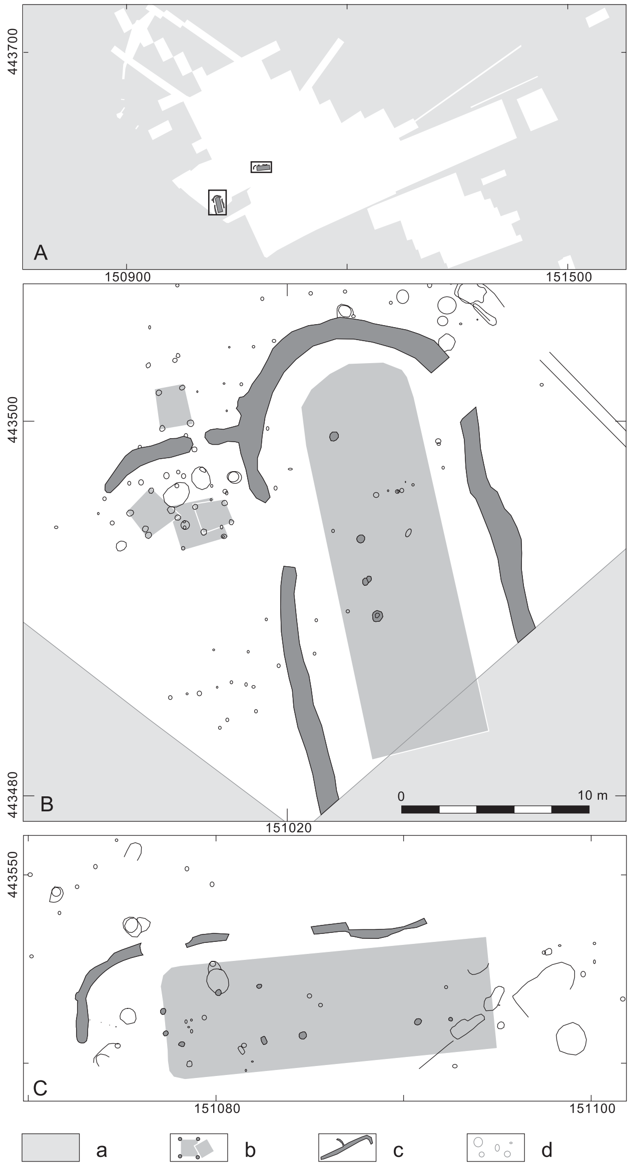

Fig. 5.51 Ditches associated with MBA-B farmhouses, but situated beyond the reconstructed roofs' eaves-drip at Wijk bij Duurstede - De Geer. For the location of house-site one (B) and two (C) see (A).

a: not excavated, b: mba-b structures, c: ditches, d: other features.

275 *E.g.* Van Mensch & IJzereef 1975; Bakker *et al.* 1977; Brandt 1980; 1988; IJzereef 1981; Bosman & Soonius 1990; IJzereef & Van Regteren Altena 1991; Buurman 1996; Woltering 2000; Ufkes & Veldhuis 2003; Lohof & Vaars 2005.

276 According to IJzereef & Van Regteren Altena (1991, 68) house plot drainage ditches of the older (end-Middle Bronze Age-B) occupation phases are situated mostly nearer to the house's long sides, are curvilinear in shape and sometimes extended in curved trajectory around the house's short sides, whilst those of the later (Middle Bronze Age-Late Bronze Age transition and Late Bronze Age) occupation phases, are situated more distant and consist of separate and straight ditch trajectories. Some radiocarbon dates obtained for samples from ditches of the latter type at Zwaagdijk - Oost (Ufkes & Veldhuis 2003, 49; 57) may indicate that these too can date to the Middle Bronze Age-B.

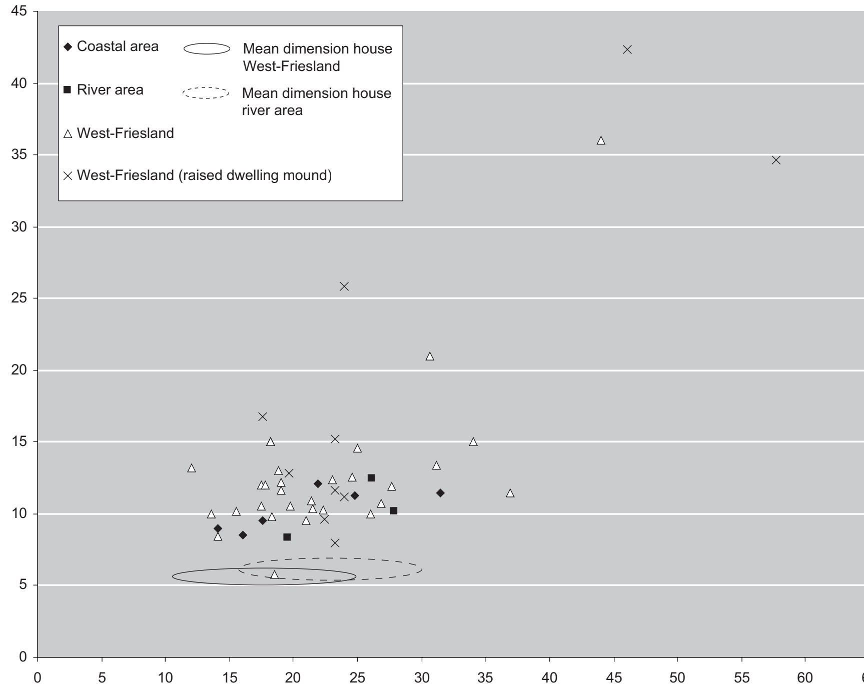

Fig. 5.52 Generalized length (x-axis) and width (y-axis; minimum dimensions, measured at centers of opposite ditches) of house plot drainage ditches from the Dutch central river area (n=3), the coastal district (n=6) and West-Friesland (n=41).

boundaries. Yet, it should be stressed that the ditches that delimit such areas are frequently, if not invariably, part of wider systems of ditches that divide settlement space into plots that may have been fields, pastures or land for other purposes. Thus, not unlike the fences in the river area, such systems of fences seem to delimit farmsteads more *de facto* than on purpose. Put otherwise: few to no ditch systems can be outlined in West-Friesland that served solely or predominantly to delimit a functional area around a Bronze Age house. Rather, their primary function seems to have combined drainage and the parcelling of settlement site space (*cf.* Brandt in Bakker *et al.* 1977, 215). This perhaps justifies the interpretation of these as parcelling and drainage ditches.

Parcelling and drainage ditches

Ditches of this type both drained and compartmentalised areas of settlement site space in West-Friesland and in the coastal areas (*supra*; fig. 5.53). In the river area, the southern and the (north)eastern coversand areas, such ditches are less common. Nonetheless, some (segments of) such ditches are known from Bronze Age settlement sites in these areas.

At Noordwijk in the coastal area, an Early Bronze Age house plan was recovered to the south of which two stratigraphically separated layers of ard-marks were recovered (Van Heeringen & Van der Velde 1999; Van der Velde 2008). The upper layer of ard-marks was divided by ditches into sub-rectangular plots of *c.* 245 to 256 square meter. Unfortunately, due to erosion no complete section could be drawn in which the ard-marks and ditches could be related stratigraphically to the houses (Van Heeringen, Van der Velde & Van Amen 1998, 18-19). As ditches have more frequently been observed in the coastal areas in association with ard-marks on sites dated to the Middle- or Late Bronze Age (*e.g.* Waasdorp 1991, 329; Hagers *et al.* 1992), the Early Bronze Age date must remain provisional.[277]

At Zijderveld, two ditches were found in the north-west part of the excavations (Theunissen & Hulst 1999b, 170). As one is cross-cut by the Iron Age house (Appendix I, fig. I.21), they are provisionally dated to the Bronze

277 For the ditches (and possibly associated ard-marks) at Zwaagdijk, a single radiocarbon date of 3310 ± 60 BP (GrN-4243: Modderman 1964a, 34) is available that provides a *terminus post-quem* age of *c.* 1740-1440 cal BC for the ditches. At Den Haag - Bronovo (Waasdorp 1991; Bulten *in prep.*), an Iron Age date cannot be excluded for the ditches present (*op. cit.*, 320), but underlying phases of ard-marks were dated to the Bronze Age. At Velsen - Westlaan (Bosman & Soonius 1990, 3), some presumably Bronze Age ard-marks were documented, but their relation to the various ditches is not yet clear as the site has not yet been published in full. At Haarlem - Bouwput Ridderstraat (De Jong 1988, esp. 31) various ditches were observed in the sections of a construction site, for which two Middle Bronze Age-B radiocarbon dates are available. No traces of ard-marks were observed.

Age.[278] Their irregular shape in plan and curved trajectory, may however suggest that these are natural crevasse channels, caused by fluvial systems that post-date the Zijderveld fluvial system (Van Zijverden 2003a). In the other parts of the Zijderveld excavations, several other ditches have been uncovered, but for these a Bronze Age date cannot be proved as finds are mostly absent (Knippenberg & Jongste 2005, 70-72). One of these ditches cross-cuts a posthole of a Middle Bronze Age-B house, which may indicate that some (if not all) of these ditches post-date the Middle Bronze Age-B occupation phase. At Enspijk - A2, a 12 m long relatively straight ditch segment was uncovered (Ter Wal 2005b, 24). It is situated between two Middle Bronze Age farmhouses and is orientated almost at right angles to them (fig. 4.5, A). This may suggest that it was never intended to delimit farmsteads at this site, but that it served another function (*e.g.* drainage). The curvilinear and angular trajectory of a *c.* 46 cm wide ditch in the north-west corner of the excavations at Tiel - Medel 8 could be followed for *c.* 30 m, but as it was situated at the excavation extents, it is not clear whether it enclosed an area of a particular function (Van Hoof & Jongste 2007, 59 fig. 5.6).

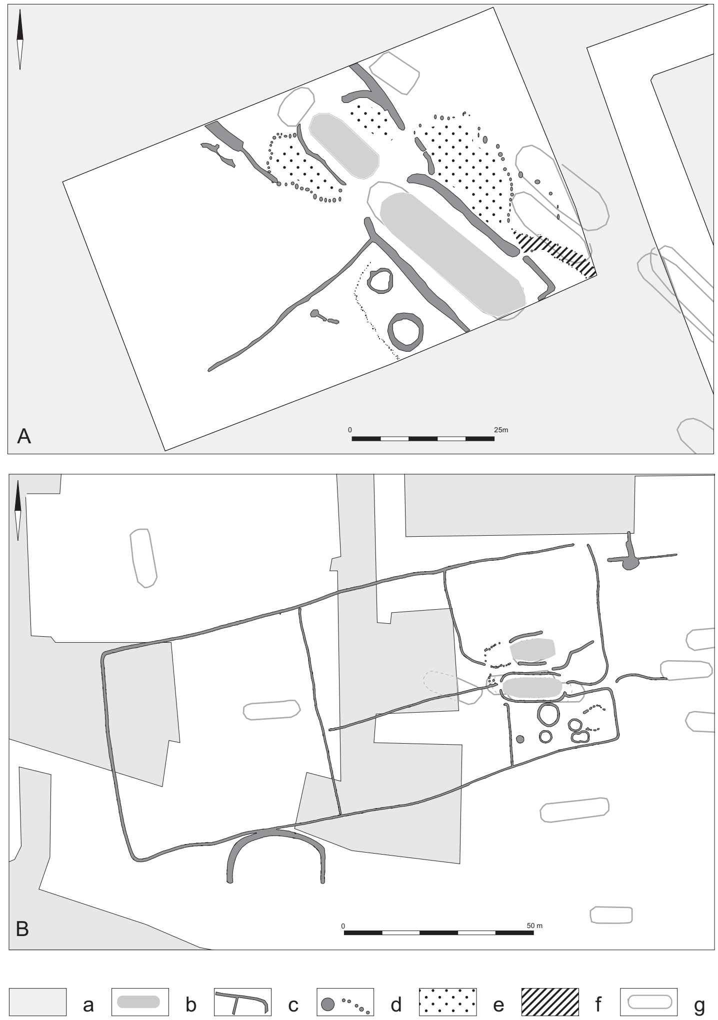

Fig. 5.53 Simplified interpretation of the MBA-B occupation around Andijk houses 7 and 8 (A; after IJzereef & Van Regteren Altena 1991, 68 fig. 5) and Bovenkarspel houses 44 and 45 (B; after IJzereef & Van Regteren Altena 1991, 67 fig. 4, *cf.* Chapter 7, fig. 7.8).

a: not excavated, b: houses, c: ditches, d: pits and postholes, e: possible dung-heaps, f: pathway, g: location of houses from other phases.

In a test-trenching campaign near Cuijk, a village situated near the Meuse in the southern coversand area, several short (all < 10 m) curvi-linear ditch segments have been uncovered (Cuijk - Dreef; Ball, Heirbaut & Peters 2005, 31-32). From some of these, small fragments of pottery were recovered that could be dated to the Bronze Age (*loc. cit.*). A tentative Early Bronze Age structure was also recognized at the location of the ditches, but the ditch segments cannot be interpreted as being related to this structure (*op. cit.*, 23-25).

The excavations at Sittard - Hoogveld uncovered a *c.* 8 m long angular interrupted ditch that was dated by recovered ceramics to the Middle Bronze Age (Tol & Schabbink 2004, 22 fig. 12; 26). As the ditch was situated at the excavation extents, it could not be uncovered in full and it remains unclear what the function was of the area it delimited.

The examples offered above show that ditches of varied forms do occur on Bronze Age settlement sites in various regions, but that they are only commonly encountered in West-Friesland and in the coastal areas. There, such ditches can more frequently be understood as representing parts of larger systems of fences that parcelled and drained settlement-site space, and may occasionally *de facto* have delimited farmsteads. Some of these ditch systems

278 It is unclear whether any Bronze Age finds were recovered from these ditches (L. Theunissen, pers. comm., March 2007).

can be interpreted as larger ‘holdings’, that are frequently more or less rectangular in shape and that range in size between 0.02 (*e.g.* Hagers *et al*. 1992, 73 fig. 5b) and 5 hectares (*e.g.* Bakker *et al.* 1977, 194 fig. 7). As ard-marks have been found with several of them, a function as parcelling features – for plots used at least once as crop-fields – is plausible.[279]

Frequently, the parcelling and drainage ditches in these areas are combined with house plot drainage ditches. Their frequently large numbers and the common association to house plot drainage ditches indicates that their drainage function may have been of prime importance. Several botanical and archaeozoological indications are available that the landscape of West-Friesland became increasingly wetter at the Middle Bronze Age-B to Late Bronze Age transition.[280] Such deteriorating conditions may have necessitated the construction of drainage (and parcelling) ditches there.

For the central river area, an increase in fluvial activity around the Middle Bronze Age-B to Late Bronze Age transition may have locally created wetter conditions (*cf.* Chapter 2, fig. 2.13).[281] This has, however, not led to ubiquitous ditch construction on the Bronze Age settlement sites in the present study area. Even at sites such as Dodewaard (Theunissen & Hulst 1999a) and Tiel - Medel 8 (Van Hoof & Jongste 2007) where Bronze Age occupation may have spanned from the Middle Bronze Age to the Late Bronze Age, ditches interpretable as house plot drainage ditches or parcelling and drainage ditches are absent.[282] Only at Wijk bij Duurstede (Chapter 4, section 4.5; Appendix IV) are house plot drainage ditches recovered in some numbers.[283] Possibly, habitation continued here at slightly higher parts of the micro-topographic landscape, aided by the drainage offered by house plot ditches.[284] The smaller segments of possible parcelling and drainage ditches recovered from settlement sites within – and outside – the river area indicate that several other (additional) uses for ditches other than solely drainage may have been current. These could have provided construction materials, may have been used to (conceptually) delimit specific parts of settlement space for specific purposes, or may have been used for agricultural or domestic purposes. Unfortunately, the ditches themselves shed little light on their former functions. In any case, ditches that can be interpreted as having served solely or primarily to surround and define farmsteads are rare to absent for the Middle Bronze Age-B (*cf.* Gerritsen 2003, 74).

Inter-settlement ditches?

At this point, a fourth and final type of ditch is discussed. These are what may be considered inter-settlement site ditches. They are ditches that are not confined to, or integrated with, ditches around (clusters of) houses, but that rather seem to extend beyond these and possibly marked out the limits of settlements. As such, they could have served as communal boundaries, regardless of the possibility that they offered additional functionality such as drainage, the warding-off of livestock or defensive purposes.[285]

At Tiel - Medel 1, two straight *c.* 70 cm wide ditches at 10 m apart could be followed for over 150 meters (Hielkema 2003, 22). They are situated 120 m north of the Middle Bronze Age house of that site and run straight towards Tiel - Medel 8 (Van Hoof & Jongste 2007), where these ditches were no longer observed (fig. 5.54). Presumably, the

279 Ard marks were found for instance at Hoogkarspel (Bakker *et al*. 1977, 218), Voorburg (Hagers *et al*. 1992, 73 fig. 5b), Hauwert (Brandt 1988a, 67 fig. 5), Zwaagdijk (Modderman 1964a) and Noordwijk (Van Heeringen, Van der Velde & Van Amen 1998, 115 fig. 5).

280 Van Geel, Buurman & Waterbolk in Buurman 1996, esp. 160-167 and references therein. See also Jongste & Van Zijverden 2007 and section 7.4.2.

281 Berendsen & Stouthamer 2001, 90; 104-105; Jongste & Van Zijverden 2007 and references therein.

282 But see below for ditches at Tiel - Medel 1 (Hielkema 2003), which is situated 180 m east of Tiel - Medel 8.

283 As the excavation Wijk bij Duurstede - De Geer has not been published in full, a suggested Late Bronze Age dating for the Bronze Age houses with ditches may tie in with the argumentation above (Van Es *et al.* 1992, 44), but must remain tentative as the houses may also date to the Middle Bronze Age-B on typological grounds.

284 The more humid conditions at Wijk bij Duurstede may be related to the avulsion of the Kromme Rijn from the Houten fluvial system (Berendsen & Stouthamer 2001, 212), combined with gradual floodbasin water table rise. In any case, flooding may have been significantly severe between *c.* 1150-950 cal BC to end the Bronze Age habitation (Steenbeek 1990, 92; 188; 122-122).

285 Considering the modest depth and width of most ditches on Bronze Age settlement sites, a defensive function seems improbable. The symbolic value of having a communal boundary may have been much more important than its actual physical properties (see also the discussion of possible symbolic roles of boundaries in section 5.5).

ditches stop or turn north-or southward in the 170 m wide unexcavated area between sites Medel 1 and Medel 8 (fig. 5.54). Ceramics originating from both ditches are thought to date to the Early- to Middle Bronze Age (*ibid.*), but these sherds should possibly be considered *terminus post quem* indicators.[286] If the paired ditches were Middle Bronze Age in date, and if these turned to the south just east of Tiel - Medel 1, a very speculative interpretation as an inter-settlement ditch may be forwarded. It may have been the case that these ditches thus separated the Middle Bronze Age occupation of Medel 1 from that of Medel 8. Possibly, the slightly different orientation of the farmhouse at Tiel - Medel 1 in relation to those at Tiel - Medel 8, supports an interpretation of these habitation sites as representing two individual settlement sites (see also Chapter 6, section 6.4.1). The ditches could have served as boundaries for site Medel 1, but their construction may have been related to the nearby presence of the occupation at site Medel 8 (*cf.* Cohen 1985, 12; 110; *supra*).

Fig. 5.54 Paired straight ditches at Tiel - Medel 1 (Hielkema 2003) and the presumably Middle Bronze Age-B structures at Tiel - Medel 1 and Tiel - Medel 8 (Van Hoof & Jongste 2007).

a: not excavated, b: presumable Middle Bronze Age-B structures, c: ditches and reconstructed trajectory, d: fence lines.

At Wijk bij Duurstede - De Horden, a one to four meter wide ditch could be followed for over *c.* 170 m to the south of the settlement site. While originally published as having a fully curved trajectory to the south of the Middle Bronze Age-B settlement site (Hessing 1991, 43 fig. 2), the original documentation suggests that in the west, the ditch bends distinctly to the south (fig. 5.55). The shape of the ditch in parts mirrors that of the micro-topographic landscape, mimicking the trajectory of the swales situated to the south of the ditch. In parts, the ditch was lined to both sides

286 The ground plan of a four-post granary-type outbuilding overlaps with the one of these paired ditches, but no cross-cutting was observed. For the granary-type outbuilding, a Bronze age date is forwarded and the date for the ditches is assumed to be different (Hielkema 2003, 20). Suffice to state that, partly because of such ambiguous reasoning, the dating of the ditches must remain tentative.

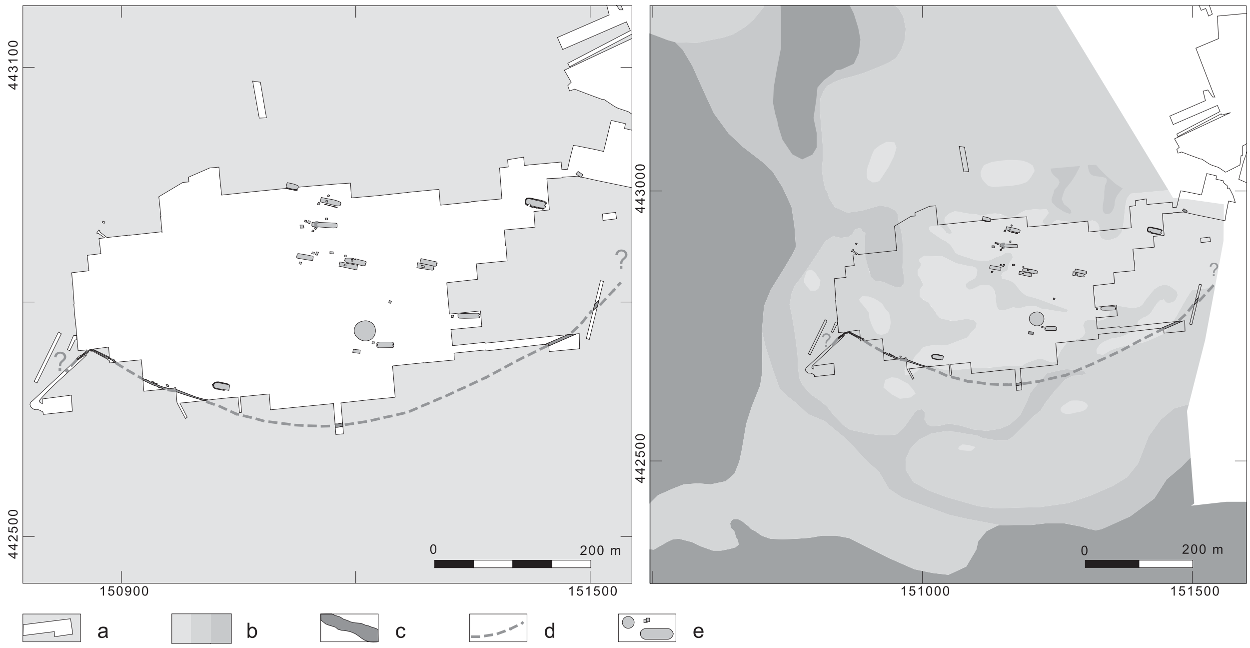

Fig. 5.55 Location of the possible inter-settlement ditch at Wijk bij Duurstede - De Horden in relation to the other structures (A; after Hessing 1991, 43 fig. 2) and the relative height of the underlying fluvial deposits (B; after Van Zijverden 2004a).

a: excavated areas, b: top of sand in underlying deposits (for legend see Appendix IV, fig. IV.4), c: ditches, d: reconstructed ditch trajectory, e: Middle Bronze Age structures.

with type-1a fences (Appendix IV, fig. IV.22). Unfortunately, no datable finds were recovered from the ditch and it is dated to the Bronze Age solely based on its stratigraphic position (Van Es *et al.* 1980, 51; Hessing 1985, 21; Hessing & Steenbeek 1990, 15 fig. 5).

If this ditch indeed was dug at the time of Middle Bronze Age-B occupation, it may be one of very few examples where a possible settlement boundary has been uncovered. The location and shape of the ditch suggest that it may have marked the transition between the higher parts used for occupation and more lower-lying parts of the surroundings. Its spatial extent suggests that it cannot be associated to any particular house-site. Rather, the ditch seems to tie together (whether by intent or by consequence) the various house-sites. As such, it is possible that the construction of this extensive ditch system was of communal importance, and was possibly executed by occupants of multiple houses. The remarkable turn in the ditch trajectory to the west is an important feature. It suggests that complete enclosure of settlement site space may not have been the ultimate goal for the construction of this ditch. Because of its distant location from the houses and the fact that it does not enclose a specific parcel, it is improbable that it was constructed for its drainage capacities. The typical westernmost trajectory leads one to postulate an opening in the ditch system, which – together with the unsubstantial nature of the fences that accompany it in parts – could also indicate that it had limited value as a defensive structure against unwanted human or animal visitors.[287]

Combined, these observations suggest that it was the demarcation of a transitional zone, at the border of what was perceived as settlement site space itself, that was of chief importance. In this case, the location of the ditch may have been influenced by the morphology of the micro-topographic landscape, but was not bound to it. As no ditches girding similarly lower-lying areas within the more densely settled area were found, it may be assumed that the ditch was understood in relation to the occupation. As such, it more likely represents a settlement (site) boundary than a landscape boundary, although in this case these functions may have been entwined. It is plausible that the

287 The possibility that it served to ward off animals from the highest part of the settlement sites should not be dismissed completely, as fences may not have been preserved everywhere and mobile or above-ground barriers may have filled archaeologically apparent ‘gaps’. Unfortunately, no details on the ditch in general and its westernmost trajectory in particular have been published.

communal construction of such a feature, combined with the social, religious or symbolic statements made by its presence thereafter, outweighed any practical function that it could have additionally served.

Outside the river area, ditches for which a similar function may be postulated are equally scarce. A possible parallel may be found in the ditch system of the excavations at Hoogkarspel - Watertoren (Bakker *et al.* 1977). There, in addition to many house plot drainage ditches and parcelling and drainage ditches, a ditch system was recognized that seemed to form the northern, eastern and southern limit of an area with several house-sites (*op. cit.*, 194 fig. 7). This outer ditch incorporated the location of an older barrow and followed roughly the morphology of the underlying creek-ridge deposits (Bakker *et al* 1977, 222). As this ditch system showed no interconnections with an equally extensive ditch system just to the west of it (Bakker *et al.* 1977, fig. 10), it may be postulated that – in addition to practical functions – it also may have served as a (communal) boundary setting apart the western agglomeration of house-sites. For the younger period (Middle Bronze Age-B/Late Bronze Age transition and Late Bronze Age) occupation at Bovenkarspel, a ditch system with comparable properties is situated in the south-eastern part of the excavation (IJzereef & Van Regteren Altena 1991, 66 fig. 3b). There as well, an outer ditch may be indicated that is not integrated with other nearby ditch systems and that may have enclosed multiple house-sites. It should be stressed however, that considering the low number of possible examples, ditches do not seem to have been frequently used to define – possibly communal – settlement limits on Bronze Age settlement sites. There is, however, an inherent risk that such structures were in reality more common, but that these are situated more distant from the house-sitesand are situated outside the excavated area – a problem that can only be overcome by increasing the scale of settlement site excavations.

5.7 Pits and wells

Definitions and classifications

Pits may be defined archaeologically as all non-linear features that were presumably not postholes or graves (Schinkel 1998, 267). Such a definition (*i.e.* by exclusion) indicates that there are great difficulties in the classification and reconstruction of the former functions of these features. Pits may have been dug for various reasons, of which storage (*e.g.* cellar pits, silos), raw material procurement (sand, clay, water) and domestic and artisanal uses (*e.g.* food preparation, textile production) are the most obvious.[288] Some pits may have been (secondarily) used for refuse disposal and some may have been dug solely for ritual or depositional purposes. For the majority of pits recovered at Bronze Age settlement sites, no arguments can be forwarded to indicate such a particular function.[289] As finds are generally scarce from pits and need not be related to their original use, the shape of pits in section is usually an important criterion in functional classifications (*e.g.* Bersu 1940, 49; Schinkel 1998, 269). In addition to the shape in cross-section, the spatial patterning and relations to other features have been used to outline categories such as isolated pits, pit clusters,[290] pit-circles and pit-alignments,[291] or pits with post-settings (*infra*).

Pits and their relation to houses

According to various scholars, pits were an integral part of Bronze Age farmsteads.[292] Nonetheless, there has been limited systematic attention to assessing the validity of this claim, or to the location and function of such pits. Some information on the frequency of occurrence of pits situated within the ground plans of Bronze Age houses has already been offered in section 5.2.3.3. For the river area, the question whether pits were integral parts of Middle Bronze Age house-sites will be investigated in Chapter 6 (see also section 6.4.4). Here, a brief introduction to the different types and functions of pits on Bronze Age settlement sites suffices.

288 See Kok 1998 for a nearly exhaustive discussion of archaeologically claimed pit uses.
289 *E.g.* Van den Broeke 1980, 14; Theunissen 1999, 125; De Voogd & Schoneveld 2002, 69; Hielkema, Prangsma & Jongste 2002, 107; Ufkes 2003, 61; Knippenberg & Jongste 2005, 68; Van Hoof & Jongste 2007, 59-60.
290 *E.g.* Van Hoof & Meurkens 2007; *cf.* Waterbolk 1964, 100; Hessing 1991, 43; Hiddink 2000, 24 fig. 7; Hielkema, Prangsma & Jongste 2002, 92; Tol & Schabbink 2004, 22 fig. 12.
291 *E.g.* Van der Waals 1961; Buurman 1979; Brandt 1988b, 67 fig. 5; Woltering 2000, 59-74 and references therein.
292 *E.g.* Van Regteren Altena, Buurman & IJzereef 1982, 25; Roymans & Fokkens 1991, 10; Fokkens 1991, 96; Schinkel 1994, 27; Theunissen 1999, 194; Hiddink 2000, 29; Hermsen 2003, 66; Meijlink 2002b; 762; Berkvens, Brandenburgh & Koot 2004, 68; 76.

Refuse pits

It is often implicitly assumed that pits were dug in the vicinity of the house to function (secondarily) as refuse dumps (*e.g.* Krist 2000, 21), although in general, Bronze Age pits contain only small amounts and numbers of artefacts.[293] Nonetheless, at some Middle Bronze Age(-B) settlement sites, pits with significant quantities of artefacts have been discovered, which suggests that these pits were primarily or secondarily used to deposit or discard settlement site refuse.[294]

Silos

Silos are pits dug for the purpose of underground (cereal) storage. Due to initial respiration processes of the cereals stored, if properly sealed, the carbon dioxide gas produces an anaerobe environment in which the cereal reaches a state of dormancy.[295] Pits with a restricted orifice combine a favourable volume-to-surface ratio and reduce the surface area that needs to be sealed (Reynolds 1974; Theunissen 1999, 125). If silo pits were reused, fire may have been used to sanitize the silo.[296] It seems unwarranted to interpret all burned cereals from possible silos as relicts of sanitation by fire, as sometimes burned cereals are recovered from layers that did not touch the outer walls of the silo (Bakels 1984, 25; Gerritsen 2003, 92).[297] Pits that are classified as possible silos based on their shape and/or the presence or burned walls or cereals, generally form only a small number of the overall numbers of pits of different shapes (Hiddink 2000, 32). Besides cereals, the storing other foodstuffs in pits, especially acorns, may have been common.[298]

No indisputable silos are known from Bronze Age settlement sites in the Dutch river area. Possibly, processes such as flooding, water-table rises and generally poor drainage of the more clayey parts, prohibited the use of silos in the river area. It is tempting to view the ubiquitous presence of granary-type outbuildings in the river area as a compensation for the absence of subsoil storage.[299]

Storage pits

Frequently, flat bottomed pits are classified as storage pits or – if situated within the ground plans of houses – as cellar pits.[300] Goods that were placed in storage pits as bulk matter, in boxes, bags or vessels, could be more easily accessed than those in silos, as here no anaerobe environment was intended. The sizes of such pits may have been limited to the surface areas for which the handling of a covering device (*e.g.* wooden plank or wattle work hurdle?) could still be managed. Usually, Bronze Age storage pits do no longer contain any archaeologically visible traces of their former contents, although some examples of pots possibly used for storage are known from such pits.[301] Without such finds, the interpretation of flat-bottomed pits as storage facilities is however very difficult.

Hearths and fire-pits?

For various pits at Bronze Age settlement sites, a function as possible hearth- or fire pits has been suggested based on

293 *E.g.* Woltering 1975, 21; 2000, 79; IJzereef & Van Regteren Altena 1991, 77; Schinkel 1994, 37-38; Theunissen & Hulst 1999a, 148; b, 169; Berkvens, Brandenburgh & Koot 2004, 67; Ball, Heirbaut & Peters 2006, 26.

294 *E.g.* section 6.4.4; fig. 6.10; Appendix V, fig. V.20; Roymans & Hiddink 1991, 120.

295 Reynolds 1974, 119; Richard-Molard 1990 and references therein; Jayas, D.S. & S. Jeyamkondan 2002; Olsen *et al.* 2006, 324.

296 *E.g.* Modderman 1977, 25; Groenewoudt & Verlinde 1989, 278; Verlinde 1993b, 46; Berkvens, Brandenburgh & Koot 2004, 72

297 For examples of presumable Bronze Age silos that have yielded burned cereals see Waterbolk 1961, 131; Hessing 1991, 44; Roymans & Hiddink 1991, 123; Wesdorp 1997, 23; De Hingh 2000, 88; Hiddink 200, 29-32, *cf.* Bakker *et al.* 1977, 214; Berkvens, Brandenburgh & Koot 2004, 68, Meurkens 2006, 29.

298 *E.g.* Bakels & Van der Ham 1980, 81; Groothedde 1998; De Hingh 2002, 201; Lanting & Van der Plicht 2003, 176; Van Hoof & Van Beek 2005, 102; Meurers-Balke 2005, 192, *cf.* Karg & Haas 1996. Deposits of acorns cannot be proven to be associated with specific types of pits.

299 Possibly, the conditions in West-Friesland were similarly moist to prevent successful subsoil storage of cereals (IJzereef & Van Regteren Altena 1991, 77).

300 *E.g.* Theunissen 1999, 125; Krist 2000, 23; Hiddink 2000, 32; Dautzenberg, De Koning & Vaars 2003, 17 fig. 11; Van Hoof & Jongste 2007, 60 fig. 5.7; Van Hoof & Meurkens 2007a, 35 fig. 5.9; Deiters 2008, 75, *cf.* Berkvens 2004, 102 figs. 6.8-6.9; 139.

301 *E.g.* Van Hoof & Meurkens 2007, 35 fig. 5.9; Arts & De Jong 2004, 3; Slofstra 1991, 144; Roymans & Hiddink 1991, 120; Berkvens 2004, 101-102.

the presence of larger quantities of charcoal and/or burned clay in the pit's fill.[302] In the Dutch river area, such pits are as a rule situated outside the Middle Bronze Age-B houses proper, which would argue against a function as hearths in the strictest sense for that period. In addition, with many of these pits no outer fill comprising layers of charcoal or burned clay are found. Moreover, no traces of ashes or fire-induced reddening of the natural matrix directly outside the feature were observed.[303] This suggests that such pits contained deposits of materials burned elsewhere (*e.g.* hearth fills, oven debris etc.), rather than that fires were once lit in them.[304] Whereas soil discolorations underneath the locations of assumed hearths within Bronze Age houses or concentrations of burned clay interpreted as hearths are known,[305] no hearth has been preserved at the former surface level in the Netherlands (but see Strahl 2004 for a German Late Bronze Age example).

Wells and drinking pools

A category of deep pits, frequently with a funnel- or cylindrical shape in section, may have been wells. Some wells may have had a lining of hollowed-out trees, which may have been removed when the well was taken out of use.[306] Several Bronze Age wells have yielded larger fragments of wood that may have been part of a wooden (plank?) or wattle work lining that could be radiocarbon dated.[307] In more clayey subsoils, where the well sides are less prone to erosion by stagnant water, lining may not have been necessary at all.[308]

In the absence of clear lining materials, it is frequently difficult to establish whether a deep pit served to provide or contain drinking water at all.[309] Furthermore, confusion may arise in differentiating wells and drinking pools. Whereas for the former, consumption by humans is implied, drinking pools were used by livestock to drink from.[310] The latter are generally less deep and may have relied on rainfall (*i.e.* thus representing basins rather than wells) and have less steep profiles, which makes it easier for animals to reach the water. Cattle-hoof imprints around such drinking pools and cattle-louse recovered from them, testify to such a function.[311]

Despite the observations that wells and drinking pools occur near Middle Bronze Age(-B) houses,[312] their distribution seems not to be confined to the vicinity of the houses. Accordingly, wells were presumably not constituent elements of prehistoric farmyards (see Chapter 6, esp. section 6.4.4). Rather, wells frequently seem to cluster in locations that may be situated more distant from the houses.[313] The presence of such clusters (some of considerable time depth; Chapter 4, fig. 4.20) indicates that presumably visual cues (*e.g.* vegetation, visible depressions of older

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302 *E.g.* Modderman 1955b, 25; Theunissen & Hulst 1999a, 139; 145; Hielkema, Prangsma & Jongste 2002, 107; 155-156; Hielkema, Brokke & Meijlink 2002, 186; 203; 263; 287; Berkvens, Brandenburgh & Koot 2004, 72; Knippenberg & Jongste 2005, 67; Huis in 't Veld 2006, 27.

303 For an example of pits at a Bronze Age settlement site (outside Middle Bronze Age house plans) that *do* display traces of burning see Annaert 2008, 189.

304 At the Middle Bronze Age-A site of Den Haag - Bronovo, two pits contained many fire-affected 'cooking stones' (Waasdorp 1991, 329).

305 Section 5.2.3.3; *cf.* Theunissen & Hulst 1999a, 139; Hielkema, Prangsma & Jongste 2002, 133; Knippenberg & Jongste 2005, 36.

306 *E.g.* Fokkens 1991, 101; Hielkema, Prangsma & Jongste 2002, 107; De Leeuwe & Van Hoof 2007, 66.

307 *E.g.* Oss-Mikeldonk: GrN-16735: 3020 ± 30 BP (Fokkens 1991, 101), Oss-IJsselstraat: GrN-8305: 3200 ± 30 BP (Wesselingh 1993, 113-115), Oss-Ussen: GrN-9981: 2995 ± 35; GrN-16905: 3380 ± 25 BP; GrN-16906: 3120 ± 25 BP (Van der Sanden 1987c, 54; Lanting & Van der Plicht 2003, 185), Oss-Schalkskamp: GrN-19666: 3485 ± 20 BP; GrN-19667: 3425 ± 20 BP (Lanting & Van der Plicht 2003, 176) Oss- De Geer / Spaanderstraat: GrN-27158: 3400 ± 40 BP (Jansen & Van Hoof 2003, 44-45), Rosmalen: GrN-27242: 3390 ± 20 BP (De Koning & Vaars 2003, 43; 49), Velsen-Westlaan: GrN-16896: 3215 ± 30 (wattle; Lanting & Van der Plicht 2003, 183), Zijderveld: RING-1461: 1345 ± 5 BC (Knippenberg & Jongste 2005, 12).

308 *E.g.* Van Regteren Altena *et al.* 1968, 137; Hielkema, Brokke & Meijlink 2002, 162; 187; 288; Hielkema 2003, 20-21; Knippenberg & Jongste 2005, 65; De Leeuwe & Van Hoof 2007.

309 In Dutch publications, the term *waterkuil* (water pit/hole) is sometimes used to designate unlined deep pits that may have served as wells, but in which lining could not (or no longer) be detected.

310 Wells intended for water for human consumption are possibly more frequently dug down to below the first available aquifer, presumably to avoid the pollution of the upper aquifer caused by human and animal excrement.

311 Van Regteren Altena *et al.* 1980, 32; Jansen & Fokkens 1999, 71; Hielkema, Prangsma & Jongste 2002, 113; 140; Lanting & Van der Plicht 2003, 186; Knippenberg & Jongste 2005, 63-65; Ter Wal 2005b, 24.

312 *E.g.* Knippenberg & Jongste 2005, 36 fig. 6.4; 38 fig. 6.6; Schinkel 1994, 33, *cf.* section 6.4.4.

313 *E.g.* Hielkema 2003, 20-21; Chapter 4, fig. 4.16; Hielkema, Brokke & Meijlink 2002, 160-162; 187; 205.

wells) indicative of good accessible aquifers steered the choice of location for wells. Additionally, wells and drinking pools may be associated with parcelling and drainage ditches (*cf.* Bakker *et al.* 1977, 214; Buurman 1996, 18; Ufkes & Veldhuis 2003, 61).

5.8 Other possible settlement site elements

The different settlement site elements discussed so far offer a basic overview of the elements most frequently recognized at excavated Bronze Age settlement sites: houses, outbuildings, ditches, fences and pits of different sorts. Their common recognition, however, implies an important caveat. At various Bronze Age settlement sites, but most notably those from the Dutch river area (Chapter 4), the ratio between the elements identified and the total number of features observed is rather low. At various settlement sites, configurations of postholes are documented that can no longer be archaeologically meaningfully interpreted. Consequently, archaeologists are prone to overlook the fact that, in addition to the elements that *are* identifiable, several additional – categories of – (post-built) structures existed whose ground plans *cannot* be isolated. One should keep an open mind to the fact that what appear to be common elements (*e.g.* granary-type outbuildings), need not have been the most common settlement site element in the past. As this discussion hinges on recognizeability, some rarer and less easily reconstructed settlement site elements are discussed here.

Two-posters?

Two-post structures may very well have existed in prehistory as drying racks, loom supports (*cf.* Aubry & Sehier 2005), or for hosts of other purposes (*cf.* Verlinde 1991b, 29 fig. 3; 40 fig. 5). However, as straight lines can be drawn between any two features, the archaeological credibility of such reconstructions is poor. Only in areas of extremely low feature density, may two-post structures be outlined with any certainty (*op. cit.*, 39). Two-post alignments have rarely been claimed for sites other than Zwolle - Ittersumerbroek (Verlinde 1991b; 1993).

Three-post linear structures?

For post-alignments comprising three posts, for the same reason as described above with the two-post structures, caution is also necessary. In denser post-configurations, an alignment of posts, even of comparable size and depth, can be reconstructed with too much ease. In the case of three-post alignments, three post sizes, shapes and two inter-post distances can be compared, allowing for recognition with somewhat better validity. At four Bronze Age settlement sites in the river area, three-post alignments could be recognized (fig. 5.56). They are located in areas of sufficiently low feature density, show a significantly larger feature diameter than the surrounding postholes, and have been uncovered in a large enough area to exclude the possibility that their constituent posts were parts of not fully uncovered six-post granary-type outbuildings. If these were above-ground structures in the first place, their function(s) are not known.

Round structures

The possibility that some round structures recognized at Zijderveld and Dodewaard were Bronze Age houses akin to those of the British Isles, has been investigated (and refuted) by Theunissen (1999, 182-185). In the various excavations of Dutch Bronze Age settlement sites of the last eight years, no tentative round houses have been discovered, and it seems unlikely that these were ever current at Middle Bronze Age-B settlement sites in the Netherlands (but see Late Bronze Age examples from Northern France (*e.g.* Defossés, Martial & Vallin 2000, Jahier 2005; Mare 2005) and an Iron Age example from Belgium (Bourgeois 1991, 178 fig. 6)).

Nonetheless, several round and rounded post-configurations have been reported from Bronze Age settlement sites. Three examples originate from Zwolle - Ittersumerbroek (Verlinde 1991b, 31; 50; 1993, 46), where they are interpreted as pens for smaller livestock such as sheep. However, as they show little uniformity in size and orientation, their validity may be questioned. At Blerick, a possible Middle Bronze Age round structure was uncovered that is also interpreted as a sheep pen (fig. 5.7, F; Theunissen 1999, 182 fig. 4.49), as are two ovoid post settings from Spoolde (fig. 5.7, D-E; Van Beek 1988, 5; 9 fig. 3). The round structures claimed for Nijnsel (fig. 5.7, A; Beex & Hulst 1968, 125; Van Beek 1991, 32 fig. 6) and Elp (Van Beek 1991, 29 fig. 4; 30 fig. 5) were reconstructed during post-excavation

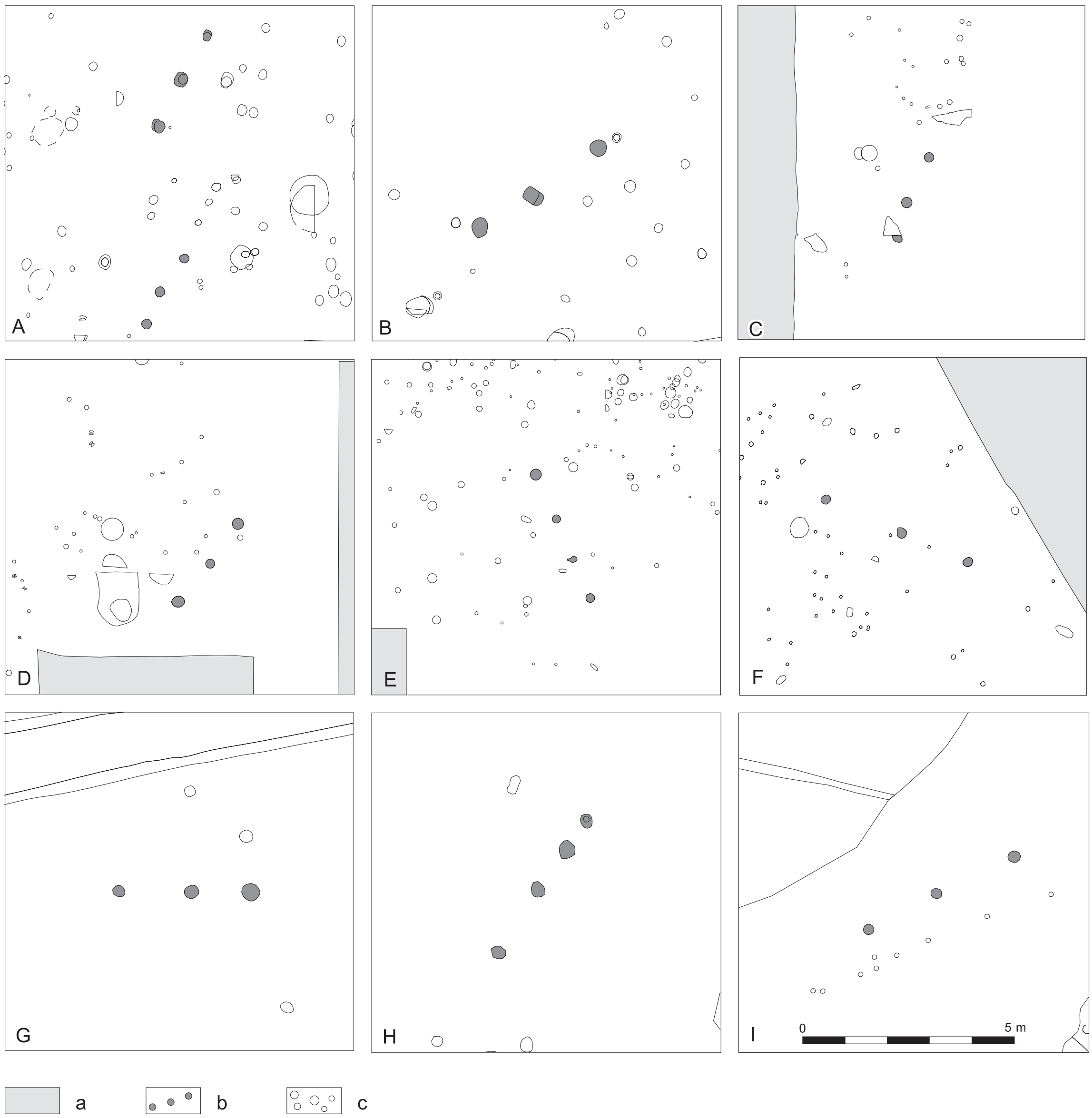

Fig. 5.56 Possible three-post linear structures at Bronze Age settlement sites from the Dutch river area (A-C; Meteren - De Bogen 29, D-E; Meteren - De Bogen 28-1, F: Enspijk - A2, G: Tiel - Medel 8, H: Wijk bij Duurstede - De Horden, I: Zijderveld; all to same scale).

a: not excavated, b: possible three-post linear structures, c: other features.

analysis from areas with moderate to high feature density and accordingly cannot be considered reliable (*cf.* Fokkens 2005b, 428 notes 45-47). Whereas the round structures described above are all of a considerable size (> 5 m diameter), several smaller round to ovoid post arrangements have been published for Bronze Age settlement sites. At Eigenblok, a configuration of *c.* 3.2 m diameter was recovered for which also a function as livestock enclosure was suggested (fig. 5.7, C; Hielkema, Prangsma & Jongste 2002, 120). Another example from Zwolle - De Vrijhof could not be dated directly, yet a Bronze Age date is assumed (Verlinde & Wevers 2001, 164-165). At Angelslo-Emmerhout, a oval nine post (*c.* 5 by 9 m) structure was uncovered that is interpreted as a Bronze Age livestock pen.[314]

314 Kooi 2005, 127 fig. 10-A. The arguments for this dating are however unclear.

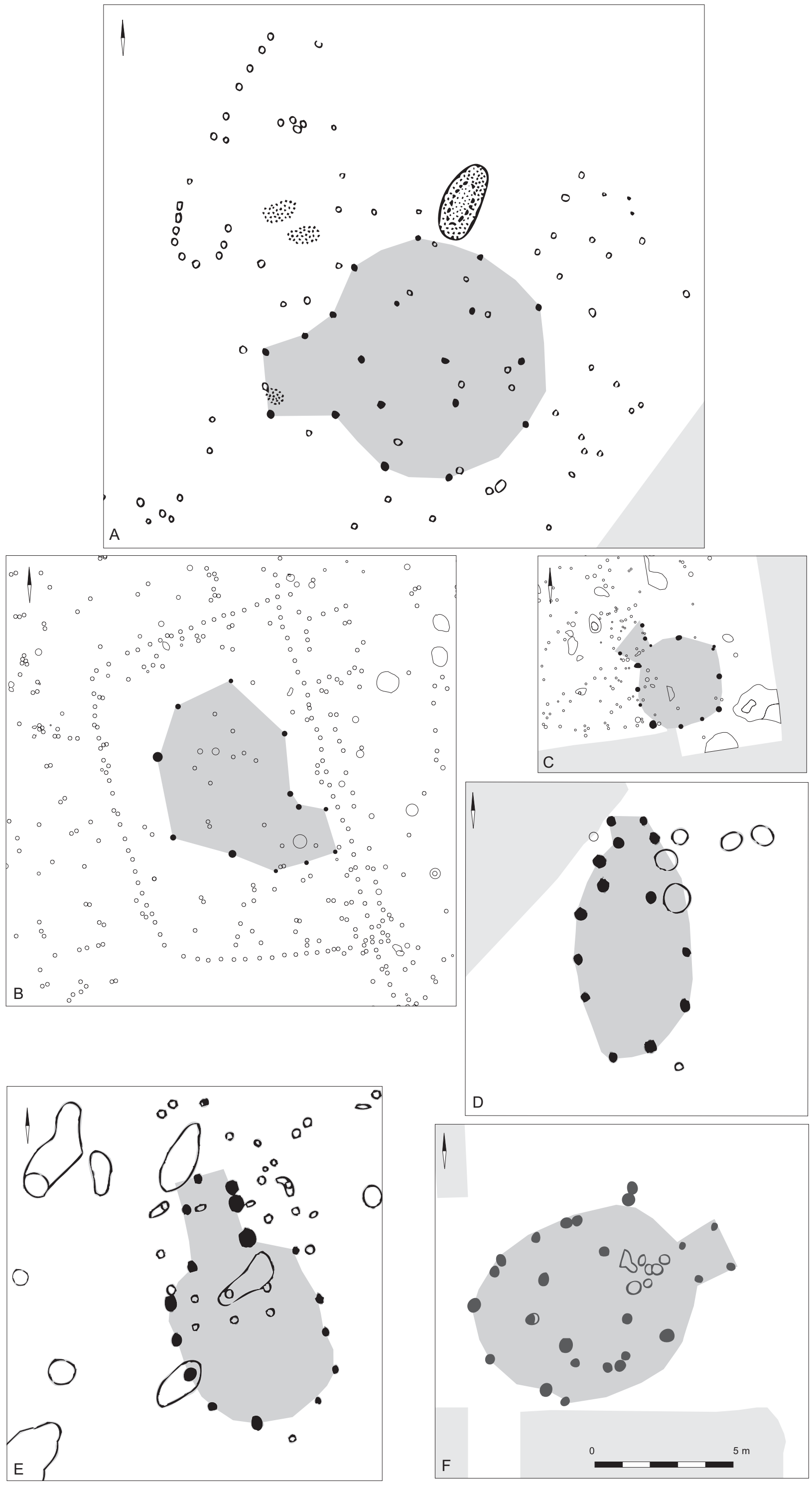

Fig. 5.57 Examples of tentative round structures from different settlement sites (A: Nijnsel (after Beex & Hulst 1968, 121 fig. 4), B: Zijderveld (after Theunissen & Hulst 1999b, 164 fig. 4.36), C: Eigenblok (after Hielkema, Prangsma & Jongste 2002, 121 fig. 3.19), D-E: Spoolde (after Van Beek 1988, 9 fig. 3) and Blerick (after Theunissen 1999, 182 fig. 4.49), all to same scale).

While the validity of the specimens reconstructed from dense posthole concentrations must be questioned, it is probable that round structures were – albeit infrequently – Bronze Age settlement site elements. The large variation in shape, construction (inner posts or not) and size, argues against a single function. In any case, an interpretation as houses seems improbable (Theunissen 1999, 182-185) while the interpretation as livestock pens may be just one of several different possible functions.

Pits with irregular post settings
At Tiel - Medel 8 and at Rhenen - Remmerden, pits have been found that appear to be surrounded by an irregular post configuration. The two post-settings with pits uncovered at Rhenen measured *c.* 2.5 by 2.8 m and 3 by 4 m and had large round to sub-rectangular pits at their centre (Van Hoof & Meurkens 2007, 47 fig. 5.16). From a posthole of one of the posts and from the central pit of the former, Bronze Age sherds were recovered (*op. cit.*). The post-setting at Tiel measures *c.* 2.6 by 1.9 m and from the (unsectioned) pit three sherds of Late Bronze Age-Iron Age pottery originated (Van Hoof & Jongste 2007, 43). A similar pit with a post-setting datable to the Late Bronze Age has been uncovered at Cuijk (Heirbaut 2005, 37 fig. 5.4a). The post-settings possibly served to support a roof construction that covered the pit, or a construction that prevented animals from meddling with its contents.

Irregular to U-shaped post settings
At several Dutch Bronze Age settlement sites, irregular to 'U-shaped' post settings comprising single or multiple rows of posts have been uncovered (*e.g.* Harsema 1997a, 152 fig. 10; Wesdorp 1997, 17 fig. 12-13; Brandt 1998b, 67 fig. 5).[315] Frequently, the structures do not appear to fully enclose their inner area, and may have had entrances in their long (*e.g.* Brandt 1988b, 66 fig. 4) or short sides (*cf.* Harsema 1997a, 152 fig. 10). Whereas the large size of some examples may support an interpretation as cattle sheds or pens (Harsema 1997a, 153), the smaller size of others (*e.g.* fig. 5.57, A; Beex & Hulst 1968, 121) suggests that such structures may have a wide range of functions.[316]

Burnt areas
The presence of burnt areas relies on the preservation of the former surface level. Their poor chances of being recognized are thus related to taphonomic processes. At Eigenblok sites 2 and 3, patches of burnt clay were recognized that may be dated by stratigraphy to the Middle Bronze Age-B occupation period (Hielkema, Prangsma & Jongste 2002, 108; 113; 123; Appendix II). The fact that they were situated at some distance from the farmhouses, may indicate that these were places where open fires burned (possibly for food-preparation or for craft activities such as woodworking), and thus had to be placed beyond the immediate vicinity of the flammable farmhouse roof. Alternatively, these locations may have supported superstructures of clay such as ovens, furnaces (but see below), or food-smoking constructions. From the burnt patches themselves, no clues as to their former function(s) were recovered.

At Oosterhout - Rustwat in the easternmost Dutch river area, an excavation of an area next to a residual gully yielded two structures, whose function remains ill-understood (Van den Broeke 2002, 20; 2004, 2-3). Of these structures – which were rounded to square in plan and measured *c.* 5 across – only a ditch remained. The dicthes were covered with a layer rich in charcoal and burnt clay, from which no 'normal' settlement debris such as pottery or bones were recovered. Near to and from the residual gully next to the structures, a bronze dagger presumably dating to the final century of the Middle Bronze Age(-A) and a complete quartzite saddle quern were recovered.[317] Moreover, the bottom of a rectangular pit measuring *c.* 0.6 by 1.3 m in plan, was completely covered in fragments of burnt clay that had been fired elsewhere. This assemblage of finds and features is interpreted by the excavator as a

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315 Possibly also Lohof & Vaars 2005, 19 fig. 8. See Reichmann 1982, 446 fig. 9; Blouet *et al.* 1996, 438 fig. 10 and references therein; Dartevelle 1996, 472 fig. 4; Bertelsen *et al.* 1996, 263 for comparable structures at Bronze Age settlement sites in Germany, France and Denmark.

316 At two sites in Hoogkarspel, ditches with similar U-shaped outlined have been recognised whose function is also unknown (*e.g.* Bakker & Metz 1967, 209 fig. 5; Brandt 1988b, 66 fig. 3).

317 The dagger was recovered from the slope towards the residual gully, while the quern was recovered from the lowermost part of the residual gully. This gully is thought to have been waterlogged during autumn and winter, but was possibly dry in summer time and spring (Van den Broeke 2004, 1-3).

ritual site, in which the use of fire (as reflected by the deposits of burned clay and the covering layer of charcoal-rich sediment) played a significant part (Van den Broeke 2004, esp. 2).

Gardens?

Whereas by strict definition, gardens are usually not classified as being part of the farmstead, it may not have been uncommon for plots for growing vegetables to be situated close to the houses, possibly within a farmstead. This could apply to crops that needed more routinely human care, or better supervision against raiding animals. As gardens were presumably not characterized by deep features, these are rendered archaeologically invisible save for possible fencing. The larger crop-fields, which were presumably also placed within fenced plots, can sometimes be identified more easily by their longer stretches of fence (sections 5.4; 6.4.3), occasional ditches (section 5.6) and ard marks.[318]

5.9 Non-settlement site elements?

At the end of a chapter that has focused on the different elements that frequently *are* recognized on Bronze Age settlement sites, some attention should perhaps be paid to the elements that are apparently *not* typical settlement site elements. With the large number of excavated settlement sites, the fact that certain elements are *not* recovered at settlement sites may be as informative as those elements which *are* typical to Bronze Age settlement sites.

Pottery production

In light of the large amounts of pottery fragments that can be recovered from single, relatively undisturbed house-sites (see Chapter 6, fig. 6.36, A), it is striking that no locations where such domestic ceramics were produced are known. Possibly, the burnt patches described above may be related to the firing of pottery, but direct evidence is absent. If pottery production occurred in settlement site space, one would perhaps expect to have recovered more wasters or oven fragments. Save for incidental finds of tempered clay lumps with kneading traces,[319] and possibly fire-affected quartz stones (as a preparation for fragmentation into tempering material?),[320] no indications of pottery production are known from within Bronze Age settlement sites.

This does not mean that pottery production never took place within settlement site space. Its poor visibility may also be related to the small scale, and possibly spatially stochastic nature of its production, combined with the fact that the firing need not have left sufficiently distinct traces. Conversely, it is equally well possible that pottery was produced at larger distances from settlement sites, such as at the clay – and stone? – procurement sites. That way, only the successfully fired vessels would need to be transported into the settlements and (open) fires were kept at safe distances from flammable thatch in the settlements.

Bronzes and bronze working

Although occasionally found, bronze items are by no means commonly recovered from Bronze Age settlement sites. This may be explained by the frequently unsystematic use of metal-detectors in excavations (and with older excavations; the complete lack thereof) and the obvious factor that bronze could be reworked by melting and thus need not have been discarded in great quantities. This is, however, only half the explanation. Bronze artefacts were indeed spared from the crucible and placed in specific zones of the landscape. Fontijn has reviewed the situation for the southern Netherlands and has shown that Bronze Age settlement sites in general were only infrequently the locale for bronze deposition (Fontijn 2003, esp. 144-147). Moreover, in line with a more general pattern of selective deposition (*i.e.* certain objects were preferably deposited in specific places and other objects in other places; *cf.* fig. 8.8), only a distinct set of Bronze items may have figured in settlement site deposition. Chisels and sickles are

318 For ard-marks see note 277 and Hielkema, Prangsma & Jongste 2002, 141-142; 156; Appendix II, figs. II.5, II.14 and II.16; Hielkema, Brokke & Meijlink 2002, 165; 206; 302; Appendix III, fig. III.26, *cf.* fig. III.30, *cf.* Pronk 1999, 55.

319 *E.g.* Jungerius, Sloos & Fokkens 1990, 39; Van Beek & Wevers 1994, 50 fig. 7; Arnoldussen 2007b, 89, table 6.6.

320 *Cf.* Theunissen & Hulst 1999b, 175; Van Gijssel *et al.* 2002, 319; Van Gijn, Kars & Lammers-Keijsers 2002, 503; Knippenberg 2005, 85.

most frequently encountered.[321] Weapons, by comparison, are known in large numbers from marshes, streams and confluences of rivers (*c.* 67-149 (ex- and including spearheads); Fontijn 2003, 88; 118; 155) while only a handful of weapon fragments has been found in a settlement site context (*cf.* section 8.2.3.4).[322] In addition, a significant number of bronze pins, and smaller bronze fragments are known from settlement sites (Fontijn 2003, Appendix 9). As for these smaller items, incidental loss may very well have been the cause of them entering the archaeological record, and they should only be considered intentional depositions after cautious consideration of the evidence (*cf.* section 8.2.3.4).

While it is clear that bronze items were present in various types and numbers at Bronze Age settlement sites, one may wonder whether bronze was actually worked there as well (Fontijn 2003, 137-143; Appendix 8). The fact that a clear-cut mould (Oss - Horzak; Fontijn, Fokkens & Jansen 2002) and other possible mould fragments have been recovered from Bronze Age settlement sites, does not necessarily indicate on-site production, as these fragments – like possible slag fragments (*e.g.* Sier & Drenth 1999, 21; Jongste 2001a, 37, *cf.* Van der Waals 2001) – may have been moved from their original location.[323] Droplets created by hammering hot copper or bronze, however, may indicate on-site production (*e.g.* Letterlé 1985, 332; Hielkema, Brokke & Meijlink 2002, 239; 263; Verhelst 2006, 43). Only one of the slag fragments and possible mould fragments has been analysed in detail for metallurgic composition (or metal residues; Letterlé 1985). Consequently, only for a very few number of sites, is metalworking reconstructed to have been executed within the excavated parts of settlement site space. If with future analyses the finds-categories like burned clay and pottery are consistently scrutinized for oven-, mould- and crucible fragments, this number may increase significantly.[324]

Monumental burials

At three Bronze Age settlement sites in the Dutch river area, funerary elements such as ring-ditches or burial mounds proper have been uncovered.[325] While the ring-ditch at Wijk bij Duurstede can only be indirectly dated to the Bronze Age (based on incorporated sherds and stratigraphy, no grave was found; Appendix IV), the barrows from Eigenblok are most likely to have preceded the Middle Bronze Age-B occupation period (fig. 8.5; Chapter 4, section 4.3.4). Preliminary studies of the chronological relations between Middle Bronze Age occupation and funerary traces

321 Fontijn 2003, 141 Appendix 9. To this appendix, several other finds – some with weaker association (*e.g.* surface finds prior to excavation, stray finds) – may be added: Meteren - Boog C Noord (bronze awl; Butler & Tulp 2001); Houten - VleuGel 20 (bronze pin, awl, chisel and copper-alloy droplets: Verhelst 2006, 43), Ottoland - Oosteind (copper object: Deunhouwer 1986, 179), Tiel - Medel 1 (bronze belt plate (Iron Age?): Hielkema 2002a, 23-24), Tiel - Medel 8 (a socketed axe: Hielkema & Hamburg 2007, 127 fig. 6.14),Wijchen (bronze flat axe: Modderman & Montforts 1991, 147), Berghem (bronze socketed axe and sickle fragment: Verwers & Beex 1978, 7 fig. 9-10), St. Oedenrode (a bronze ring from a Middle Bronze Age pit: Van Bodegraven 1988, fig. 43), Ede (bronze needle, dating and association unclear: Hulst 1986, 36), Colmschate (bronze pin: Verlinde 1985, 307), Loon op Zand (part socketed axe: Roymans & Hiddink 1991, 125 fig. 16), Barendrecht (copper fragment, unpublished), Rosmalen (flat axe, next to excavated area; De Koning & Vaars 2003, 18 fig. 6), Angelslo (bronze sheet fragment: Van der Waals 1967, 39), Laren (decorated needle: Butler 1969, 54 fig. 19), Zwolle - Ittersumerbroek (tang of Late Bronze Age knife: Van Beek & Wevers 1994, 59 fig. 53), Velsen (copper awl and bronze needle from different layers: Vons 1970, 304), Ittervoort (two casting jets for socketed axes; Drenth, Heijmans & Keijers 2007, 121), Den Haag - Bronovo (copper awl or pin and possible bronze working debris; Bulten *in prep.*).

322 *E.g.* Bronze daggers at Dodewaard site 20 (Jongste 1997b, 14) and Eigenblok (Hielkema 2002a, 327, *cf.* Gaffrey & Deiters 2005), a spearhead from Rhenen (Van Hoof & Meurkens 2008, 91 fig. 8), part of a sword from Elst (Fontijn & Meurkens 2006, 45-47, *cf.* Assendorp 1997, 53; 59). Note that outside the Netherlands, bronze weaponry (*e.g.* Brück 1999b, 152; Nielsen 1999, 159; Nowakowski 2001, 145; Ziermann 2004; Gaffrey & Deiters 2005) and axes (*e.g.* Björhem & Säfvestad 1989, 107; Rasmussen & Adams 1993, 141; Nilsson 1993-1994; Brück 1999b, 151-152; Suddaby 2003, 77-78) do seem to figure more prominently in settlement site depositions.

323 Tentative mould fragments claimed for Kesteren (Siemons & Sier 1999b, 22; 27-28) and Dodewaard site 28 (Bulten 1998a, 26). See Drenth, Heijmans & Keijers 2007, 121 on debris from casting socketed axes outside the river area.

324 Several (Middle and Late) Bronze Age settlement sites outside the Netherlands have yielded mould fragments or other evidence indicative of bronze working (*e.g.* Springfield Lyons (UK: Brück 1999, 151), Frouard (F: Blouet *et al.* 1996, 443), Goin (F: Blouet *et al.* 1996, 446), Rodenkirche (D: Strahl 2004, 519), Troldting (DK: Bech 1997, 3), Kirkebjerg (DK: Thrane 2005, 157-163), Store Tyrrestrup (DK: Nilsson 1993-1994), Vrå (S: Karlenby 1994, 7), Hallunda (S: Carlsson 2001, 51), Stora Kopinge area (S: Gröhn 2004, 216; 222; 240-241; 310; 327).

325 Wijk bij Duurstede- De Horden; Chapter 4, fig. 4.28, Rumpt - Eigenblok; Chapter 4, fig. 4.9, D and Meteren - De Bogen; Chapter 4, fig. 4.21.

for the wider area of the Low Countries suggest that monumental burial places frequently pre-date recognisable occupation phases (Bourgeois & Arnoldussen 2006, Bourgeois & Fontijn 2008). Only at Meteren - De Bogen is there good evidence to suggest that Middle Bronze Age-B habitation and interments were literally intercalated in time (fig. 4.15; Bourgeois & Fontijn 2008; Meijlink 2008). As with most sites excavated in the Dutch river area where a sufficiently large area was excavated for multiple house-sites to be recognized, the absence of monumental Middle Bronze Age-B burials is striking. At sites where we have many houses, we lack the monumental graves of their inhabitants (*cf.* section 8.2.3.3).

This differentiated spatial distribution of the living and the dead is all the more salient as several of the models proposed to characterize Middle Bronze Age settlement dynamics, have suggested that during this period, barrows were frequently erected near the locations of the houses (see Chapter 3, section 3.3). Based on the presently available data, this seems to be a misrepresentation of the prehistoric situation. Possibly, Middle Bronze Age monumental funerary locations were preferably situated in relatively elevated parts of the landscape, often commanding wide vistas (Fontijn 2007, 71). For the river area, it is tempting to postulate that such locations were situated outside the areas that were chosen for habitation.[326] In this light, it may be significant that the possible barrow at Wijk bij Duurstede - De Horden and that of Meteren - De Bogen, were both situated on the highest parts of the micro-topographic landscape (*cf.* figs. 4.18; 4.28). It was possibly the conspicuous 'barrow shaped' natural morphology that steered interment at those locations in the first place. This tallies with analyses of barrow locations outside the river area (Houkes 2000/2001; Fontijn 2007) and with the observation that also outside the river area, sometimes natural elevations were used 'as barrows' for interment (Fontijn 2007, 80; *e.g.* Van Giffen 1930, 31-32 fig. 14; Glasbergen 1954, 82; Modderman 1967, 61).

While monumental burials may not have been a normal element of Middle Bronze Age settlement sites, the dead are not altogether absent.[327] Rare discoveries at settlement sites of small pits with cremated remains, sometimes in urns, such as at Oss - De Geer (fig. 5.10, B; Jansen & Van Hoof 2004, 8), Breda (Koot & Berkvens 2004, 61-74) and Sittard (Tol & Schabbink 2004, 43) suggest that interments within settlement sites may have taken on less monumental forms than the barrows known in large numbers outside these. Furthermore, in addition to a unique double burial of two teenagers in a ditch at Bovenkarspel (IJzereef 1981, 209) and the possibility that some flat graves may have been situated within settlement sites,[328] stray human remains have been uncovered at several settlement sites.

At Meteren - De Bogen, a remarkably well-preserved human thighbone was recovered from underneath a layer of peaty floodbasin deposits and a tibia fragment originated from a pit with many animal bones (Robb 2002b, 679-680; 689). Several teeth and skull fragments were also recovered from the finds-layer and some leg bones and a jaw fragment from a pit and an adjacent well (*op. cit.*). At Eigenblok, three burned fragments of a human cranium were recovered from the finds-layer at site 5 (Robb 2002a, 349). At several sites of Tiel - Medel, human bones and teeth were recovered from the finds-layer and from postholes (Hielkema 2002b, 27; 2003, 77; Ufkes 2005, 101). Outside the river area, stray human bones at Middle Bronze Age settlement sites have been recorded from ditches, pits and wells at Bovenkarspel (IJzereef 1981, 209-211), ditches at Andijk (Van Mensch & IJzereef 1975, 60) and Hoogkarspel (Bakker *et al*. 1977, 206) and from a pit at Velsen (Cavallo 1988). But what does the presence of these bones signify?

A possible explanation may be that these bones represent disturbed graves, from which bones have become dislodged by dogs, ploughing or other unceremonial human acts. In this scenario, one would expect more (disturbed) interments to be known from settlement sites. An alternative explanation may be that for most of the deceased, the funerary rituals did not result in interment in a subsoil (barrow) grave. We may think of excarnation (*cf.* Louwe

326 Possibly, the Bronze Age communities near the margins of the Dutch river area made use of the directly adjacent Pleistocene areas for formal burial. For instance, from the site Tiel - Medel 8 (Van Hoof & Jongste 2007; Hielkema & Hamburg 2008), the ice-pushed hills of Rhenen (Van Hoof & Meurkens 2007; 2008) can easily be seen in clear weather. On ridges and slopes of these ice-pushed sediments, many (Bronze Age?) barrows have been erected (see Bourgeois & Fontijn 2008).

327 But see Louwe Kooijmans 1974, 239-260; 312; Wassink 1981, 82 for examples of formal burials in Late Neolithic to Early Bronze Age settlement sites in the Dutch river area.

328 *E.g.* Waterbolk 1964, 109-110; 1987, 196-197; IJzereef 1981, 209; Theunissen 1999, 73 and references therein; Van den Broeke 2006, 89 note 27.

Kooijmans 1985, 102; Baetsen 2005), the deliberate disposal of bodies in midden areas (*cf.* McLeod 1981, 36-37) or possibly the wholesale discard of human corpses by dumping them in rivers (*cf.* Van den Broeke 1992; Ter Schegget 1999, 202).[329] While such acts may have been unceremonious, the opposite is also very plausible. Possibly, the dead were transformed by specific rites of passage into ancestors of the household, clan or other social group. They may very well continued their 'lives' in such an altered state above-ground in the settlements.[330] Brück (1995, 256-257; 1999b, 155; 2006) has argued that during the Late Bronze Age in Britain, fragmentation of human remains may have been an important part of dealing with such 'ancestralized' human remains. Fragmentation (such as the deliberate crushing of cremated bones, or the disarticulation of skeletal remains) may have metaphorically referenced other generative processes, such as the preparation and storage of cereals (Brück 2006, *cf.* Bradley 2005, 8-14). Cereals are processed by threshing ('excarnation') and grinding ('fragmentation') and – like with cremation graves – fire was the transformative agent. Possibly, like cereals, human remains were separated into parts to be 'stored' underground (*e.g.* by interment, unceremonious dumping with refuse, or by river 'graves') and parts were retained for 'consumption'. Such consumption could be the distribution of ancestral remains among those entitled, as tokens that both legitimized certain behaviour and ensured that all entitled would reap the benefits of ancestral blessings. This must, however, remain a tentative interpretation as direct evidence for such fragmentation (which may in the future be derived from DNA analyses) is yet lacking. In any case, it offers a framework within which both the absence of monumental graves and the presence of seemingly unceremoniously scattered human remains can be understood.

5.10 Summary

In this chapter, an overview was offered of various Bronze Age settlement site elements. The houses have received considerable attention, as they form both the core of many settlement site definitions (see Chapter 3, section 3.2) and are used in this study as the centre points for spatial analyses to look for farmstead structuring (Chapter 6). I have shown that the different properties of the houses in the various sub-periods of the Bronze Age may have led to a difference in ease of recognition and consequently in numbers (of sites) known.

Early Bronze Age houses from the Low Countries are scarce, and are likely to have shared only a basically two-aisled roof-bearing structure. For the Middle Bronze Age-A, no reliably dated houses can be put forward, although several claims to the contrary have been made. Possibly, during this period constructional properties of houses underwent a process of change (toward a three-aisled construction from the 18th or 17th centuries BC onwards?) that rendered them archaeologically invisible. It cannot, however, be excluded that during this period, houses were built in some regions that relied on constructional techniques that leave no or few archaeologically visible traces. In any case, Early Bronze Age and Middle Bronze Age settlement sites can for the time being be characterized mainly by the presence of features with pottery decorated in traditions typical of these periods.

From the 15th century BC onwards, farmhouses were built that show regional variation, whilst still adhering to a supra-regional tradition: In all areas of the Low Countries, Middle Bronze Age-B farmhouses were constructed with a mean longitudinal spacing of the roof-bearing posts at around 1.9 to 2.3 m. I have shown that this spacing was widely shared, and cannot (and presumably need not) be related to the indoor stalling of livestock.

Some Middle Bronze Age-B type houses (*e.g.* A1, B2b; see section 5.2.3.3) may have continued into the (start of the) Late Bronze Age, yet presumably around and after the 12th to 11th century BC, much more variation in house construction was again common. This may have again decreased the archaeological visibility of houses, until after the last quarter of the 9th century a house-type emerged that presented a radical break with those of the preceding Bronze Age (fig. 5.31).

329 Among the Asante, pre-pubescent children, the sterile, suicides and those struck by inauspicious deaths (*atofo*) were buried in the midden deposits. The graves may be lined with thorny bushes, the corpses mutilated and verbally abused and spirits told not to return in the same sterile or defective state (McLeod 1981, 37).

330 For a Bronze Age archaeological example see: Parker Pearson *et al.* 2007, 81-82 (*cf.* Parker Pearson 1999, 158-161), for an anthropological examples see the dealing with skulls and long bones in New Guinea (Barth 1987, 3-4), the mummified chiefs of the New Guinea Dani (Corn 1991, 206-207, *cf.* Gardner 1992, 68; Rutherford 1996, 58), or the curation of ancestral bones placed on the beam (metaphorically and/or physically) supported by the *tavu* of Tanimbar houses (McKinnon 2000, 165; 173). In the Indonesian fishing town of Lamalera, ancestral skulls were kept in the boat houses, ritually fed and rubbed against the prows to ensure good fishing trips (Barnes 1996, 224).

Moving away from the houses proper, this chapter has dealt with the function, structural characteristics and dating of different types of outbuildings. I have shown that especially square and rectangular four- and six post granary-type outbuildings were common companions to Middle Bronze Age-B farmhouses, but that several other types can be dated to the Middle Bronze Age-B as well.

Attention has also been paid to fences and palisades. While the differences between them if defined by criteria such as posthole size and inter-post distance may be blurred, their spatial characteristics create clear distinctions. Fence lines were presumably primarily part of large-scale bi-axial systems of landscape compartmentalisation, that spatially surpassed the level of the house-sites. House-sites, and presumably also crop fields and pastures were set inside, and were presumably *de facto*, but not by primary intent, defined by fence systems (*cf.* Chapter 6, section 6.4.3). Fences were sometimes repeatedly repaired on the spot, but there are also indications that fence systems at a larger scale were replaced in their entirety, as at some sites different orientations suggest fence systems originating from different phases of landscape structuring. Palisades, by contrast, are generally spatially much more confined. They seem to have defined certain plots, but rarely ever fully enclose particular areas. This suggests that they may have been predominantly boundary markers, whose erection and presence thereafter may have been partly symbolic. I have argued above that such a symbolic function may also have applied to other features, such as to some of the fences.

Pits of different shapes and different assumed former functions have also been discussed. I have argued that only few pits can be rightly classified as refuse pits, and I will argue later-on (Chapter 6, *cf.* fig. 6.14) that the distribution and contents of pits varied significantly between settlement sites. Only for wells and drinking pools can their former function frequently be established by their distinct shapes in section. I have argued that – while both may occur close to houses – for wells in particular, their spatial distribution will have been related to the distribution of usable aquifers rather than the distribution of other settlement site elements.

Finally, at the end of this chapter attention was directed to settlement site elements that by their nature (*e.g.* few or no dug-down traces; irregular configuration) are only infrequently encountered at Bronze Age settlement sites. Moreover, a reversal of the approach (which elements appear to be *absent* from settlement sites?) has been used to outline some characteristics of Bronze Age behaviour and landscape use.

As such, this chapter serves as a bridge between the qualitative presentation of the data in Chapter 4, and its specific application in analyses targeted at looking for house-site ordering, which form the topic of the next chapter. Having discussed the particularities of the individual elements, now attention must be focused on establishing their specific spatial interrelations (Chapter 6).

6 In search of Bronze Age farmsteads: analysing prehistoric house-sites

6.1 Introduction

After having discussed the history of the concept of the 'farmstead' in settlement archaeology and having forwarded the more analytical term 'house-site' (Chapter 3), a qualitative selection of Middle Bronze Age settlement sites from the Dutch river area has been presented (Chapter 4), whose constituent settlement site elements have been discussed in detail in the previous chapter. In the present chapter, these lines of enquiry are recombined, in order to answer the question of what the nature of Bronze Age house-sites in the river area was. To this end, a systematic methodology for analysing house-sites is introduced and applied to the data from the Dutch river area.

As stated in chapters 1 and 3, Bronze Age settlement sites have seen little direct analysis targeted at establishing the nature of the house-site. Thus, specific questions like 'What are common and less common elements?', 'What spatial interrelations existed between the different elements at a Bronze Age house-site?' and 'Are house-sites physically defined?' have only rarely been raised and have never been dealt with systematically. Rather, archaeological accounts are generally rather descriptive (*e.g.* 'several granaries are found next to the farmhouse') and rarely comparative in nature. While it is generally implicitly assumed that 'some ordering' of the house-site was current in prehistory, the nature of this 'ordering' and the methodology by which it is investigated is usually not described.

It has already been suggested in chapter 1 that the (superficial?) similarities of some of the Bronze Age house-sites to sub-modern agrarian farmsteads may have caused this apparent lack of systematic research (section 1.2). To consider the 'logic' of prehistoric 'farmsteads' as something that goes without saying, may well be the result of false analogies inspired by the culture-historical- and romanticist sentiments of contemporary society at large, or even personal memories and experiences.[1] In this sense, it may be important that the Dutch scholars working with the results of the first large scale settlement excavations in the sixties and seventies of the former century, grew up in a period when the Dutch landscape was still to a larger extent shaped predominantly by agricultural use than today.[2] The fenced-off early 20th century farms, with clearly defined functional areas and outbuildings,[3] would have been a phenomenon which was still abundantly present in the landscape and very much part of every-day rural life back than.

Based on the above observations, there is a clear risk that archaeologists dealing with Dutch later prehistoric settlement sites, tacitly project a 'natural' and unspecified farmstead concept back to the past when discussingprehistoric 'farmsteads'. This need not be erroneous, and Bronze Age farmsteads may very well have shared properties with sub-modern farmsteads, but a detailed and systematic analysis of Bronze Age house-sites has never been undertaken. Therefore, this is one of the main goals of the present chapter.

6.2 Order in prehistoric house-sites?

Any analysis of house-site ordering should start-off with a critical evaluation of its concepts. The use of the word 'ordering' can be particularly misleading, as its meanings range from descriptive (*e.g.* a sequence, arranged or regulated conditions) to normative (*e.g.* prescribed or customary modes of behaviour, forces of harmony and regularity in cosmology). I will first comment on the latter and thereafter the former and their relevance to the present investigation.

1 *Cf.* Lemaire 1997; Bazelmans, Kolen & Waterbolk 1997; Brück 1999a, 64.
2 *Cf.* Hendrikx 1989, 104-110; Reijnders 2002(1997), 100; Boivin 2003, 154-159; Stobbelaar & Hendriks 2003, 26 table 1, Pols *et al.* 2005, 11-14.
3 Blink 1902; 1904; De Hullu 1937; Trefois 1941; Bijhouwer 1943; Everhard 1965; Bieleman 1987; Albers 1990; Bierema & De Vries 2000 (1994); Voorhorst 1996; De Vroome 1996; Van Ooststroom 1998; Smallegange 1999; Leopold 2001; Verhagen 2002; Scholtens 2004.

To strive for 'order' (to counter 'chaos'?) hints at processes underlying the creation of ontological security and structures well beyond direct scientific research questions.[4] Being human, classification (ordering) is central to our cerebral processes that allow us to function in everyday life.[5] These remarks indicate three important pitfalls.

First, the ordering of any data relies on criteria by which these are handled. Just as fruits can be sorted by colour, taste or shape with equal validity, there is no preset, 'logic', ordering of prehistoric house-sites (*cf.* Agorsah 1993, 8; Miller 2005, 399-401). Order in prehistoric house-sites is only visible to the extent that, if challenged by specific research questions, different hypotheses will yield more (or less) comprehensible outcomes. To put it more simply: looking for house-site structuring is largely an etic process, with patterned data easily being misrepresented as being informative of 'prehistoric ordering'.[6]

Second, it is important to consider to what extent the quest for prehistoric house-site 'ordering' is not a moot point. Whereas the argument above stressed the problems of the knowability and the unwarranted transposition of viewpoints from present-day to prehistoric situations, the problem may be much more fundamental. If one accepts the assumption that for any human society, regardless of place and time, their everyday environment is seen as being imbued with a 'natural' or 'logical' ordering,[7] the search for such 'ordering' is transferred beyond of the realm of possibilities of archaeological research. To put it otherwise, it is very well possible that Bronze Age farmers, like any other human being, conceived of their (house-site) environment as an ordered, structured, and very much logical locale, regardless of its appearance to present-day researchers.

Third, an archaeological perspective on house-site ordering is naturally flawed. Dealing with fragmented relicts, in varied states of preservation, Pompeian circumstances are rarely a reality. This indicates that our data set may be blurred significantly by the palimpsest nature of the archaeological record. A swarm of postholes that can no longer be disentangled may hide a multitude of use-phases characterized by any distinct – and changing – ordering in former times. Consequently, low density patterns (*e.g.* low feature and/or structure densities) are at risk of being regarded as 'Pompeian' or 'snapshot' situation when they can in fact could have been formed over large time periods, just as high density patterns may be dismissed as 'chaotic' or 'unstructured' while these represent the superimposed remains of several, once distinctly ordered, use-phases.

In short, based on the above considerations, archaeologists are limited to pattern recognition, and for each of the patterns discovered, it is appropriate to reflect on whether the question asked had prehistoric relevance, or what inferences on prehistoric behaviour can justifiably be made. Yet, for any approach, the underlying assumptions and intended results should be made explicit.

6.3 Visual Analysis of Spatial Overlays (VASO): assumptions, aims, results

In absence of a methodology suitable for the systematic analysis of settlement site or house-site structuring, one had to be established in the context of this study. This approach has been labelled 'Visual Analysis of Spatial Overlays' (hereafter VASO in short). This methodology relies on computer generated overlays of excavations plan from settlement sites, which are thereafter inspected visually in order to trace and outline specific patterns.[8] Examples

4 *Cf.* Ingold 2000, 160-161. As Laing (1965, 42) stated: [only] 'If a position of primary ontological security has been reached, the ordinary circumstances of everyday life do not afford a perpetual threat to one's own existence.' *Cf. opus cit.*, 82: 'The reality of the world and of the self are mutually potentiated (…)'.

5 *Cf.* Hallowell 1955, esp. 40; 75-91; 186; Douglas 1966, 36; Casson 1983; Lawrence & Low 1990, 477-478; Segal 1994, 24-25; Jenkins 2000, 7-8; Ingold 2000, 160-162.

6 This, consequently, necessitates explicit discussion of what 'order' is looked for in archaeological enquiries. Remarkably, the contributions in the volume by Parker Pearson and Richards (1994) called 'Architecture and Order' rarely address such issues (but see Parker Pearson & Richards 1994, 10-11). In addition, Hillier & Hanson's 'The Social Logic of Space' (1984) provides an example of *a priori* validity of etic notions of 'order', when they state that an anthropologically informed theory of space '(…) must account for basic differences in the ways in which space fits into the rest of the social system. In some cases there is a great deal of order, in others rather little (…)' (Hillier & Hanson 1984, 5; 52; 80).

7 *Cf.* Hallowell 1955, chapter 4; Hillier 1996, 40-43; Ingold 2000, 160-161.

8 Ian McHarg (1968) is accredited with the initial use of cumulative overlays in spatial analyses. For an critical discussion of the strengths and weaknesses of overlay analyses in GIS in general, see Unwin 1996, esp. 132-134. For other or related archaeological approaches using spatial overlays see for instance: Bersu 1940, 50 fig. 10; Gregg *et al.* 1991; Kroll & Price 1991, 2; Fletcher 1995, 59; Veil & Breest 2004, 350 fig. 3; Therkorn 2004, 86 fig. 29; Gröhn 2004, 274 fig. 61; 332 fig. 63.

of such patterns are, for example, the spatial locations of wells or outbuildings in relation to house plans or each other. Through such analyses, specific hypotheses on the ordering of prehistoric house-sites can be made testable. Moreover, this technique allows studying differences between house-sites of different settlement sites and may thus allow analyses and generalizations at several spatial scales. I will describe this methodology in more detail below, prior to applying it to data on Bronze Age settlement sites from the Dutch river area.

6.3.1 The hypothetical house-site

At the base of VASO lies the concept of the 'hypothetical house-site'. Based on the commonly used descriptions for prehistoric 'farmsteads' (section 3.2.2) and information available on sub-modern rural farmsteads (note 3), a generic, model 'farmstead' or house-site may be envisaged.[9] Such a house-site would comprise a farmhouse building, around which open areas and outbuildings are encountered. Possibly, a functional logic steered the location of different house-site elements in relation to the house, and some elements (*e.g.* open areas, outbuildings) may therefore display a preferred spatial position in relation to the house.[10] Pits and wells can also be part of such a house-site, and the extent of this house-site is thought to have been physically marked by ditches or fences. As for dimensions, an area of 20-25 m around the house is often used (*e.g.* Fokkens 1997, 365; Theunissen 1999, 112-113).

The different elements of what may be called a 'model farmstead', are thus based on archaeological claims and historical analogies. Such a model farmstead is the – albeit often implicit – dominant framework for the interpretation of archaeological house-sites. In this study, such model farmsteads are not used as a descriptive reflection of past farmstead structuring, but as a heuristic device to steer archaeological analyses of prehistoric farmsteads. A technique that is capable of outlining the constituent elements and their interrelations for such a model farmstead is called upon (VASO; *infra*), as this can also outline differences and similarities between prehistoric and modelled farmstead structuring.

Assumptions

In order to allow comparison of prehistoric house environments internally (against each other) and externally (against house-site models), some assumptions for the hypothetical house-site must be made. First, in this study, a house-site is assumed to be situated within a 50 by 50 m square area. Second, the house is seen as being conceptually, as well as spatially central to the hypothetical house-site. In particular, the corresponding orientation of the farmhouse and other house-site elements may be an expression of such a conceptual and spatial interrelation. As most Bronze Age houses are orientated roughly northwest-southeast (see section 6.4.3), the farmhouse of the hypothetical house-site is also orientated northwest-southeast. Within the 50 by 50 square meter area, and around the farmhouse, fences, pits, wells, ditches and outbuildings are thought to cluster. These settlement site elements will provisionally be referred to as house-site elements below.

Hypotheses

Based on the above considerations and assumptions, a number of hypotheses can be forwarded, but endless others may be compiled.

1. If settlement site elements such as outbuildings, pits, wells, fences and ditches are indeed the typical constituents of the prehistoric house-site, one would expect them to occur exclusively or in greater numbers in close spatial association to the farmhouses.

9 To outline the distinctions more clearly: a 'model farmstead' describes elements and their interrelations for assumed farmsteads, a 'hypothetical house-site' is a geometric shape (in this study a 50 by 50 m square) centered on a documented house plan within which possible house-site elements and their interrelations are investigated, while the term 'farmstead' denotes (and describes) a structured house-site as observed historically or proven archaeologically.

10 For example, in sub-modern farmsteads, baking houses are freestanding due to fire-risks, a bleaching field is left unbuilt, walnut tree are planted near the byres to reduce the number of flies, and churning is done away from living areas as this attracted flies *et cetera* (see references in note 3).

2. If the house proper was central to the house-site, other house-site elements may display a correspondence through their placement (and/or orientation) in relation to the house.

3. If the spatial properties (location and orientation) of house-site elements were of importance, one may expect these conditions to have been respected in rebuilding.

4. If the placement of house-site elements bears no relation to the farmhouse, their distribution around the farmhouse should leave an even (random) distribution pattern.

5. If concepts of prehistoric house-site ordering were shared among the local community (in space and/or time) occupying a given settlement site, one would expect the house-sites of a given settlement site to be more similar internally, compared to house-sites from another settlement site.

In order to test these and related hypotheses, the number, distribution, orientation and interrelations of the relevant settlement site elements in the vicinity of prehistoric farmhouses must be analysed. This calls for a methodology, that allows the information on the nature of Bronze Age house-sites to be analysed in a systematic and controllable way. First, the technical procedure will be introduced below.

6.3.2 Technical methodology

The first step in the method of analysis is to identify the relevant house-site elements in the excavation plans. This can be done from both analogue and digital excavation plans. Thereafter, these elements need to be digitized as outlines, allowing for mapping at selected scales.[11] In this study, MapInfo and Autocad software was used. The result should be a multilayer vector file containing the layers with the outlines of houses, outbuildings, fences, ditches, wells, pits *et cetera*. The layer name should identify the house-site (*e.g.* number, label) and the elements present on that layer (*e.g.* pits, barns, fences).[12] The objects on these layers, should furthermore have a specific line property (*e.g.* colour or dashed) per layer, in order to identify them later in composite overlays. Essentially, the result is a simplified excavation plan, with the selected house-site elements recognisable by layer line type and the possibility to toggle on and off the visibility of these layers (fig. 6.1).

As the second step, copies of the resulting multilayer file are required, one for each recognized house(phase). These copies are named after their defining house(phase). Then, the copies are opened and the centre of their constituent house – defined by the centre of gravity for the area enclosed by the inner rows of the roof-bearing posts – is determined and indicated as a point. This centre-point will also form the centre of the hypothetical house-site. On a temporary layer, a 50 by 50 square meter area with its diagonals is drawn, whose centre-point is an arbitrary, yet known coordinate (*e.g.* 1000/1000) of the coordinate system used. Thereafter, the elements of all layers (save for the temporary layer with the square) are translated, with the house-centre point as the base-point, and the arbitrary centre coordinate (1000/1000) as the endpoint of translation. Next, all layers (save for the temporary layer with the square) are rotated to the necessary number of degrees to make the long-axis of the central house fit with the northwest-southeast diagonal of the square.[13] The elements which are thereafter situated outside the hypothetical 50 by 50 square meter area, may be cropped (deleted) from their respective layers.[14] The temporary layer with the square is removed and the file saved. This procedure is repeated for all copies containing separate house-phases (fig. 6.2).

11 In theory, digitizing a 36 m perimeter around the centre of the house suffices (½√5000), but for the complementary analyses (*e.g.* distribution of elements inside versus outside hypothetical house-sites) the location of the elements outside the house-sites proper is needed. For efficiency, it is best to digitize all selected elements at this point.

12 Digitizing the excavation extent boundary is advisable as well, as this is necessary to evaluate 'empty' areas.

13 The northwest-southeast axis chosen here is arbitrary, but not trivial. Middle Bronze Age houses vary in orientation from west-east to north-south, but generally avoid a northeast-southwest orientation. Therefore, the perpendicular northwest-southeast orientation is used here as a generic default orientation (see fig. 6.15 and section 6.4.1 for details on house orientation).

14 While cropping increases clarity of composite overlay plots (*infra*), uncropped files may be used to check – or or look for – patterns at scales beyond the 50 by 50 m square used here

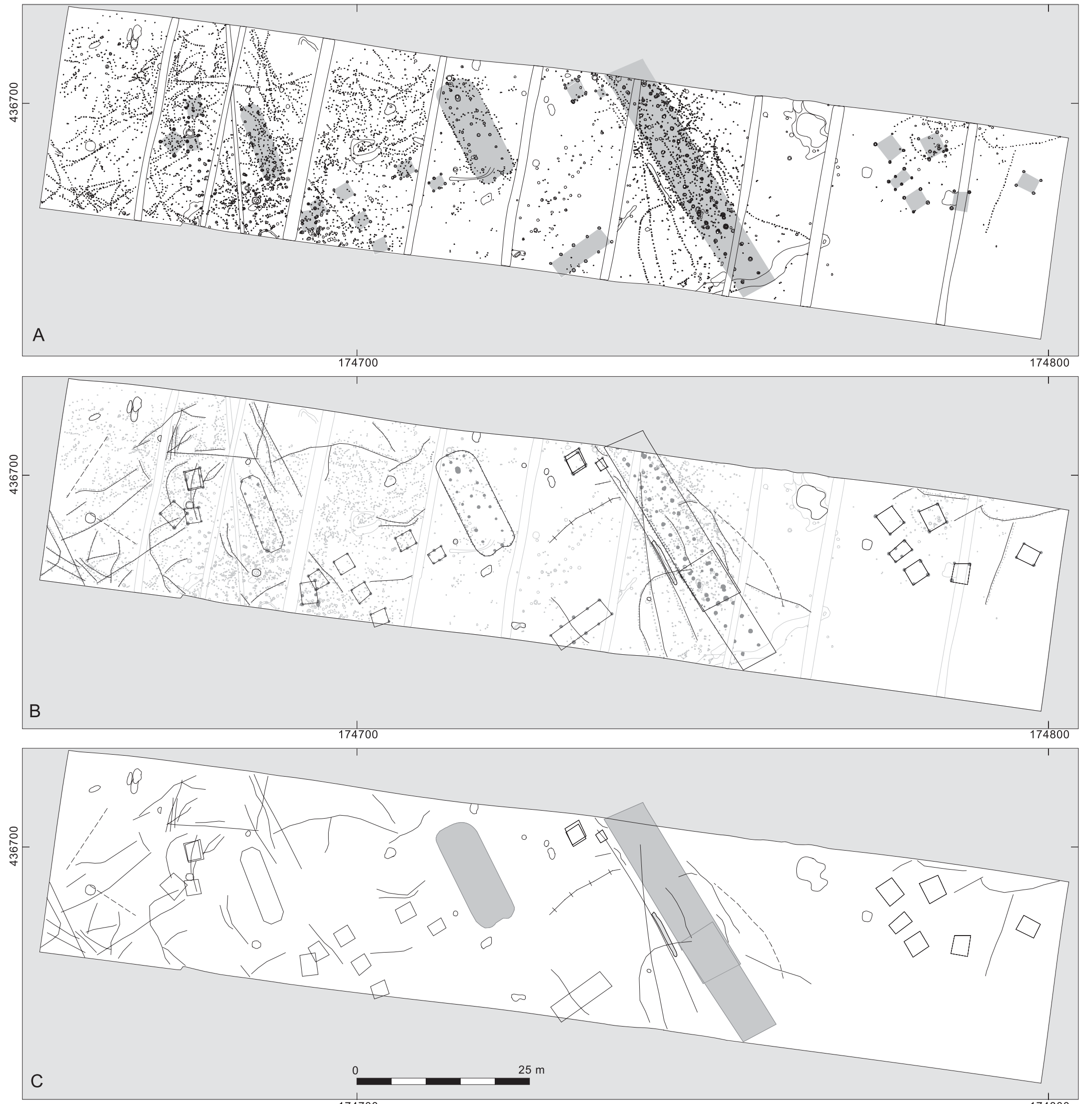

Fig. 6.1 Visual Analysis of Spatial Overlays (VASO), step one: digitizing the relevant outlines (A to C).

The third step is the compilation of a single file from the copies after translation and rotation. This is the creation of the overlay from which the method derives its name. In this file, all hypothetical house-sites of a given settlement site are represented by layers per element. This file allows comparison of the number, placement and orientation of house-site elements in relation to the defining farmhouses for all house-sites in a settlement site (fig. 6.3). By toggling on or off certain layers, the (dis)association of the house-site elements can be analysed. In this study, the excavation extents and the layer containing the scale bar and north-arrow has been toggled invisible in all images to improve clarity. For instance, questions of the sort 'Do pits cluster to the long side of houses?' or 'Are wells generally situated in the corners of systems of fences?' can now be investigated.

The visual aspect of the analysis is reasonably self-explanatory. Pattern recognition (such as the clustering of elements) relies on visual identification. Whereas one may apply more objective techniques for the pattern analysis (GIS based frequency or density analyses), human perception and sensibility appear still better suited to the task. GIS based analyses require polygon to centre-point or polygon to grid conversions for computation. Some archaeological data, such as fences and ditches, are spatially extensive and often of non-linear morphology, and are not meaningfully

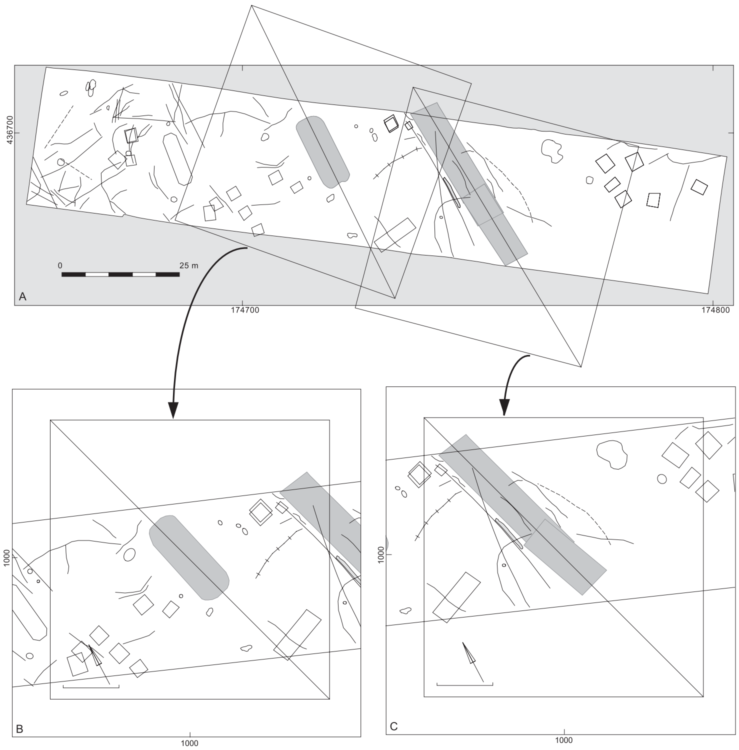

Fig. 6.2 Visual Analysis of Spatial Overlays (VASO), step two: translation and rotation around an arbitrary centre point.

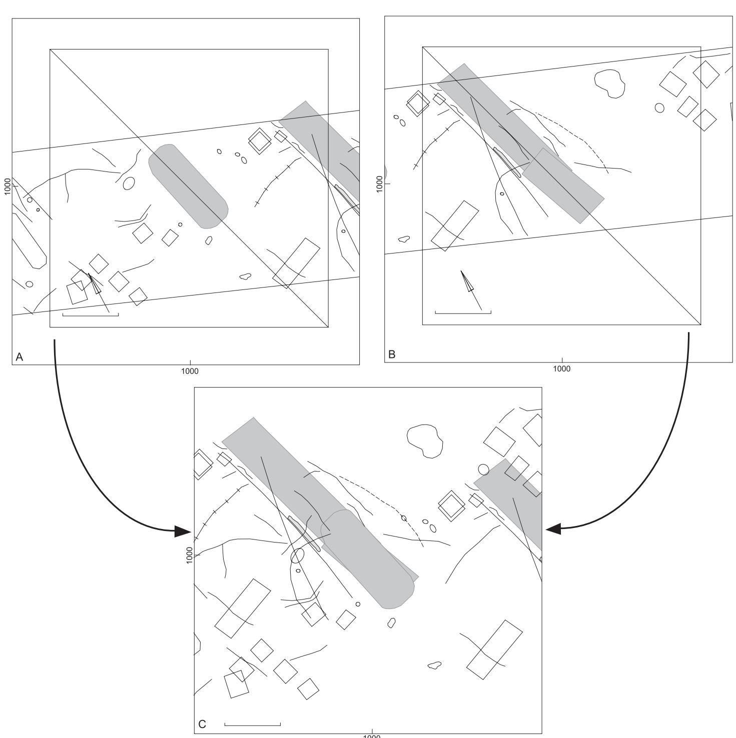

Fig. 6.3 Visual Analysis of Spatial Overlays (VASO), step three: creating the composite overlay.

converted (but for an example using outbuildings, see figure 6.22).[15] In addition, the observed phenomena need to be checked with the individual copy files or the master excavation plan, checked with the excavation extents and be placed in archaeological context. These tasks can hardly be (nor should be) automated. Furthermore, VASO is a tool for investigating specific spatial (inter)relations and not an end-goal in itself. The composite plots resulting from VASO are never meaningful in themselves, but are suitable to compile – and to certain degree test – meaningful inferences of archaeological relevance.

6.3.3 Problems, limitations and pitfalls

As stated above, VASO is a tool with archaeological potential, but which also is characterized by several obvious problems, limitations and pitfalls. The most severe of these problems is that of archaeological contemporaneity, or the 'palimpsest' problem. When digitizing elements for VASO, generally there are no individual dates for the elements incorporated available. This means that one is building on the assumption of near contemporaneity for the uncovered elements. To dismiss this problem lightly seems myopic, but quantification of this parameter is also difficult. In any case, in the situation where high feature densities are present within the ground plan of the defining farmhouse – and that can not be interpreted as belonging to the house structure proper – contemporaneity should be questioned. Obviously, the same goes for (settlement- and) house-sites where a large occupation period is suspected based on typological observations or absolute dates. Palimpsest situations can occur from temporal (same location, other time), as well as lateral overlap (same location, (near) same time), both of which should be reckoned with.[16]

Consequently, it is evident that briefly used sites – characterized by low feature densities – with no indications of previous or later use and with excellent feature preservation are ideal for VASO. Therefore, in this study all hypothetical house-sites have been evaluated for suitability (table 6.1). This allows the isolation of the best quality data to asses established patterns or inferences (*cf.* section 6.4.5).

criteria / classes	time-depth	extent of excavation	certainty of recognition	feature preservation
excellent	only Bronze Age one house-site low feature density	large areas around house plan	house plan certain recognized during fieldwork	many stakes or hoof-imprints and house walls preserved
good	only Bronze Age one house-site	house plan and direct vicinity	house plan certain	many stakes or hoof-imprints preserved
moderate	only Bronze Age multiple house-sites	complete house plan	house plan probable	some stakes or hoof-imprints preserved
poor	multiple periods	incomplete house plan	house plan insecure	no stakes or hoof-imprints preserved

Table 6.1 Criteria and classes used for the evaluation of house-site suitability in VASO.

The second main problem with VASO is the fact that it is predominantly confirmative in nature. The pre-selection of elements to be digitized (while being an archaeologically informed decision) means that other phenomena, are excluded from analysis although they could be just as informative (*e.g.* burnt patches). This can be overcome by adding extra layers for the phenomena to be included and theoretically by including the excavation all-features plan (and finds-distribution plans) in the analysis. The latter option is, however, prone to decrease the visual clarity central to VASO.

15 Theoretically, frequency of occurrence can be calculated for grid matrices which are of adequately small grid cell size to allow the mapping and counting of, for instance, fence lines. This would significantly increase computational complexity, while not accordingly increasing archaeological understanding. As an example, for a grid cell with value for fences of 2, it is unclear whether these are two parallel fences (*e.g.* a rebuilt fence) or two fences which run at right angles and only intersect within that cell. A visual approach allows distinguishing between the two.

16 As an example of the latter, imagine two houses 50 m apart on an east-west axis, labeled 'left' and 'right'. If the prehistoric preferred location of farmstead elements was 30 m to the west of the house, VASO of house 'right' will yield no elements, whereas those on 'left' are likely to be misinterpreted as belonging to that house.

Along similar lines, the size of the hypothetical house-site is an important factor. Certain patterns are visible only at larger scales and elements which in prehistory were seen as part and parcel of a house-site, are now – because of their distance to the centre of a house – possibly excluded. This problem too can be overcome reasonably easily. Size and shape of the hypothetical house-site have no technical restrictions, although again visibility may decrease with increased size. In addition, it is possible that in using more extensive hypothetical house-site areas, patterns unrelated to the proximal location to a prehistoric farmhouse distort the plot. Consequently, 50 by 50 m (*i.e.* 25-36 m from the house) is used here as an appropriate spatial scale.[17]

Additionally, the close proximity of prehistoric farmhouses used in VASO can pose a problem. If house-site elements, for instance outbuildings, are situated in between two houses, they will appear twice on the VASO plot. This duplication effect, however, is reduced if larger numbers of house-sites are overlain.[18]

A final, and more fundamental caveat is posed by the rotation of house-site elements to the northwest-southeast axis. This rotation facilitates comparison, but is also strongly reliant on the assumption that it is the (orientation of the) house which was the main determining factor in the placement and orientation of the other house-site elements. Assume, for instance, that the placement of the other house-site elements was not determined by properties of the farmhouse buildings proper, but on sets of rules influenced or determined by solar or stellar orientations. If preferences existed like 'house-site element 'x' should be placed to the (magnetic) south of the farmhouse entrance', and the orientation of the houses differed (yet was not of importance), the rotation of all house-site elements will blur the pattern (fig. 6.4). Ideally, VASO should be repeated without rotation, to investigate this. As however in most sites the differences between the orientation of the houses are minimal (see section 6.4.1), often a single-run (with rotation) of VASO suffices.[19]

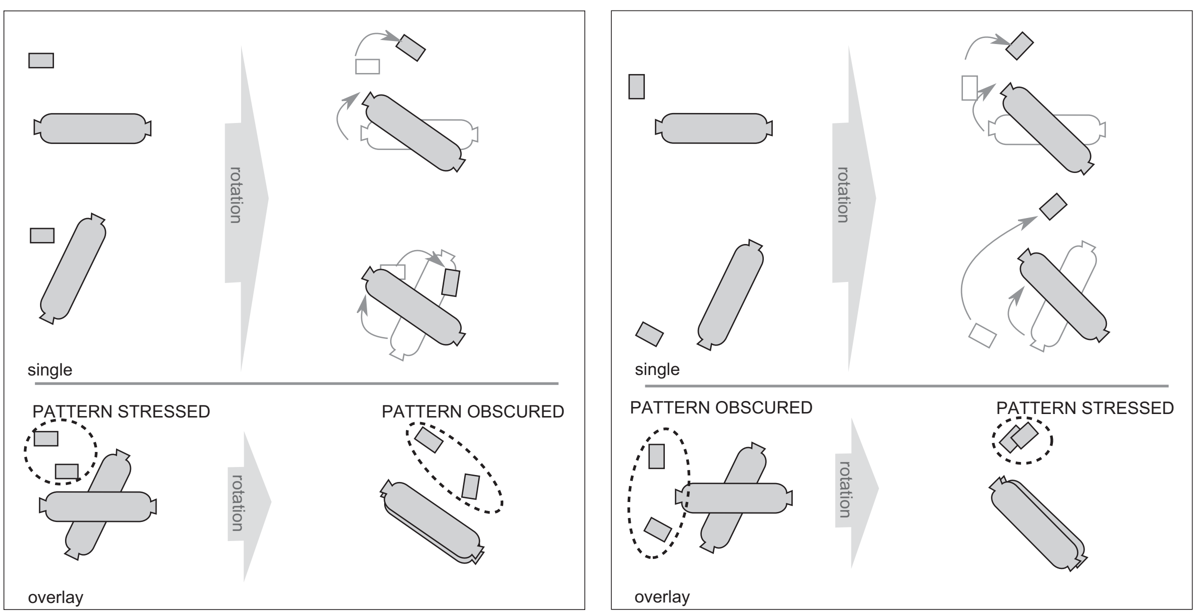

Fig. 6.4 Example of how rotation and house-site structuring rules can either enforce or obscure patterns depending on the nature of the rules.

17 See section 6.4.2.

18 Overlying larger numbers of house-sites can stress shared properties, and reduces the (visual) prominence of individual (outlying) observations. Consequently, overlying larger numbers of house-sites helps to determine which patterns are more generic (*i.e.* more widely shared) house-site structuring *within* settlement sites, or to outline difference for multiple house-sites *between* settlement sites.

19 Nonetheless, to allow verification of the results, both rotated and not-rotated VASO plots for all Bronze Age settlement sites from the Dutch river area are provided at the end of this chapter (figs. 6.37-6.59).

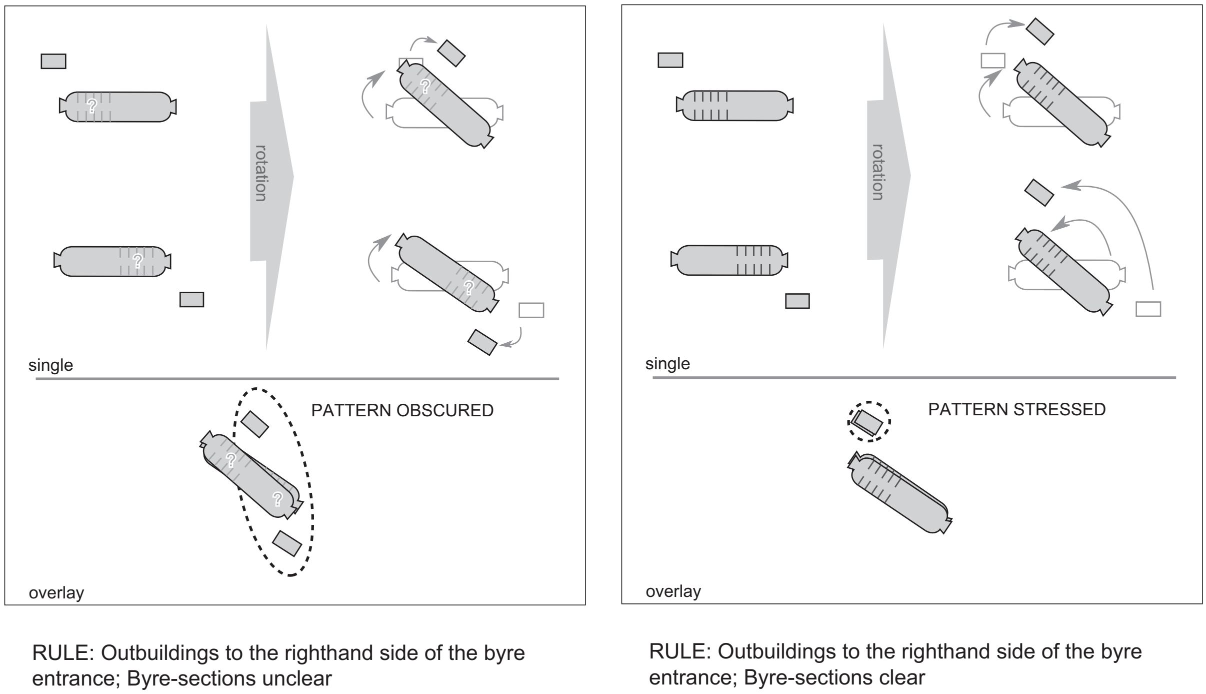

Fig. 6.5 Example of how lack of information on functional divisions of the house, rotation, and house-site structuring rules can either enforce or obscure patterns depending on the nature of the rules.

In addition, some of the rules guiding house-site structuring may have been based on criteria which have no or limited archaeological visibility. As an example, the difficulties in recognizing byre sections in Bronze Age houses from the river area (see section 5.2.3.3 and fig. 5.17), complicates the study of the relation of house-site elements to such house-sections (fig. 6.5).

6.3.4 Analyses and interpretations: an introduction

For all of the Middle Bronze Age house-sites from the settlement sites discussed in chapter 4, VASO has been done against magnetic north as well as with all house-sites rotated towards NW-SE. In addition, the house-sites from the excavations at Tiel - Medel 8 (Van Hoof & Jongste 2007), have also been incorporated. For all these house-sites, the orientation of the houses and outbuildings has also been studied, and are represented by wind-rose diagrams. The images showing the VASO plots for the different house-sites (towards magnetic north and rotated) and the wind-rose diagrams for the settlement sites can be found at the end of this chapter (figs. 6.37-6.59). Only a selection of these images will be used here as illustrations to support key arguments.

First, a brief description of the seperate outcomes of the VASO for the different settlement sites will be offered. This will allow detailed discussion of the (backgrounds to the) patterns observable. Thereafter, any emerging patterns will be checked with the results of VASO done for all sites discussed in chapter four.

6.3.5 Zijderveld

The VASO plots and wind-rose diagrams (figs. 6.37-6.39) for Zijderveld show that the houses conform to a roughly WSW-ENE system of orientation. The single plan that deviated from this pattern is situated nearly exactly perpendicular to it, suggesting that 'at a right angle' may have been an acceptable (complementary, or even conforming) orientation for a Bronze Age house. Based on the plans published in Chapter 4 and Appendix I, it was concluded that this system of orientation is also reflected by the fences at Zijderveld, which extend beyond the (hypothetical) house-sites (section 4.2.3). Within the hypothetical house-sites, stretches of fence are frequently situated within 20 m of the houses and show roughly corresponding orientations. Only very few fences show a trajectory that suggests that they defined a perimeter around the house. Most fences run relatively straight, parallel, and extend beyond the houses.

Several fence-lines cross-cut the ground plans of the houses and outbuildings, indicating that several phases of use of the house-site need to be accounted for. This may also be assumed based on the frequent occurrence of multiple fence-lines ('bundles') on a given location (*cf.* fig. 6.26). It is furthermore important to note that fences of different types (types 1a and 2; see section 5.5) occur together in such 'bundles', since it has been suggested by Theunissen (1999, 168-169) that the different types may have had different functions. Their co-existence and similar orientation in such bundles, however may suggest otherwise.

No evident patterns are discernible in the few pits located on the Zijderveld house-sites. Mostly, pits are found to the north of the houses. Of the three pits to the south of the houses, two are rather large. Only for the larger pit on house-site 1 a function as a drinking pool can be argued for (Knippenberg & Jongste 2005, 63-65). These drinking pools generally contained most finds (some between 2 to 6 kg), whereas the other pits uncovered in the 2005 excavation never yielded more than 200 grams of finds. This renders an interpretation as refuse dumps for the latter pits unlikely. As also to the northwest of house 2 (fig. 6.37, B) and the north of the house 3 (fig. 6.37, C) larger pits have been interpreted as drinking pools, no preferred southern location for these pools may be assumed. The wells at house-sites 2 and 4 (fig. 6.37, B; D) are also situated to the north of the houses, but here numbers are too low to attach much value to this observation.

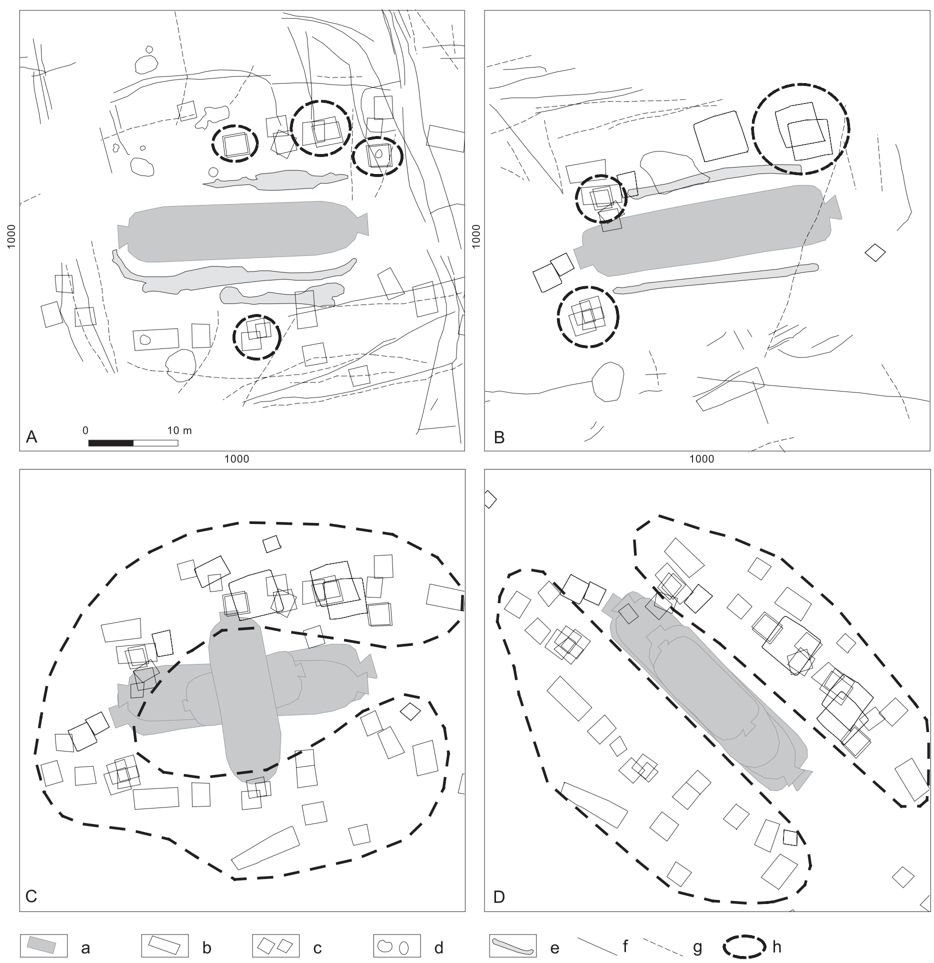

Fig. 6.6 Rebuilt outbuildings on house sites 1 and 3 (A, B; towards magnetic north) and the VASO plot for Zijderveld houses and outbuildings towards magnetic north (C) and for the rotated house-sites (D).

a: houses, b: barns/sheds, c: granary-type outbuildings, d: pits, e: ditches f: type 1a fences, g: type 2 fences, h: clusters of (rebuilt) outbuildings.

Many outbuildings are encountered at close distances to the houses. At least three outbuildings are present with all houses, usually conforming in orientation to their nearby farmhouse (compare the orientation of the outbuildings at house-site 1 and 4; fig. 6.37, A; D). On hypothetical houses-sites 1 and 3 the numbers are much higher (38 and 17 respectively), but the overlapping of outbuildings and houses at house-site 3 suggests multiple phases of use, whereas on house-site 1 some outbuildings may be Iron Age in date (see Chapter 4, section 4.2 and Appendix I for details). Even prior to overlaying house-sites, some clustering of outbuildings is discernible (fig. 6.6, A; B). At house-site 1, three four-posts outbuildings were rebuilt on the near-same spot and three overlapping four-post outbuildings to the south may also indicate repeated rebuilding. The generally high feature density and uncertain phasing of this house-site, unfortunately makes it hard to assess to what extent these all belonged to the Middle Bronze Age-B farmhouse house-site. At house-site 3, the Middle Bronze Age occupation phase proved easier to separate from later activity (see section 4.2; Appendix I for details). There, also three clusters of rebuilt nine- and four-posts outbuildings can be identified. Those outbuildings overlapping the Bronze Age farmhouse's ground plan and those situated directly in front of the western short side entrance are unlikely to be contemporaneous (fig. 6.6, B).

The overlay of all house-sites (figs. 6.6, C; 6.37, F) shows that outbuildings occur in a more or less elliptical zone between 5 to 20 m from the houses. In the rotated VASO plot (figs. 6.6, D; 6.38, F) the morphology of this distribution is somewhat different. There, the outbuildings represent two NW-SE oriented rows to the long sides of the houses. Moreover, there is less difference in the orientation of the various outbuildings. To the left-hand side of the eastern short side entrance, the clustering of outbuildings is intensified by the overlay. From these observations, it can be proposed that at Zijderveld:

(1) Outbuildings generally conform in orientation to nearby farmhouses and were frequently rebuilt.

(2) Outbuildings were preferably placed near the long side, with a tendency for a preferred location to the north or left-hand side of the eastern short side entrance.

(3) The areas in front of the short side entrances are predominantly left clear, which is logical considering one presumably had to enter or exit the farmhouse with wagons and livestock.

(4) Fences or bundles of fences (comprising different fence-types) run parallel to the house(-site)s but extend beyond them.

(5) Pits are relatively scarce and – if present – contain few artefacts (< 200 g).

6.3.6 Eigenblok

The predominant axis of house orientation at Rumpt-Eigenblok is NW-SE (six house phases on four to five house-sites), with only a single house oriented roughly E-W (fig. 6.7). This predominant axis is also visible in the stretches of fence at house-sites 2 and 5 (fig. 6.40, B; D). Note that on house-site 2, type-1a fences have been used exclusively, while on house-site 4, type-2 fences were used (for fence types see section 5.5). At house-sites 4 and 6a/b (fig. 6.40, C; E-F), only few and short fence lines could be reconstructed, which means that no arguments on their orientation should be made. At house-site 1 several stretches of type-1a fence-lines can be recognized, some of which may combinedly have delimited the house-site. These are the stretches of fence which run roughly parallel to the axes of the house and display chamfered corners at 10-15 m from the house. Two tentative stretches of fence to the northwest of house 5 (fig. 6.40, C; i) possibly also show a curved trajectory, which reflects a spatial relation to the house. Mostly, however, the longer stretches of fence such as those at house-sites 2 and 4 (comprising both type-1a and type-2 fences) extended in a linear trajectory beyond the confines of the hypothetical house-sites. Consequently, the house of house-site 5 is better interpreted as being situated near an intersection of systems of fences, than as being bounded by these (*contra* Hielkema, Prangsma & Jongste 2002, 136; 161).

The pits at the various Eigenblok house-sites are few in number and frequently overlap with the ground plans proper. As there are no arguments to suppose that these overlapping pits were once part of the storage facilities of the houses, it remains questionable which pits were ever contemporaneous to the farmhouses. Several of the larger pits seem to occur more frequently to the (north)west of the houses (fig. 6.40, H and 6.40, L), but this overlay distribution is somewhat distorted by house-site 4, where several larger pits (possibly drinking pools; Hielkema, Prangsma & Jongste 2002, 122) occur in those areas. The Eigenblok pits generally contained no clues (*e.g.* finds, shapes) to hint at their original function. Only the larger pit between the two curved fences or palisades at house-site 5 (fig. 6.40; D; i) has yielded a quantity of finds that suggests a (secondary) function as a refuse dump. The two burnt patches (fig. 6.40, B-C; e) at house-sites 2 and 4 are of equally enigmatic function and furthermore may post-date the Bronze Age occupation (Hielkema, Prangsma & Jongste 2002, 108-109; 123).

Only one single well was found within the hypothetical house-sites, to the north-west of houses 2a-b (fig. 6.40, B; e). It was situated between parallel type-1a fences. If the fences ever defined a farmstead, the location of the well may have changed from in- to outside the farmstead or *vice versa* upon the replacement of the fence. As the well only yielded some bones of toads, the dating of the well to the Middle Bronze Age relies solely on stratigraphical arguments (Hielkema, Prangsma & Jongste 2002, 107-108).

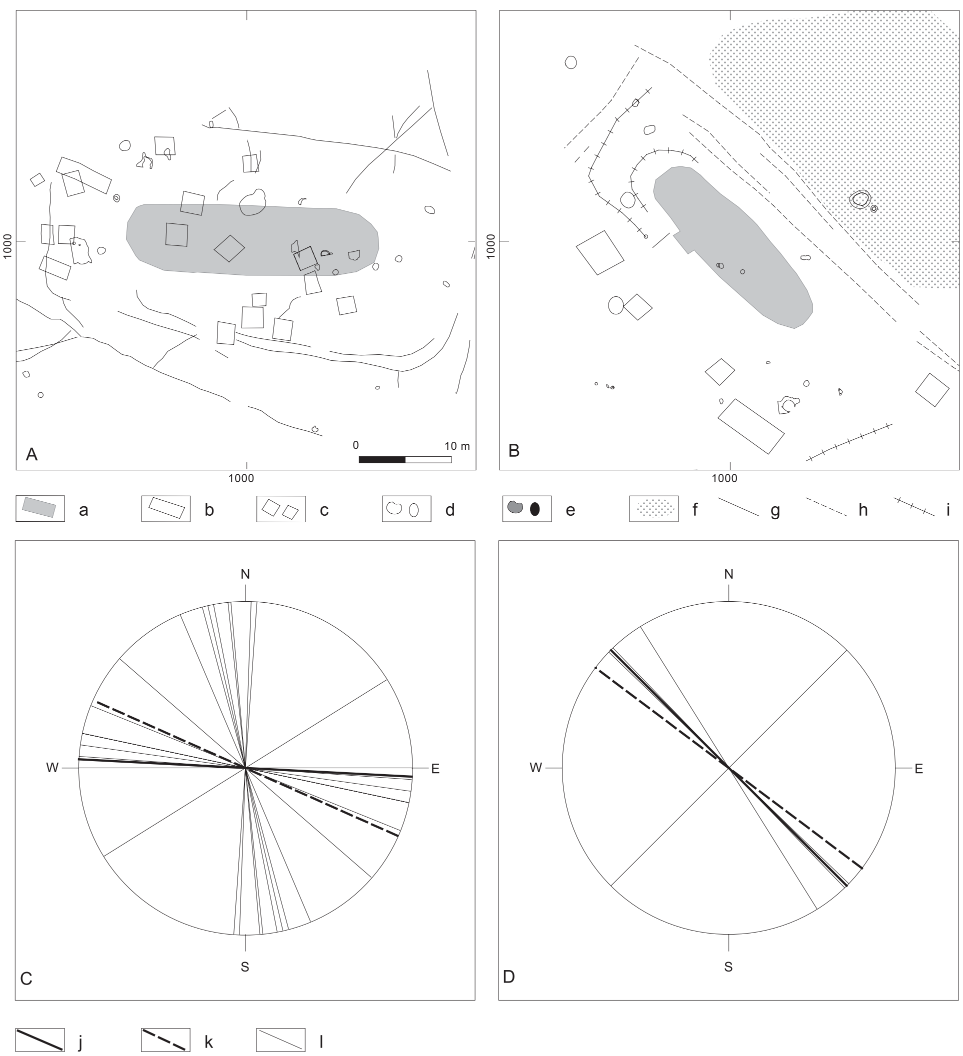

Fig. 6.7 VASO plots towards magnetic north for Eigenblok house-sites 1 (A) and 5 (B) and their wind-rose diagrams (C and D respectively).

a: houses, b: barns/sheds, c: granary-type outbuildings, d: pits, e: wells (dark grey fill) and burned patches (black fill), f: cattle hoof imprints, g: type 1a fences, h: type 2 fences, i: other fence types, j: orientation of houses, k: orientation of barns/sheds, l: orientation of the granary-type outbuildings.

At Eigenblok house-site 5, a ring-ditch possibly belonging to a funerary monument (a barrow) was excavated, but as this belonged to an older use-phase of the site (see section 4.3.5 and Appendix II), it has not been depicted on the VASO plots. It is unclear whether this older funerary monument was still visible at the time of Middle Bronze Age-B habitation on that house-site, as it may have been eroded by younger crevasse formation. For what it is worth, the area of the former monument appears not to have been intensively overbuilt during the Middle Bronze Age-B occupation period. At Eigenblok site 6, another – yet more certain – funerary monument could be identified that may also predate the Middle Bronze Age-B occupation. This barrow is situated directly east of the house-site(s) at Eigenblok site 6.[20]

All Eigenblok house-sites have yielded outbuildings, although – as at Zijderveld – their numbers differ markedly (between 1 and 17). These outbuildings generally correspond in orientation to that of their nearby farmhouse. The single outbuilding at site 4 (fig. 6.40, C) is the noteworthy exception. The large number of outbuildings that overlap with the ground plans of the houses often (four to six out of seven) show a different orientation than that of the farmhouse. As the others conform reasonably well to the orientation of the farmhouse (see the wind-rose diagrams; fig. 6.42), different orientations may hint at the palimpsest nature of a house-site. No evident preferred location for outbuildings can be suggested, although they occur mostly in the western half of the hypothetical house-sites. One final comment on the orientation of the outbuildings needs to be made. From the wind-rose diagrams it is clear that at house-sites 2 to 6, outbuildings and houses conform to a NW-SE (and perpendicular) axis. At house-site 1, however, several outbuildings conform to the W-E axis of house 1 or a direction perpendicular to it. This correspondence within a house-site and difference in correspondence between house-sites (fig. 6.7), supports the initial VASO assumption that the house may have been conceptually central and was steering the orientation of additional house-site structures (see also section 6.3.12).

In addition to the fences, pits and outbuildings present on most Bronze Age sites, the good feature preservation allowed ard-marks, cattle hoof-imprints and even Bronze Age human footprints to be documented (section 4.3.5; Appendix II). Of these traces, only the human- and cattle hoof-imprints at house-site 5 (fig. 6.40, D) may have been contemporaneous to the farmhouse. The distribution of cattle hoof-imprints seems to be defined by the NW-SE fence-lines to the east of house five. They concentrate near a presumable drinking pool situated there. In the extreme south-east corner of the hypothetical house-site around house five some ard-marks were documented, but these ran at right angles and across the fence-line bundle, suggesting that they belong to another phase (Hielkema, Prangsma & Jongste 2002, 141). As similar ard-marks were observed at house-site 6, where they overlapped and cut-across the features of the structures there (*ibid.*, 145), it is more likely that the ard-marks of house-site 5 also post-date the Middle Bronze Age-B occupation period. The same is likely to apply to the cattle-hoof-imprints at house-site 6b, which continue into the ground plan of the house. In any case, the evidence from house-site 5 suggests that cattle could (while grazing or being penned), be found as close-by as 10-15 m from a Bronze Age farmhouse (fig. 6.40, B; D). To sum up the Eigenblok results:

(1) Outbuildings share the orientation of nearby farmhouses.

(2) Fences or bundles of single-type fences conform in orientation to the farmhouses, but are likely to extend beyond the house-sites.

(3) The few pits show no clearly clustered distribution, but predominantly occur in the north and north-west part of the house-sites. They seldom contain many finds.

(4) Outbuildings that overlapped with house ground plans generally had a different orientation, suggesting that orientation and contemporaneity are correlated.

(5) Some fences may have controlled the movement of livestock, but cattle-hoof imprints are found as close-by as 10 to 15 m from a farmhouse.

20 See section 4.3.5 and Appendix II, *cf.* fig. 8.6.

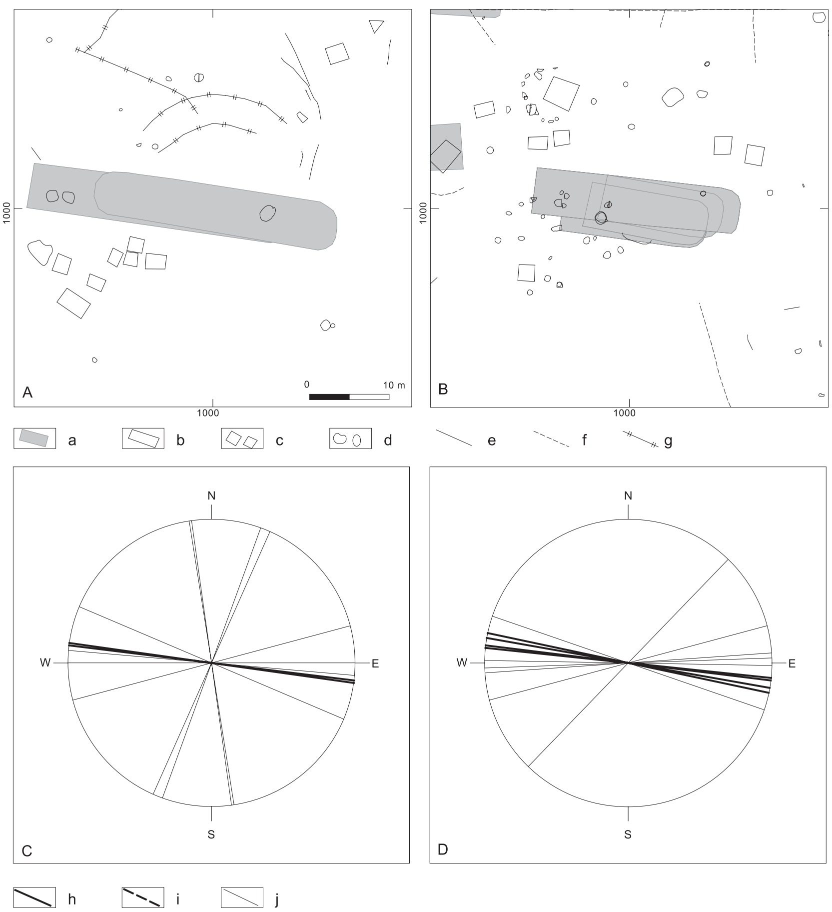

Fig. 6.8 VASO plots towards magnetic north for De Bogen house-sites 29B2/3H (A) and 30B-EH (B) and their wind-rose diagrams (C and D respectively).

a: houses, b: barns/sheds, c: granary-type outbuildings, d: pits, e: type 1a fences, f: type 2 fences, g: palisades or other fence types, h: orientation of houses, i: orientation of barns/sheds, j: orientation of granary-type outbuildings.

6.3.7 De Bogen

At the site Meteren - De Bogen a total of 12 possible Middle Bronze Age-B house-sites could be analyzed with VASO. Of these, one house-site (Bogen 45CH; fig. 6.43, F) yielded only pits and a single fence-line, which reduces applicability. For two other house-sites (Bogen 45DH and Bogen 29AH; fig. 6.43, G; I) I have argued that their central structures are presumably not houses, so these should be treated with extra caution (Chapter 4; Appendix III).

All De Bogen houses are oriented W-E with some (< 20 degrees) variation (see the wind-rose diagram; fig. 6.43, L). That the orientation of the Bronze Age farmhouse was meaningful to a Bronze Age household can be inferred from the observation that where houses were rebuilt, the successors differed only marginally in orientation from the previous buildings (see fig. 6.8).

The number of recognizable stretches of fence at the various De Bogen excavations is relatively low. As postholes of small posts (stakes) were recognized on all sites, it seems unlikely that poor feature preservation can explain the few fence lines recognized. Conversely, the high feature density present in parts of the excavated area may have rendered the recognition of fences difficult. Nonetheless, stretches of fence could be recognized to the east and north-east of De Bogen site 45 and at De Bogen site 30. For all these fences – of which some can be followed for over a hundred meters – two main systems of orientation can be established (see Chapter 4, fig. 4.19). Especially the type-2 fences make up a N-S/E-W system of long, straight fence-lines, whereas another system of WSW-ENE/NNW-SSE fences comprises both type-1a and type-2 fences. Both types sometimes occur together in bundles of fences, such as at De Bogen site 30. It should be stressed that none of the fence-lines or bundles show any clear-cut spatial relation to the houses (see fig. 6.43, N). Rather, the fences seem to be part of a system that is situated at a spatial scale above that of the house-sites. This is best illustrated at De Bogen site 30, where most fences of the various De Bogen sites could be recognized. There, fences of both systems of orientation can be recognized, but none of these shows any spatial relation (*e.g.* correspondence in orientation, shape) to any of the three undisputable Middle Bronze Age house-sites there (see fig. 6.9, A). Even more so, some smaller stretches of fence seem to overlap with the ground plan of one of the houses. This indicates that not all fences are contemporaneous to the houses and that the fences did presumably not define house-sites but were part of a wider system of land-partitioning.

Several palisades (*i.e.* wide-spaced and narrow-spaced post alignments) could be recognized at the De Bogen sites, of which most were situated on De Bogen site 29 (fig. 6.9, B; e). There, a curvilinear palisade which partly enclosed a *c.* 50 by 100 m part of the floodbasin, was rebuilt and replaced (or was accompanied by) a type- 1a fence (Appendix III, fig. III.28). Near houses 29B2/3H (see fig. 6.8, A), two other curved lines of substantial (*c.* 28 cm diameter) posts placed at 2.1 to 2.3 m apart were found (fig. 6.9, B). To the north, posts with similar dimensions and spacing were placed in line with the WSW-ENE system of fences. In the original publication, these posts were interpreted as the remains of a house ground plan (house 29AH; Hielkema, Brokke & Meijlink 2002, 172), but here an interpretation as two palisade lines is preferred, as the rows of posts continue outside the reconstructed house plan and are structurally similar to the curved palisades discussed earlier (see section 4.4.3 and Appendix III). If the corresponding WSW-ENE orientation of these two parallel, more-or-less straight, palisades to the fences and the ditch cross-cutting house 29B2H indicates contemporaneity, they could all be part of a system of landscape structuring that post-dates the Middle Bronze Age-B occupation period (see section 4.4 and appendix III). For the two curved palisades, their dating is unclear. One posthole contained a single rim-sherd decorated with hollow round impressions that could be (but need not be[21]) dated to the Early Bronze Age or Middle Bronze Age-A. If it is no coincidence that the mean spacing of the posts in the two curved (and the two less reliable angular rows of posts directly to the north of them) is similar to the Middle Bronze Age(-B) houses at that site, these palisades may have been part of the house-site of houses 29B2H and 29B3H. Nonetheless, their function remains enigmatic and their exact dating unclear.

Fig. 6.9 Systems of fences, palisades and ditches at De Bogen sites 30 (A) and 29 (B).
a: not excavated, b: houses and structures, c: type-1a fences, d: type-2 fences, e: palisades, f: ditches.

21 *Cf.* Van Beek 2005, 79; Fontijn, Fokkens & Jansen 2002, 66.

There is no indication for a preferred location of pits in relation to the Middle Bronze Age farmhouses at the various De Bogen sites. The VASO plots show a relatively random (*i.e.* even) distribution of pits deeper than 10 cm around the houses (see fig. 6.10 and 6.43, P). Generally, pits contained no or few (weight < 200 grams) artefacts. Exceptions are the two larger pits overlapping with the ground plan of house 28-4CH (see fig. 6.43, A; Hielkema, Brokke & Meijlink 2002, 278), seven larger pits at site 28-1 (see fig. 6.43, B; *ibid.*, 263), the (grave)pits within the ring-ditches at house-sites 45BH and 45HH (see fig. 6.43, C-D; *ibid.*, 204) and two pits to the west of house 45CH (fig. 6.43, F; *loc. cit.*). At sites 29 and 30, a similar pattern could be documented. Pits generally contained few finds (Hielkema, Brokke & Meijlink 2002, 158; 186) and those that did contain a considerable amount (> 500 g) of finds generally either overlapped with the ground plans of houses or contained datable ceramics which indicated that these may have pre-dated the Middle Bronze Age-B occupation phase. The above observations suggest that pits rich (> 200-500 g) in artefacts were rare for the Middle Bronze Age(-B) occupation phase at De Bogen (fig. 6.10; see also section 5.7). Of the 21 possible refuse pits at the De Bogen house-sites, 13 (*c.* 60 %) presumably predated the Middle Bronze Age occupation phase, five (*c.* 24 %) yielded no datable finds and only three (*c.* 15 %) may date to the Middle Bronze Age(-B) occupation period based on their incorporated finds. As only a handful of possible refuse pits were situated beyond the hypothetical house-sites and the overall number of pits recognized at De Bogen exceeds 400, it is safe to state that at De Bogen, refuse-pits are very infrequent phenomena indeed.[22]

Likewise, wells are rarely found on the hypothetical house-sites of De Bogen. One well could be recognized to the west of house 28-4CH (fig. 6.43, A; Hielkema, Brokke & Meijlink 2002, 288), but yielded no datable finds. At 20-25 m to the west of houses 29B2/3H, a cluster of three wells was discovered of which one could be dated to the last century of the Middle Bronze Age-A and two others to the first three centuries of the Middle Bronze Age-B.[23] At site 30, at 20 m to the west of the house-site of house 30AH, another well dated to the first two centuries of the Middle Bronze Age-B was found next to several Late Neolithic precursors (fig. 4.20; Meijlink 2002a, 47; Hielkema, Brokke & Meijlink 2002, 161). Apparently, wells do occur in clusters – of sometimes remarkable time-depth – but beyond the hypothetical house-sites proper. This distribution of wells is more likely to have been steered by the – above-ground visibility and/or orally transmitted knowledge of – the location of usable aquifers as opposed to any spatial relation to the Bronze Age farmhouse.

Although outbuildings can be identified at nearly all hypothetical house-sites at De Bogen, it is not always clear whether they actually ever belonged to the farmsteads of their nearby farmhouses. Especially in the cases where outbuildings overlap (*e.g.* fig. 6.43, E; K) or differ markedly in orientation (*e.g.* fig. 6.43, C-D; I; L, see also above), their contemporaneity may be questioned. Between the extreme examples of house-sites 45CH

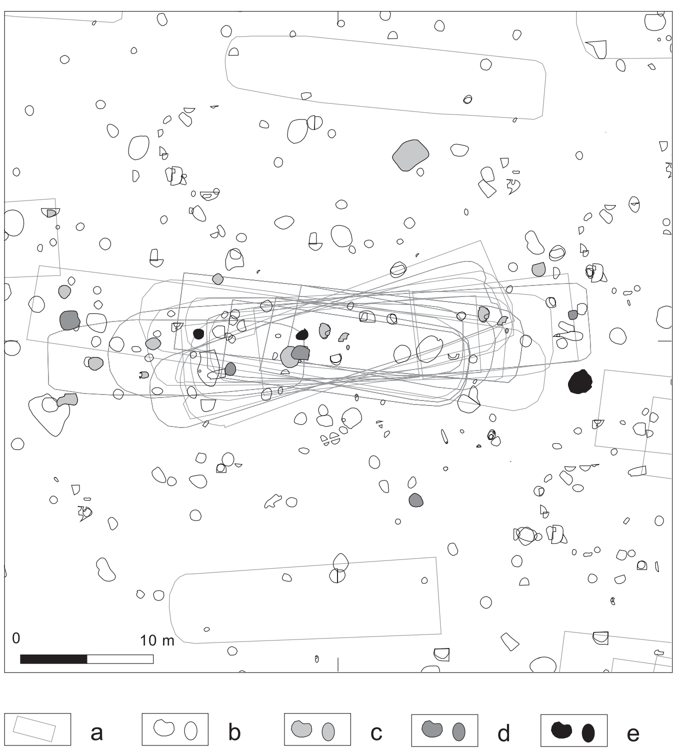

Fig. 6.10 VASO plot towards magnetic north for pits of unknown date, possible pre-MBA refuse pits and possible MBA refuse pits and MBA houses at Meteren-De Bogen.

a: houses, b: pits of unknown date, c: possible refuse pits of unknown date, d: possible pre-MBA refuse pits, e: possible MBA refuse pits.

22 The total for all periods is 411 (Hielkema, Brokke & Meijlink 2002, 157; 185; 203; 225; 262; 265; 269; 273; 276; 287).
23 See Chapter 4; fig. 4.16, F; fig. 4.17, d; Meijlink 2002a, 47; Hielkema, Brokke & Meijlink 2002, 187.

– within which no outbuilding are found,[24] and house-site 28-1AH[25] – to the north of which a cluster of 11 outbuildings was situated – generally the De Bogen house-sites comprise between two and eight outbuildings. It should, again, be stressed that the contemporaneity of any of these outbuildings is debatable. Nonetheless, there is some evidence – besides a correspondence in orientation – to suggest that these indeed were part of Middle Bronze Age(-B) house-sites. The highest numbers (eight) of outbuildings were documented on sites where the farmhouse was rebuilt, suggesting that this rebuilding of the houses also led to a larger number of outbuildings from an archaeological perspective.[26] Outbuildings were not replaced on the exact same spot, although the cluster of outbuildings north of house 28-1AH may shelter a rebuilt square four-post outbuilding and a rectangular outbuilding that was rebuilt twice (Hielkema, Brokke & Meijlink 2002, 260-262, Appendix III fig. III.22).[27]

No distinct spatial patterns are visible in the VASO plot for houses and outbuildings towards magnetic north nor in the rotated plot (fig. 6.43 and 6.44, O). In both plots, the outbuildings cluster around the farmhouses and roughly (yet far from predominantly) conform in orientation. This less rigid conformity of orientation between outbuildings and farmhouses may be a consequence of the palimpsest nature of this site (*i.e.* outbuildings from other occupation phases have wrongfully been analysed in relation to the Middle Bronze Age(-B) houses; see also Appendix III) or it may simply be that concepts or rules of orientation were less rigidly adhered too at this site.

At De Bogen site 45, a funerary location was discovered that may have been used from the Late Neolithic to the final centuries of the Middle Bronze Age-B, although its phasing has been much debated.[28] It is plausible that the formal monumental phase (*i.e.* a ring-ditch, and possibly a mound body) dates to the Middle Bronze Age-A, so prior to any Middle Bronze Age-B occupation. During the Middle Bronze Age, additional interment and occupation took place on the same spot, but the phasing is unclear.[29] In any case, it demonstrates that the presence of a(n older) funerary plot apparently did not conflict with a (later) use of the same plot for occupation, or *vice versa*. It is perhaps no coincidence that the spacing used in the construction of the 'mortuary house' 45HH is identical to that of ordinary Middle Bronze Age-B farmhouses at De Bogen. The difference between a house for the dead and one for the living could hardly have been smaller.

To conclude, for the sites known as the Bogen, the following statements on the structure of the Middle Bronze Age house-sites can be made:

(1) Houses differ only slightly (< 20 degrees) in orientation from each other, and if houses are rebuild, the difference in orientation is minimal to none, suggesting that house orientation was a meaningful property when a house was rebuilt.

(2) Fences do not surround Bronze Age house-sites, but parcelled the landscape in more or less straight fence lines. At least two different systems of orientation can be outlined for the fence systems. There is some evidence to suggest that fences of different types were part of different orientation systems, but fences of different types also occur together in bundles.

(3) The spacing between posts of some of the palisades is similar to that of the roof-bearing posts of Middle Bronze Age(-B) houses. Possibly, parts of construction schemes for houses and palisades were related.

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24 This house is situated on (*i.e.* is cross-cut by) the excavation limits (see section 4.4, Appendix III or Hielkema, Brokke & Meijlink 2002, 195), which means that once present outbuildings could have been situated to the north of this house.

25 At site 28-1AH it is likely that more house(phase)s were present during the Middle Bronze Age, but they cannot be reconstructed with sufficient certainty (Appendix III, but see Hielkema, Brokke & Meijlink 2002, 249-259). Consequently, the high numbers of outbuildings may be a reflection of multiple house-phases.

26 House(site)s 29B2/3H and 30BH-30EH; fig. 6.43, H; J. Consecutive houses could have had comparable numbers of contemporaneously functioning outbuildings.

27 Possibly, the three almost square four-post outbuildings to the south of houses 29B2/3H (fig. 6.8, A) are also rebuilt instead of contemporaneous, but definitive evidence is lacking (*cf.* fig. 4.16, F; fig. 4.17; Hielkema, Brokke & Meijlink 2002, 171).

28 See Chapter 4, figs. 4.14; 4.21; Appendix III; Hielkema, Brokke & Meijlink 2002, 206-236, Meijlink 2008; Bourgeois & Fontijn 2008.

29 See fig. 4.14; 4.21; Appendix III, esp. figs. III.25; III.34.

(4) A considerable number of pits was found on the hypothetical house-sites, but save for a few exceptions, they contained few finds. Pits that contained over 500 grams of artefacts, mostly contained Late Neolithic to Middle Bronze Age-A ceramics, suggesting that they pre-dated the Middle Bronze Age(-B) occupation period.

(5) The (long-term) clustering of wells suggests that their distribution is based on the presence of useable aquifers and is not related to the location of Middle Bronze Age house(-site)s proper.

(6) Outbuildings mostly – yet not always – conformed in orientation to a nearby farmhouse. The fact that the highest numbers of outbuildings were documented on house-sites with rebuilt houses, indicates that houses and outbuildings may have been considered joint entities (*i.e.* house-site elements).

(7) It was unproblematic for the 'De Bogen' Middle Bronze Age local communities to change the function of a particular plot from a domestic to a funerary location (or *vice versa*). A possible funerary building was constructed which in spacing and span of the posts is similar to the construction scheme used for houses.

6.3.8 Wijk bij Duurstede - De Horden

The houses of the ten presumably Middle Bronze Age-B house-sites of Wijk bij Duurstede - De Horden display a very uniform W-E to somewhat WNW-ESE orientation (figs. 6.46 and 6.48). Possibly, all these houses were once integrated into a system of orientation that was defined or reflected by systems of fences, but no fences have been preserved at De Horden.[30] Although at De Horden Middle Bronze Age houses as much as over 450 m apart share a corresponding orientation (see section 4.5; Appendix IV; Hessing 1991), there were presumably limits to the extent of this system of orientation. The houses of Wijk bij Duurstede - De Geer, situated *c.* 500 m to the north of De Horden, presumably conformed to another (WSW-ENE and perpendicular) system of orientation (see Appendix IV). As there are no direct dates available for the Middle Bronze Age occupation of De Geer and this site has not been published yet in full, it is impossible to decide whether a difference in time or a different social group is reflected by this difference in orientation.

Pits are scarce on the Middle Bronze Age house-sites of De Horden and generally contained few finds (Hessing 1991, 44; Appendix IV).[31] All pits shown on the VASO plots (fig. 6.46 and 6.47, d) are dated to the Middle Bronze Age on stratigraphic grounds. Only for the pit north of house 2 (fig. 6.46, B), charcoal was dated to the Middle Bronze Age-B (Hessing 1991, 42-43; Appendix IV). The ostensible concentration of pits to the north of the houses on the VASO plot (fig. 6.46, I) is predominantly an overrepresentation due to the large number of pits to the north of the long side of house 3 (fig. 6.46, C; see section 4.5.3). To the west of house 1, two larger features – presumably pits – can be dated by stratigraphy to the Bronze Age occupation phase. As the site has not been published in full (see Appendix IV), it is not clear what the exact number, location and content of the Bronze Age pits on this site is.

On all but four house-sites, outbuildings could be recognized. Of these four, one house-site was very fragmentarily preserved (house-site 11) and another largely situated beyond the excavation limits (house-site 12; see section 4.5.3). Only for house(-site)s 6 and 8 were no outbuildings recognized despite the fact that the excavation extents and the feature preservation seemed adequate (Appendix IV). The numbers of outbuildings on the other house-sites varies from one to six. It is noteworthy that house-site 2, which yielded two house-phases, also has the highest number of outbuildings. This suggests that houses and outbuildings were (meaningfully) associated entities (section 4.5.3, esp. fig. 4.26, L). The spatial distribution of the outbuildings in relation to the houses shows two distinct patterns. Firstly, four outbuildings could be reconstructed that overlapped with the ground plans of houses. Considering the low feature densities, this may very well reflect a deliberate decision to interrelate (entwine) notions

30 The fence lines overlapping house 3 as published by Hessing (1991, 45 fig. 4) proved on the original field documentation to be situated on an excavation level above the house and none were encountered at the level of the Bronze Age house. The posts of the palisade to the south of it were visible at one level below that of the house.

31 According to the excavator, wells were altogether absent, but this is compensated for by the presence of open water nearby (Hessing 1991, 44; see also Appendix IV).

of distinct functions through spatial linkage (section 4.5.4). Secondly, all but the two outbuildings east of house 1 (fig. 6.46, A) are situated on the western half of the hypothetical house-sites. This may indicate a general preferred location in relation to the house, but no smaller spatial clusters can be indicated (fig. 6.46 and fig. 6.47, I).

On two Middle Bronze Age house-sites presumable pre-Middle Bronze Age structures were recognized. At house-site 3, a palisade of narrowly spaced larger posts was found to the south of the house. As this palisade became visible at a level below that of the house (indicating the deposition of sediments after palisade construction; *cf.* Hessing & Steenbeek 1990; Appendix IV), its presence on the later Middle Bronze Age house-site is presumably coincidental. House nine was built next to a large ring-ditch that girded the highest parts of the micro-topographic landscape. If this ring-ditch was a (pre-)Bronze Age funerary monument,[32] it can be concluded that it was in any case unproblematic to situate the one (the house) in close proximity to the other (the funerary monument) or *vice versa*.[33] The key elements of house-site structuring at Wijk bij Duurstede can be summarized as follows:

(1) Houses share an (reasonably, *i.e.* < 13 degrees) exact orientation, which is also reflected in the orientation of the outbuildings at all but one house-site.

(2) Pits are an infrequent phenomenon, but can occur clustered on a house-site. The low numbers of finds recovered from these argue against an interpretation as refuse pits.

(3) Generally a few (mean two) outbuildings accompanied houses on house-sites. They are in at all but one case, placed in the western part of the hypothetical house-site. The highest numbers of outbuildings were documented on a house-site that had seen two house-phases, indicating that houses and outbuildings may have been considered joint entities.

(4) Outbuildings could be recognized within the ground plans of four houses. There are slight indications that this may reflect a pattern of erecting granaries on former house(-site) locations.

(5) The close proximity of a funerary location and a house was seen as unproblematic, regardless of order.

6.3.9 Lienden - Kesteren

Several aspects complicate the execution of Bronze Age house-site analysis for the settlement site excavated near Lienden. To start, a critical assessment of the published data (see section 4.6 and Appendix V), has led to the conclusions that the validity of several of the originally published structures (De Voogd & Schoneveld 2002) should be seriously questioned. Instead of five tentative houses, in this study only the two most reliable ones will be dealt with.[34] Secondly, one of these two houses was situated at the excavation limits and could not be uncovered in full, whereas the second of the two most reliable houses was uncovered in a relatively small (*c.* 1000 m^2) continuous excavation surface, which in both cases may have obscured prehistoric house-sites. Thirdly, some re-interpretations have been suggested for some of the other structures at this site,[35] but these are of lower quality than the structures suggested by the original excavators, as they have not been observed and checked during fieldwork. Nonetheless, some observations on the structure of the Lienden Bronze Age house-sites can be made.

Two reasonably comparable Middle Bronze Age(-B?) houses could be reconstructed which were both roughly orientated (W)NW-(E)SE. In the vicinity of these houses, some outbuildings were found that conformed to them in orientation, or were oriented at right angles to them (fig. 6.50). If only the structures recognized by the excavators are incorporated (fig. 6.49, C), it can be noted that the distances between the outbuildings and the houses are somewhat larger than with the other Bronze Age sites. If, however, the postholes originally published as a four-aisled outbuilding directly north-east of house D (De Voogd & Schoneveld 2002, 61) are re-interpreted as several

32 For a discussion see Appendix IV and Hessing 1989; see also fig. 4.28.
33 *Cf.* sections 6.3.7 and 6.3.8. For barrow – house interrelations see Bourgeois & Arnoldussen 2006; Bourgeois & Fontijn 2008.
34 See section 4.6; Appendix V, esp. fig. V.16 and V.18.
35 Appendix V, esp. fig. V.16 and V.18.

four-post outbuildings (Appendix V, fig. V.16), a pattern not unlike that at other Middle Bronze Age sites comes to the fore.[36]

The feature preservation at Lienden was moderate, therefore more shallow traces such as fence-lines, hoof-imprints or ard-marks had not been preserved. Of the sixty pits recognized, over 24 contained large amounts of artefacts.[37] This is a markedly different situation compared to (the contents of the pits at) the other sites discussed above. The presence of pits containing over 2 kg of artefacts, may indicate a (secondary) function as refuse pits. Unfortunately, the strategy used for the analysis of the ceramics (Ufkes 2002a, 81-82) renders it impossible to make an adequate interpretation of these pits. For the 22 suspected refuse pits at Lienden site 15, which contained 1989 sherds (weighing over 8 kg), only seven (!) sherds (weighing 107.9 g) have been studied in detail. The pit-contents have thus not been studied as interesting assemblages in themselves, which means that even basic information such as the minimum number of vessels present within them is lacking. Although the four pits to the west of house P (fig. 6.49, B) all contained many finds (> 500 g), these pits appear to be part of a wider – and moderately even – spread along the higher parts of the crevasse micro-topography and show no evident spatial relation (*e.g.* clustering) near recognized structures.[38]

No additional possible house-site elements (*e.g.* fences, wells, palisades) have been recognized at Lienden, which means that only the interrelations between houses, outbuildings and pits could be analyzed. The conclusions can be summarized as follows:

(1) The two houses that could reliably be reconstructed at Lienden are orientated reasonably (< 20 degrees) similarly in a NWN-ESE direction.

(2) Some outbuildings with a comparable (or perpendicular) orientation can be found between 7 to 20 m from the house, but – if tentative outbuildings are included – also at closer distance.

(3) Some pits, containing few as well as many (> 500 g) artefacts, can be found on hypothetical house-sites. The distribution of the pits richest in weight of artefacts recovered, suggests that they show no evident spatial relationship to Middle Bronze Age house(site)s, but are part of a moderately even distribution at a larger spatial scale (possibly related to the higher zones of the micro-topographic landscape).

6.3.10 Dodewaard

Analyses of the house-site structuring of the Middle Bronze Age house-sites at Dodewaard are complicated by the high overall feature density (obscuring structures and their constructional histories) as well as the close proximity of the house(phase)s reconstructed, making it impossible to assume – based on proximity – which outbuildings are more likely to belong to what house-site.

At Dodewaard, the orientation of houses and outbuildings is likely to have been a significant property upon construction. The three (possibly four; see Appendix VI) house phases are all accurately (< 15 degrees) oriented midway between NNW-SSE and NW-SE. All but one of the outbuildings on the house-sites of these house(phase)s conform to this preferred orientation (fig. 6.51 and fig. 6.53). The larger outbuilding between house(phase)s 1a/b and 2 is – presumably not coincidentally – placed at a nearly perfect right angle to the main axis of orientation.

A large number of fences-lines could be reconstructed from the Dodewaard excavation plan (fig 6.11, A; Theunissen & Hulst 1999a, 140 fig. 4.11) and the large numbers of yet unassigned stakes indicate that several more were present in prehistory. Only a few fence-lines correspond in orientation to the houses and outbuildings. Furthermore, several fence-lines overlap with house-phases 1a/b. The diversity in orientation and overlap with the location of the houses suggests that not all fences were contemporary to the houses. In the west part of the Dodewaard

36 In this reconstruction, two of these tentative outbuildings overlap and one may be classified as a rebuilt granary. As this concerns post-excavation reconstructions, they are not discussed in the body text.
37 A total of 12 pits contained over 500 g, another 12 contained over 1 kg of artefacts (De Voogd & Schoneveld 2002, 76-80; see Appendix V, fig. V.20).
38 Compare Appendix V, figs. V.22, C to fig. V.20.

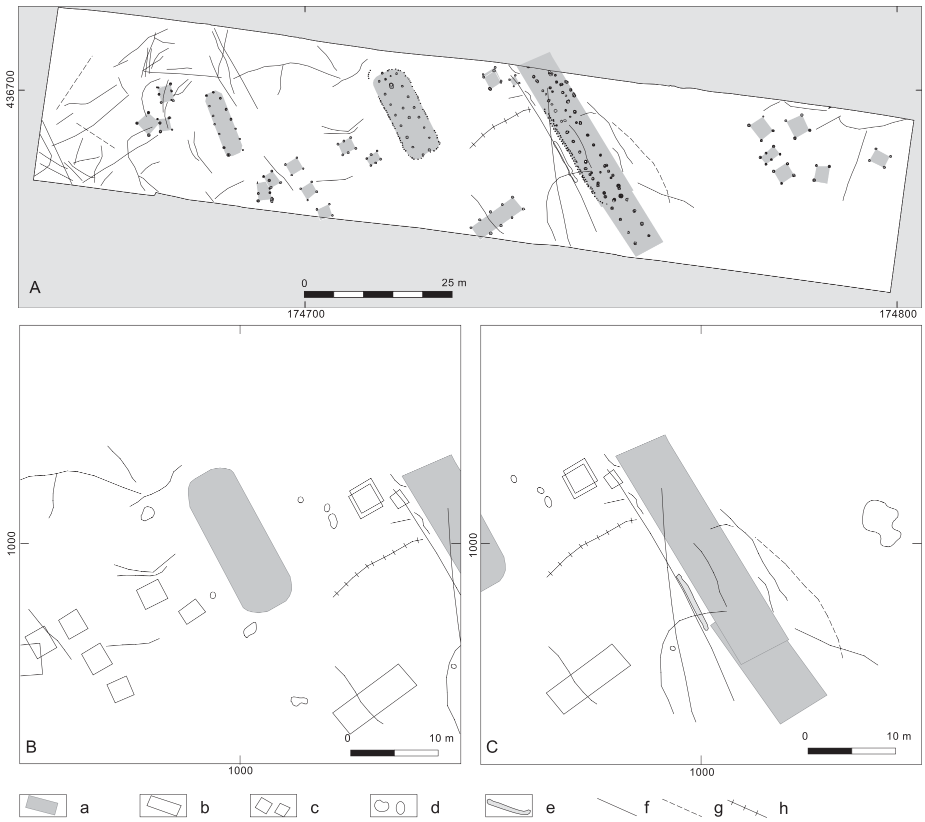


Fig. 6.11 Overview of fences and structures at Dodewaard (A) and VASO plots towards magnetic north for house-phases 1a/b (B) and 2 (C).

a: houses, b: barn/shed types of outbuildings, c: granary-type outbuildings, d: pits, e: fences, g: type-1a fences, f: type-2 fences, g: fences of other types.

excavation, some fence-lines (enclosing a rectangular area?) that share an almost N-S/E-W system of orientation can be identified (fig. 6.11, A). This orientation is also found with one outbuilding in the east of the excavated area. Both possibly belonged to another phase of landscape structuring, either preceding or following the main Middle Bronze Age(-B) occupation phase.[39] Hardly any of the smaller and curvilinear shaped fences can be grouped with either system of orientation.

Several outbuildings can be found in the direct (< 5-10 m) vicinity of the Middle Bronze Age farmhouses, as well as at larger distances. Possibly, outbuildings were preferably erected to the west of the farmhouses, as no outbuildings are situated to the immediate (< 22 m) east of house-phases 1a/b and several are found to the west of house 2. For three house-phases, a total of 22 outbuildings are known, suggesting that multiple outbuildings were once part of single prehistoric house-sites. One six- and one four-post outbuilding have been rebuilt on the exact same spot with the same dimensions and orientation, indicating that location, size and orientation were important properties of outbuildings. There are slight indications that the variation of orientation of outbuildings increases with the distance from the presently recognized houses, but the limited extent of the present excavation weakens the reliability of this observation (*i.e.* outbuildings with a deviant orientation may have corresponded in orientation to houses situated (just) beyond the excavation limits).

A limited number of pits are situated within the hypothetical house-sites (fig. 6.11, B-C; Theunissen & Hulst 1999a, 148). As they generally contained few finds, it can only be assumed that some of them are Middle Bronze Age in date (*opus cit.*, *cf.* Bulten 1997, 13; 1998c, 22). For two pits, the ceramics and lithics recovered from them – and in one case a radiocarbon date – suggest that they pre-date the Middle Bronze Age-B occupation period (Theunissen

39 But see Appendix V on presumed Late Bronze Age activities at Dodewaard.

& Hulst 1999a, 139). No features that could be interpreted as wells or drinking pools have been published and such features were presumably absent. Consequently, statements on the house-site structuring of the Middle Bronze Age(-B) houses at Dodewaard predominantly concern house-outbuilding interrelations:

(1) The three clearly identifiable house-phases at Dodewaard correspond well (< 15 degrees) in orientation.

(2) This system of orientation is also reflected in the orientation of the outbuildings, that are orientated parallel and occasionally perpendicular to the long axes of the houses. Possibly, the outbuildings were preferentially placed west of the houses.

(3) Some outbuildings are rebuilt on the exact same spot with the same dimensions and orientation, suggesting that location, size and orientation were important properties of outbuildings and that these properties were maintained when the outbuildings were rebuilt.

(4) Some of the (predominantly type-1) fences concur with the system of orientation set by the houses and outbuildings, but they by no means seem to define individual house-sites. Several stretches of curvilinear fence have deviating orientations and some overlap with the ground plans of Middle Bronze Age structures. Presumably, several occupation phases are reflected in the fence systems.

(5) Few pits (and no wells) are present, generally with few finds.

6.3.11 Tiel - Medel 8

The data from the excavations at Tiel - Medel 8 are incorporated in this chapter because at this site several house-phases datable to the Middle Bronze Age-B, as well as some house-sites dateable to the Late Bronze Age have been uncovered (Van Hoof & Jongste 2007). Consequently, the data set for the Middle Bronze Age(-B) under discussion increases in size with six to seven additional house-sites, but also a comparison between the house-site structuring of the Middle Bronze Age(-B) and Late Bronze Age periods becomes possible.

For the Middle Bronze Age(-B), six or seven house-sites have been recognized (Van Hoof & Jongste 2007). The inexactness of the count is a consequence of the close proximity of some of the houses to each other, making it difficult to decide whether they represent rebuilt or overbuilt houses on a single house-site or, alternatively, separate house-sites at close proximity. One house-site may have seen three house-phases (fig. 6.54, A; B; H), whereas another had at least two house phases (fig. 6.54, F; G). The eight Middle Bronze Age(-B) house(phase)s of Tiel - Medel 8 have two main preferred axes: either slightly southwest of an east-west axis, or alternatively slightly northwest of a north-south axis. Accordingly, the VASO plot toward magnetic north shows that these house axes are nearly perfectly (< 10 degrees) perpendicular to each other (see fig. 6.54, I and fig. 6.55). Only house 3 deviates somewhat from these axes, as it is orientated NNW-SSE (fig. 6.12, C; fig. 6.54, D).

Although some stretches of fence have been recognized for the Middle Bronze Age(-B) occupation phase at Medel 8, they can not be associated with particular house-sites (Van Hoof & Jongste 2007, 55-56). To the south of house(phase)s 5, 6 and 7, a palisade of wide-spaced (*c.* 1.4-1.8 m apart) posts (*c.* 10-20 cm diameter) could be followed for over 55 m. The orientation of this palisade fits well within the schemes laid out by the houses, as it is also slightly southwest of an east-west axis. Beyond the confines of the hypothetical house-sites, at *c.* 25-55 m to the south of house(phase) 6, three fences lines with a comparable orientation but consisting of type-1b and/or type-2 stake arrangements were discovered (*loc. cit.*). These too could be followed for moderately large (> 60 m) distances and evidently did not define individual house-sites. According to the excavator, these four fence-lines may have delimited the settlement site as a whole, rather than individual house-sites (Van Hoof & Jongste 2007, 55).

Outbuildings are found at all house-sites, and slight differences in orientation between outbuildings for the different house(phase)s indicate that the orientation of the outbuildings was presumably based on that of the houses. Note that the outbuilding to the west of the – slightly differently orientated – house 3 also shows a deviant orientation, yet matching that of house 3 (fig. 6.12, B; C). A similar interpretation may be forwarded for the outbuilding situated where houses 8 and 1a overlap. The orientation of this outbuilding matches that of house 8 better than it does that of

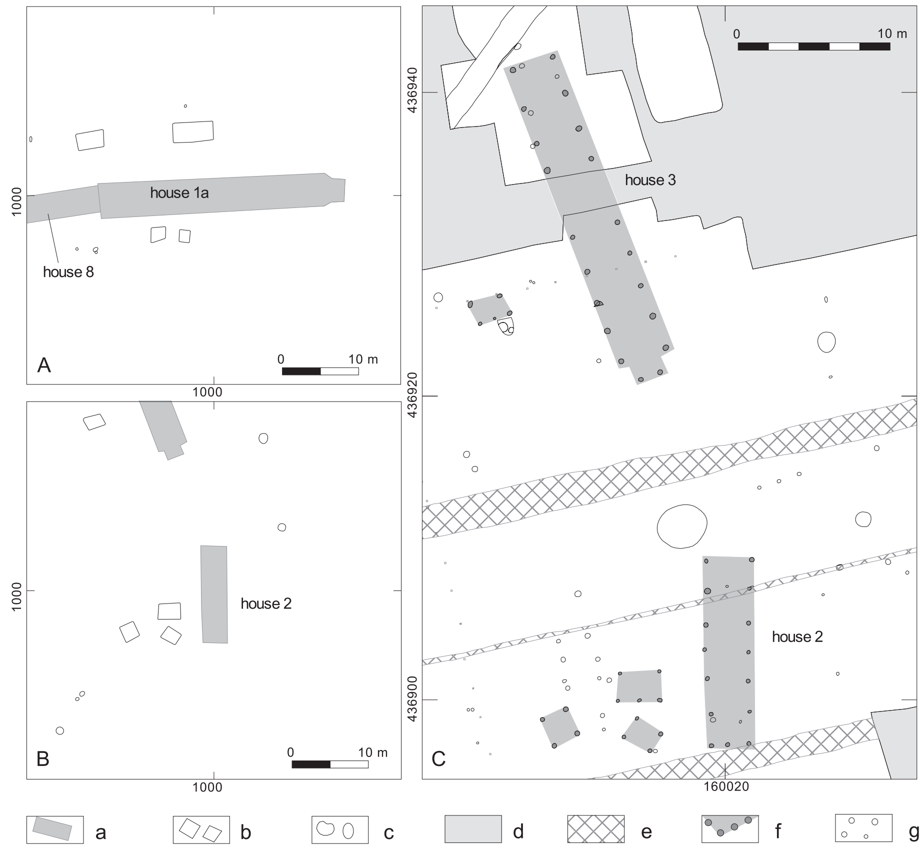


Fig. 6.12 VASO plots towards magnetic north for house(phase)s 1b (A) and 2 (B) and cut-out from the excavation plan near houses 2 and 3 (C).

a: houses, b: outbuildings, c: pits, d: not excavated, e: recently disturbed, f: houses and structures, g: other features.

house 1a (fig. 6.12, A). Another important observation is the fact that a rare (*cf.* fig. 5.39) five-post rectangular type of outbuilding was situated west of the long-sides of both house 2 and house 3 (fig. 6.12, C). Possibly, this should be interpreted as a repetition (*i.e.* 'cloning') of a preferred outbuilding location (*i.e.* house-site structuring) upon relocation of the house(site).

The number of outbuildings on the hypothetical house-sites varies, but ranges from one to five and may be two to possibly three mean per house. The highest number of outbuildings is situated between houses 6 and 7 and house 5, and presumably reflects a minimum number of outbuildings for these three house-phases (n = 5; fig. 6.54, E-G). Many more postholes were found near the reconstructed outbuildings, but they could no longer be grouped into individual structures. There are weak indications that outbuildings may have preferably been situated west of the farmhouses, as this is the location of the outbuildings at house-sites 1-3 and 5 (fig. 6.54, A-E). This is however weakened by the fact that at house-site 8 an outbuilding was presumably situated east of the farmhouse (fig. 6.12, A) and that no outbuildings were recognized west of (overlapping) houses 6 and 7 (fig. 6.54, F-G).

The VASO plot for all Middle Bronze Age house-sites towards magnetic north (fig. 6.13, A), shows that outbuildings have a wide and multi-axial distribution. The VASO plot with all Middle Bronze Age houses orientated NW-SE shows a different pattern; now the distribution of the outbuildings is best described as two elongated zones next to the long sides of the houses (fig. 6.13, B). This radical change in the distribution of the outbuildings in relation to the houses, is proof of the correctness of the assumption that the placement of these outbuildings was indeed based on properties such as the orientation of their nearby farmhouses. Consequently, the distribution of the Tiel outbuildings is best described as 'being situated near the long sides of the farmhouses, with corresponding or perpendicular orientation' as opposed to a description based or their location in a system of cardinal directions.

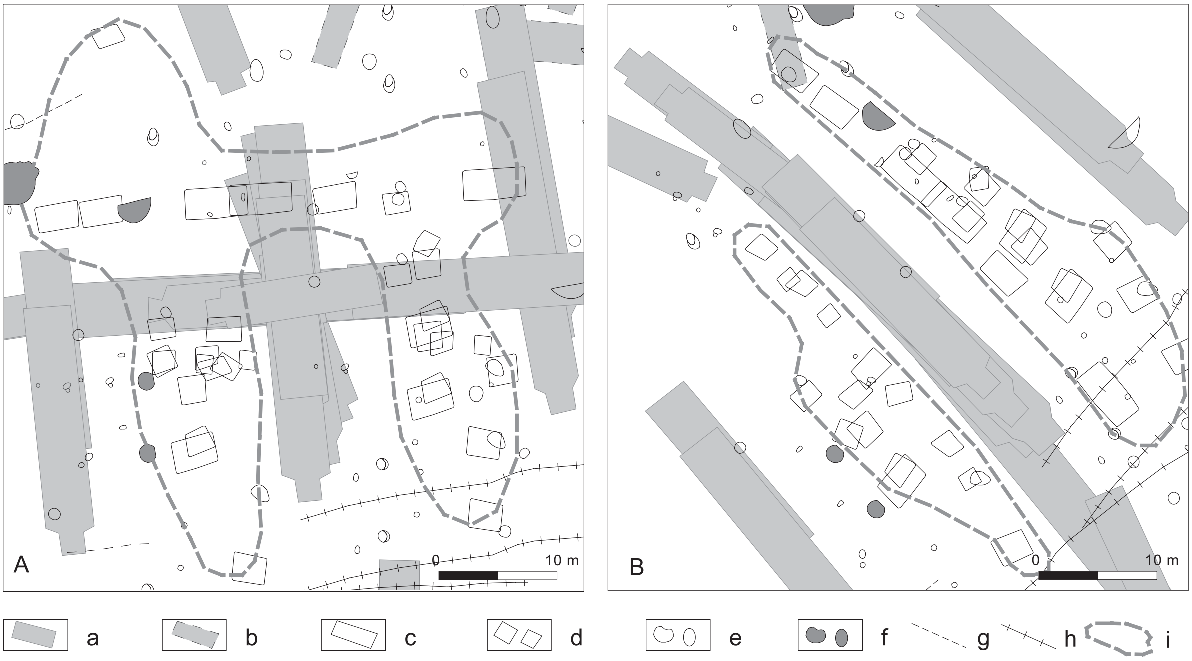


Fig. 6.13 VASO plots for all house-site elements of the Tiel-Medel 8 MBA(-B) house-sites towards magnetic north (A) and rotated to NW-SE (B).

a: houses, b: undated or LBA houses, c: barn-shed types of outbuildings, d: granary-types of outbuildings, e: pits, f: wells, g: type-2 fences, h: other types of fences, i: interpretation of the distribution of the outbuildings.

A few pits are present on most of the hypothetical house-sites, but due to younger Late Bronze Age occupation at this site, it is not always clear whether these pits belonged to the Middle Bronze Age occupation phase. Regardless of their dating, only a small portion (*c.* 14 %; 14 out of 102 pits; Van Hoof & Jongste 2007 and original documentation) contained many (> 500 g) artefacts. Of these, only three are situated on a hypothetical Middle Bronze Age house-site (the two largest pits and the pit overlapping houses 6/7 on house-site 5; fig. 6.54, E). These pits contained some sherds datable to the Middle Bronze Age-B, but most of their contents (maximum 700 g) in weight concerned animal bones. The generally low content of the pits in weight would argue against a (secondary) function as refuse pits. Nonetheless, a cluster of pits predominantly datable to the Middle Bronze Age that were all relatively rich (540-2783 g) in artefacts is known from Tiel - Medel 8. It concerns a pit cluster situated to the north-west of house-site 3 (Van Hoof & Jongste 2007, 67-78 fig. 5.15). Possibly, the pit visible in the north-west of house-site 3 formed the south-easternmost pit of this cluster (fig. 6.54, D).

Two wells were recorded on the hypothetical house-site of house 8 (fig. 6.54, H) and a possible well or drinking pool at house-site(s) 6/7. The westernmost well at house-site 8 was radiocarbon dated to the Middle Bronze Age-B, the other yielded no datable finds (De Leeuwe & Van Hoof 2007). The pit at house-site 6/7 contained some sherds datable to the Middle Bronze Age-B (*ibid.*). Their locations in relation to the houses might suggest that the wells were preferably located to the west of the farmhouses, but this pattern is distorted by the small size of the hypothetical house-sites. In reality, the wells at house-site 8 are part of a cluster of wells of which may have been re-used during the Late Bronze Age, and another is likely to have been dug during this period (*loc. cit.*). This mimics the situation at De Bogen (see section 6.3.8), where wells dating from multiple periods were situated in a small cluster. This could indicate that it was the presence of (above-ground visibile indicators of?) usable aquifers that may have steered the locations where wells were dug. In addition, two other possible Middle Bronze Age wells are situated 8 m apart at *c.* 70 m to the WSW of house 8. As they are situated near the excavation limits, no comments can be made on whether they were ever situated near a Middle Bronze Age farmhouse (Van Hoof & Jongste 2007). In short, wells could be situated as close by as 10-20 m from a Middle Bronze Age farmhouse, but may alternatively also be situated at quite large distances away.

At this point, it is fruitful to briefly consider the data for the Late Bronze Age occupation at Tiel - Medel 8. A total of seven structures have been interpreted as possible Late Bronze Age houses (Van Hoof & Jongste 2007, 38-43). Of these seven, houses 4, 9, 10 and 12 had been recognized during the fieldwork and are most likely to be Late Bronze Age structures (fig. 6.57, A-C; E; Van Hoof & Jongste 2007). For house 10, a radiocarbon date confirmed the Late Bronze Age date attributed on the basis of the ceramics from the pits in its southern aisle (fig. 5.30, no 2; fig. 6.57, C; Arnoldussen & Ball 2007). The orientation of the possible Late Bronze Age larger structures conforms to two axes, which are not perpendicular to each other. Possible houses 4, 9 and 10 are roughly (< 20 degrees) orientated E-W, whereas possible houses 11 to 13 are orientated SSW-NNE (fig. 6.56, I). This presence of multiple (non-perpendicular) axes of orientation is not documented for the Middle Bronze Age sites from the Dutch river area.

Additionally, only few of the outbuildings that surround the possible Late Bronze Age houses conform in orientation to the nearby structures (fig. 6.57, I and fig. 6.58, I). Furthermore, the number of outbuildings accompanying the farmhouses seems higher, even if compensated for the close proximity of possible houses 10 to 14 to each other (over four outbuildings mean per house). The VASO plot for the Late Bronze Age houses consequently shows a wide and dense scatter of outbuildings (fig. 6.57, H-I), that does not improve in clarity upon rotation towards NW-SE (fig. 6.58 H-I). So unlike with the Middle Bronze Age(-B) house-sites, the orientation of the farmhouse seems not to have (as strongly) determined the place and orientation of outbuildings in the Late Bronze Age. This again suggests that the conformity in orientation between outbuildings and farmhouses was a deliberate and meaningful aspect of house-site structuring during the Middle Bronze Age-B period. To sum up the conclusions for Tiel - Medel 8:

(1) All but one of the Middle Bronze Age(-B) houses of Tiel - Medel 8 conformed to a single (bi-axial, perpendicular) system of farmhouse orientation.

(2) The Middle Bronze Age houses were generally accompanied by few (*c.* 2) outbuildings, which as a rule, have a similar orientation as the nearby farmhouse. A different orientation of the farmhouse influenced that of the outbuildings next to it.

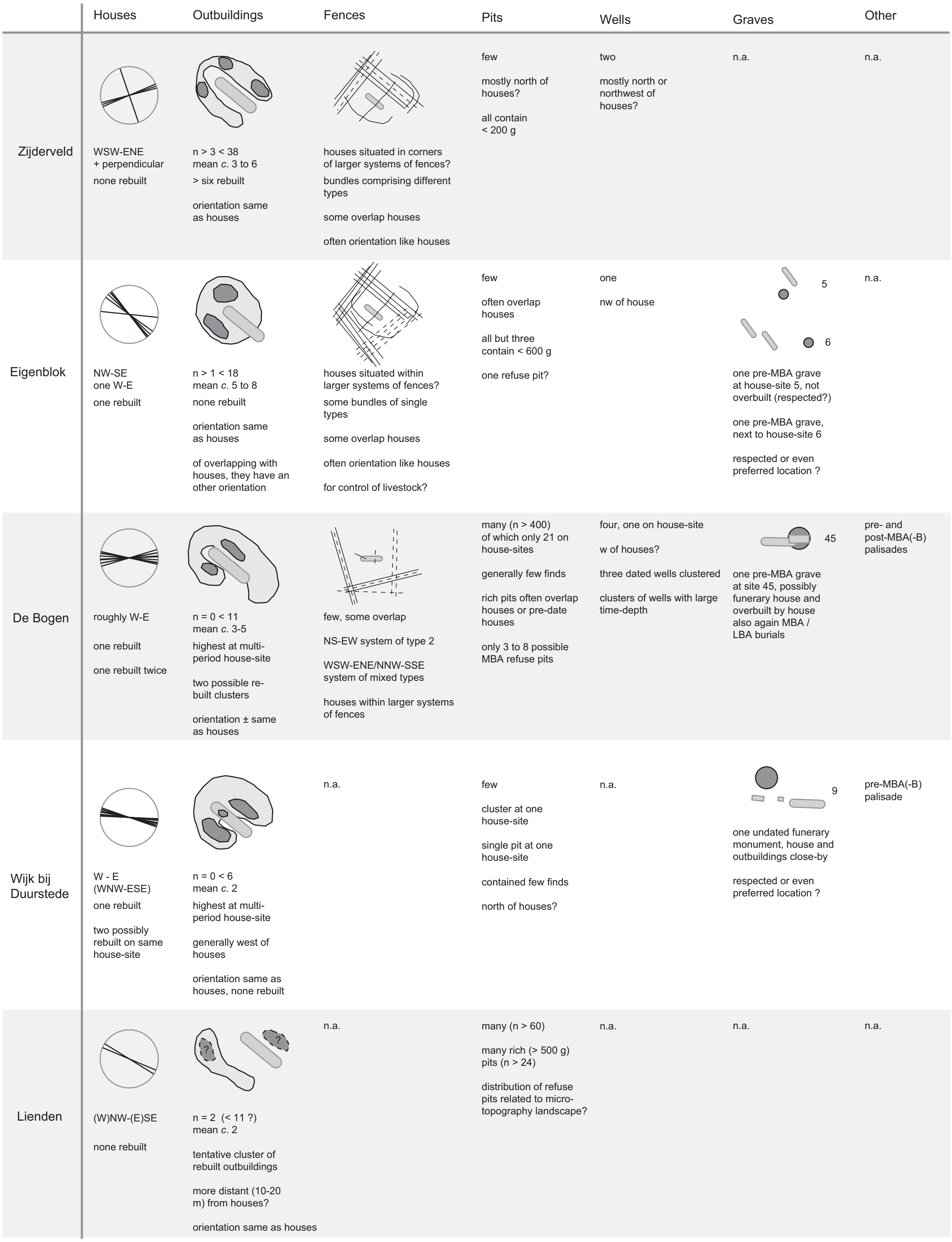
(3) For the Middle Bronze Age(-B) houses at Tiel - Medel 8, the preferred location of outbuildings is best described as ‘next to the long sides of the houses’, regardless of the cardinal orientation of the house.

(4) The construction of a specific type of outbuilding in a particular location in relation to two (differently orientated) farmhouses, reinforces the interpretation that outbuildings and farmhouses formed (conceptual) unities.

(5) This unity of farmhouse and outbuildings for the Middle Bronze Age(-B) as exemplified in points (3) and (4) is absent in the (hypothetical) houses-sites for the Late Bronze Age period. This indicates that the patterns observed are not artefacts of the (VASO) methodology applied, but that they reflect veritable Middle Bronze Age-B decision-making with regard to the structure of Middle Bronze Age-B farmsteads.

6.4 Common grounds? A comparison of the VASO results

Having discussed the results of the VASO analyses of the individual Middle Bronze Age settlement sites above in section 6.3, it is now possible to compare the individual results. If similar patterns are found for different sites, this could indicate that some house-site structuring ‘rules’ were shared or adhered to at a supra-local level. Conversely, deviating patterns could indicate which aspects of house-site structuring were susceptible to local variation. A schematic summary of the main outcomes of the VASO analyses for the different Middle Bronze Age settlement sites is depicted as figure 6.14.



	Houses	Outbuildings	Fences	Pits	Wells	Graves	Other
Zijderveld	WSW-ENE + perpendicular none rebuilt	n > 3 < 38 mean *c.* 3 to 6 > six rebuilt orientation same as houses	houses situated in corners of larger systems of fences? bundles comprising different types some overlap houses often orientation like houses	few mostly north of houses? all contain < 200 g	two mostly north or northwest of houses?	n.a.	n.a.
Eigenblok	NW-SE one W-E one rebuilt	n > 1 < 18 mean *c.* 5 to 8 none rebuilt orientation same as houses of overlapping with houses, they have an other orientation	houses situated within larger systems of fences? some bundles of single types some overlap houses often orientation like houses for control of livestock?	few often overlap houses all but three contain < 600 g one refuse pit?	one nw of house	one pre-MBA grave at house-site 5, not overbuilt (respected?) one pre-MBA grave, next to house-site 6 respected or even preferred location ?	n.a.
De Bogen	roughly W-E one rebuilt one rebuilt twice	n = 0 < 11 mean *c.* 3-5 highest at multi-period house-site two possible re-built clusters orientation ± same as houses	few, some overlap NS-EW system of type 2 WSW-ENE/NNW-SSE system of mixed types houses within larger systems of fences	many (n > 400) of which only 21 on house-sites generally few finds rich pits often overlap houses or pre-date houses only 3 to 8 possible MBA refuse pits	four, one on house-site w of houses? three dated wells clustered clusters of wells with large time-depth	one pre-MBA grave at site 45, possibly funerary house and overbuilt by house also again MBA / LBA burials	pre- and post-MBA(-B) palisades
Wijk bij Duurstede	W - E (WNW-ESE) one rebuilt two possibly rebuilt on same house-site	n = 0 < 6 mean *c.* 2 highest at multi-period house-site generally west of houses orientation same as houses, none rebuilt	n.a.	few cluster at one house-site single pit at one house-site contained few finds north of houses?	n.a.	one undated funerary monument, house and outbuildings close-by respected or even preferred location ?	pre-MBA(-B) palisade
Lienden	(W)NW-(E)SE none rebuilt	n = 2 (< 11 ?) mean *c.* 2 tentative cluster of rebuilt outbuildings more distant (10-20 m) from houses? orientation same as houses	n.a.	many (n > 60) many rich (> 500 g) pits (n > 24) distribution of refuse pits related to micro-topography landscape?	n.a.	n.a.	n.a.

Fig. 6.14 Schematic overview of the VASO results for the different sites (vertical axis) for different house-site elements (horizontal axis). The filled areas in the outbuildings column indicate the generalized main distribution (light fill) and denser concentrations (dark fill). The different line-types in the fences column indicate different fence types.

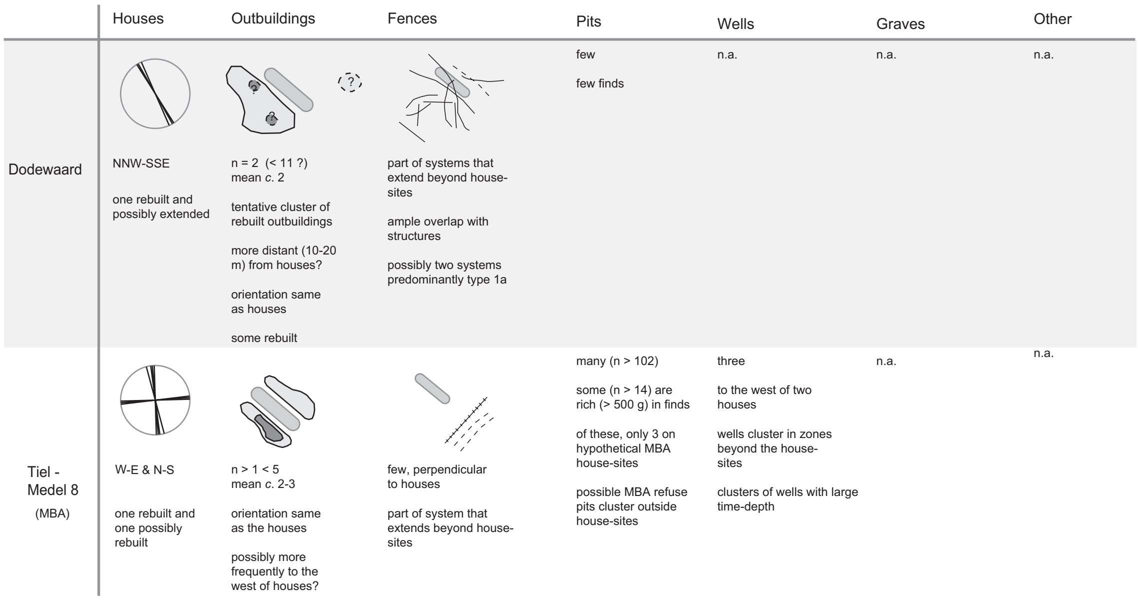


Fig. 6.14 (continued) Schematic overview of the VASO results for the different sites (vertical axis) for different house-site elements (horizontal axis). The filled areas in the outbuildings column indicate the generalized main distribution (light fill) and denser concentrations (dark fill). The different line-types in the fences column indicate different fence types.

6.4.1 The defining role of the orientation of the houses

One of the most clear conclusions is that the Middle Bronze Age farmhouses at all sites conform to a single (mono- or bi-axial) system of orientation. In the case of the settlement sites Meteren - De Bogen, Wijk bij Duurstede - De Horden, Lienden and Dodewaard, the system of orientation is mono-axial. The deviation from the mean orientation is smaller than 20 degrees, but typically much less. Only at Eigenblok was a single farmhouse orientated more than 40 degrees of the mean orientation for all houses at that site. If we ignore this single outlier, Rumpt - Eigenblok could also be classified as mono-axial. At the settlement sites of Zijderveld and Tiel - Medel 8, the system of orientation represented by the Middle Bronze Age houses should be labelled bi-axial. At Zijderveld a single house and at Tiel three houses are orientated at an angle perpendicular to that of the other houses. Assuming that the concept of 'at a right angle' had any validity for Bronze Age people, this can be interpreted as a different form of respecting the system of orientation. The documented placement of larger (*e.g.* six-post and barn/shed types of) outbuildings with their long axis perpendicular to that of the farmhouses,[40] does suggest that this 'right-angle' concept did indeed hold significance for Bronze Age farmers.

In the absence of well-dated houses, the correspondence between accordance in orientation and contemporaneity of houses cannot be proven, but is likely to have been strong. The fact that houses, even if not contemporaneous, were built with a similar orientation testifies to intentions to conform to – and in any case not disrupt – pre- or coexistent systems of orientation (Arnoldussen & Fontijn 2006, 296). This system of orientation need not, however, have relied (solely) on the houses. Especially the orientation of systems of fences may also, or alternatively, have steered corresponding orientation of multiple houses. If such houses with a corresponding orientation were indeed contemporaneous in prehistory, the shared orientation of houses within a cluster ('settlement'?, see Chapter 3) may be a reflection and indication of a distinct social group, such as a kin group, neighbourhood or other social conglomerate.[41]

40 *E.g.* Zijderveld house(-site) 1 (section 4.2.3; Appendix I), De Horden house(-site)s 1 and 3 (section 4.5.3; Appendix IV), Dodewaard house(-site) 2 (section 4.7; Appendix VI). In addition, several rectangular four-post structures may have been orientated perpendicular to farmhouses, but as the boundary between square and rectangular is debatable, they have been omitted here. See also the bi-axial (perpendicular) distribution of outbuildings in fig. 6.16.
41 *Cf.* Kok 2002, 119 on similar ideas on the significance of orientation with Iron Age houses at Oss.

In this light, it is important to note that Eigenblok and De Bogen have distinctly different axes of house-orientation (fig. 6.15), while the settlement sites were only 4.2 km apart in prehistory (*cf.* fig. 1.6). Consequently, the validity of the prevailing wind-direction as steering the orientation of the houses, as proposed by the excavators, must be challenged (*contra* Jongste 2002b, 610). It is unlikely that at such close proximity, the prevailing wind direction will have differed by forty degrees. Rather, the difference in orientation should be interpreted as a meaningful property of the houses, which was important to their inhabitants.[42] For the importance of house orientation in general, as conforming to or expressing social and/or cosmological rules, several anthropological examples are known.[43] This point will be dealt with again when fences are discussed (section 6.4.3).

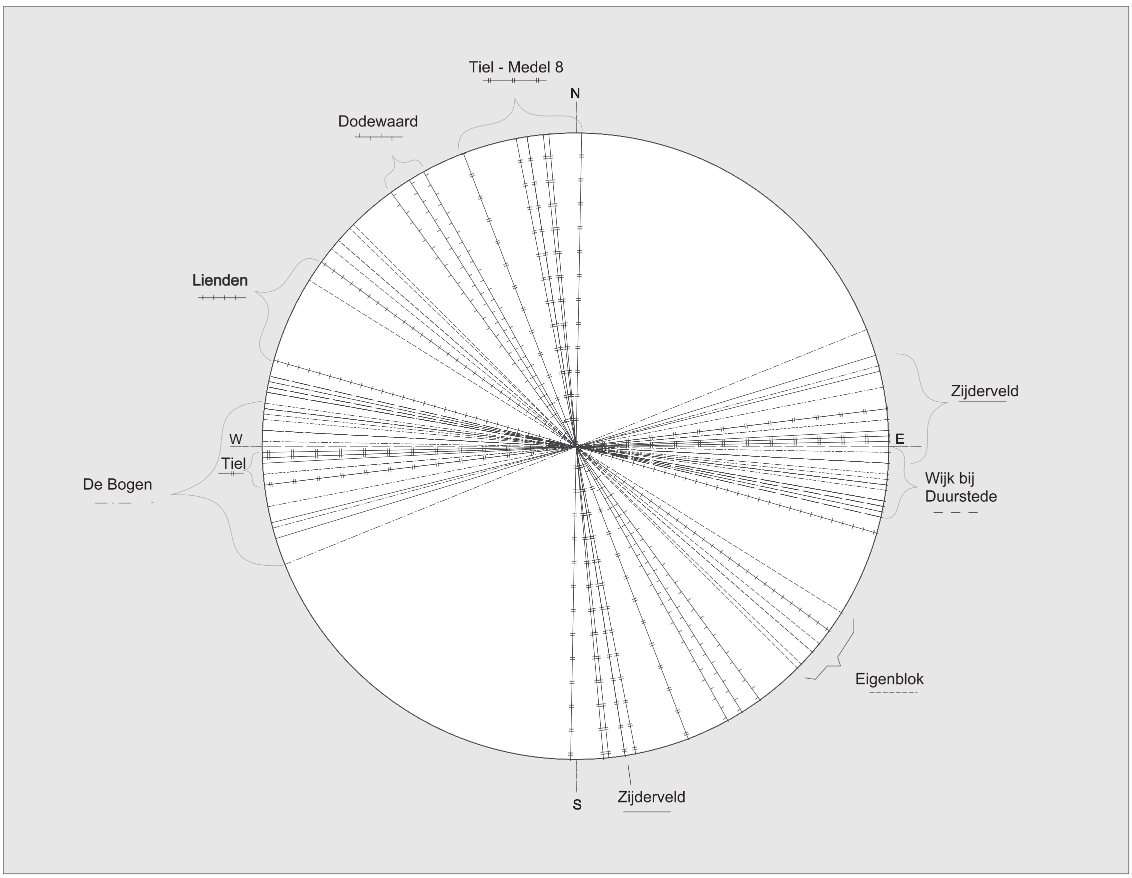


Fig. 6.15 Wind-rose diagram for the MBA(-B) houses at the seven settlement sites discussed in this chapter.

A diagram of the orientation of the Middle Bronze Age(-B) farmhouses at the seven sites analysed in this chapter, indicates that at several settlement sites, different orientations were preferred (fig. 6.15). The orientation of the houses from Dodewaard, Lienden, Eigenblok and the N-S orientated houses of Tiel hardly overlap with houses from other sites. The W-E houses of Tiel form a subset within the predominantly W-E array of houses at De Bogen. If the

42 Streiffert (2005, esp. 3) was also able to outline different traditions in house-building techniques at the settlement site level for Middle Bronze Age houses in Halland, Sweden.

43 *E.g.* Levi-Strauss (1955(2004), 242; 256), Cunningham (1973, 205-207), Rigby (1973, 264), Sahlins (1976, 33, esp. note 26), Turton (1978, 144-118), Kus & Raharijaona (1990, 23-28), Fox (1993a, esp. 14-15), Blier (1995, esp. 27-28), Carsten & Hugh-Jones (1995, 37 esp. note 28), Strathern & Stewart (2000, 236-237). For a discussion of orientation in relation to Swedish Bronze Age houses see Gröhn 2004, 323.

De Bogen houses are left out, the Zijderveld and Wijk bij Duurstede houses that are also roughly oriented W-E, also form two relatively distinct clusters.

Despite the overlapping W-E distributions, the presence of distinct groups may hint at a deliberately chosen system of orientation. As important, the direction SW-NE is conspicuously absent. As there are no evident reasons (besides cosmological or social ones) why houses could not have been built with a SW-NE orientation, it is proposed here that it was simply considered inappropriate to construct houses with that orientation in this region (*i.e.* it was irreconcilable with cosmological views).[44]

6.4.2 Outbuildings and their relations to farmhouses

How many outbuildings were present at a house-site?

At all Bronze Age settlement sites outbuildings were discovered in the vicinity of Middle Bronze Age farmhouses. Yet, this does not imply that every house was surrounded by outbuildings in the past. At De Bogen (fig. 6.43, F) and De Horden (section 4.5.3; Appendix IV), no outbuildings could be identified within some hypothetical house-sites. In addition, on some settlement sites the close proximity of house(phase)s and outbuildings made it difficult to determine which outbuilding was formerly part of which house-site (*e.g.* De Bogen site 30: ten outbuildings for six house phases; Appendix III). Yet, by and large, outbuildings are frequent if not almost invariable companions to farmhouses. Estimates for the mean maximum numbers of outbuildings per house(-site) for all Middle Bronze Age house-sites in the Dutch river area, range between two and eight, and are three to four mean.[45]

Between two to four outbuildings seems an acceptable common denominator for a 'generic' Middle Bronze Age(-B) house-site in the river area. Where higher numbers were documented, this frequently entails a house-site with multiple house phases,[46] or house-sites that are suspected to have been re-used in (or remained in use into) younger periods.[47] In the latter case, overlap between the house ground plan and some of the outbuildings was frequent. It may be significant that the highest numbers of outbuildings were documented on house-sites of relatively large farmhouses.[48] Perhaps with these larger houses more storage facilities (see section 5.4) – due to a higher number of human or animal occupants? – were deemed necessary. In addition, or alternatively, it could be that the length of the farmhouse as well as the number of accompanying outbuildings provided media through which social statuses could be claimed and demonstrated by the household or local community.[49] It should be stressed, however, that no simplistic correlation between farmhouse size (or outbuilding numbers) and social prestige may be inferred.[50]

How are the outbuildings distributed?

Having gained some insight into the *numbers* of outbuildings commonly present at Middle Bronze Age(-B) house-sites, some comment on their *distribution* should be made. In figure 6.14, the distribution of outbuildings as suggested by the VASO plots for the different sites, is represented schematically. Locations where clustering (either on single house-sites, or as a result of overlay) was observed are indicated in a darker shaded fill. At all sites, outbuildings are found close (within 5-15 m) to the farmhouses, indicating that they clustered around the farmhouses. Only at Lienden were no undisputable outbuildings reconstructed in the direct vicinity of the farmhouses. A second characteristic of

44 This avoidance of the general SW-NE direction also applies to other areas of the Netherlands during the Middle Bronze Age-B.
45 Based on the numbers of outbuildings on the house-sites per settlement site, and for all settlement sites together (figs. 6.37 to 6.55).
46 *E.g.* Eigenblok house-site 2 (fig. 6.40, B), De Bogen house-sites 28-1, 29B2/3H and 30BH-EH (fig. 6.43, B; H; J), De Horden house-site 2 (fig. 6.46 , B).
47 *E.g.* Zijderveld house-site 1 (fig. 6.37, A), Eigenblok house-site 1 (fig. 6.40, A).
48 Eigenblok house 5: 22 m, De Bogen house 29B2h: 25 m; Zijderveld house 1 (reconstructed): 26 m, Zijderveld house 3: 29 m.
49 For anthropological examples of social prestige or status related to house size see: Thompson 1940, 160-161; Denyer 1978, 21; Kramer 1979; Hayden & Cannon 1982, 138; Sajor 1999, 24; Howell 1995, 155-156; Miller 1997, 5; Marshall 2000, 96; Vellinga 2000, 258-259; Heckenberger 2005, 257, see also Wason 1994, chapter 7, concerning granaries see Malinowski 1935, 229; 242; Edelman 1943b, 142; Pélissier 1966, 709; Hill 1972, 254; Rosaldo 1980, 4; 132-134; 167; Domenig 2003, 196-197.
50 *Cf.* Waterbolk 1964, 122; Therkorn 1986, 33; Louwe Kooijmans 1993c, 17; Harsema 1997b, 91; Earle 1997, 30; 31; 61; 2001, 114; Kristiansen & Larson 2005, 277-278, *cf.* section 8.2.3.2. For a general critique on the use of house size in archaeology see Wilk 1983; Blanton 1994; Wason 1994, 137-141, for a specific Bronze Age critique see Fokkens 1999, 33; 2003, 24.

the distribution pattern is the fact that at most settlement sites, the distribution of the outbuildings follows the long axis of the farmhouses. At Tiel, Dodewaard and Lienden two separate zones to the long sides of the houses may be envisaged, whereas at the other sites some outbuildings were found in between (*i.e.* near the short sides of the farmhouse). In the latter cases the general distribution is ovoid in shape. Often, the density near the short sides of the farmhouses are low to zero, which makes sense if one considers that most Middle Bronze Age(-B) farmhouses from the Dutch river area had entrances in the short sides (see section 5.2.3.3). Leaving this area clear would allow for more convenient livestock handling and manoeuvring with wagons.

Within the more general distribution of the outbuildings, areas of more frequent outbuilding placement are indicated as darker shaded areas (fig. 6.14). At De Bogen, De Horden, and Tiel these form elongated areas near the farmhouse long side walls. At Zijderveld, Eigenblok, Lienden en Dodewaard this pattern is less clear, and the densest clusters can with equal validity be described as being situated near the longhouse's corners. So, for all Middle Bronze Age-B settlement sites in the Dutch river area, the two preferred locations for outbuildings can be indicated as 'along the long side walls of the farmhouses' and/or 'near the corners of the farmhouse'.

Albeit similar, the distribution patterns for the different settlement sites are clearly not identical. Perhaps this is, not unlike the possibly deliberately different orientation of the farmhouses, an intentional – or at least meaningful – distinction. If the differences in distribution were to be stressed, the Zijderveld distribution is the best example of the placement of outbuildings 'at the farmhouse's corners', while that of Eigenblok may be best described as 'predominantly in the west part of the house-site', at that of Dodewaard (and Tiel?) as 'outbuildings to the south/west of the farmhouses'. The preferred location of outbuildings was therefore probably bound by rules or preferences at the settlement site level.

The (conceptual) interrelations of outbuildings and houses

Having indicated general and possible preferred locations for the outbuildings, it must be stressed that there are some additional arguments that convey the strong (conceptual) ties between farmhouses and outbuildings for the Middle Bronze Age(-B).

The first of these arguments focuses on orientation. At six of the settlement sites, a preferred correspondence in orientation (*i.e.* orientated parallel or perpendicular to) between the outbuildings and the nearby farmhouse could be argued for. However, it is clear that the differences in orientation between houses and outbuildings on a hypothetical house-site is often bigger than the difference in orientation between the houses of a given settlement site.[51] This may predominantly be a side-effect of the lack of chronological resolution (*i.e.* the palimpsest character of the data used). This is also suggested by the fact that at several house-sites, outbuildings with a deviant orientation were found to overlap with the house ground plan, arguing against contemporaneity.[52] Alternatively, the orientation may not have needed to be that precise. In any case, it was far from arbitrary. At the majority of sites, the direction of most outbuildings follows that of the houses or is (again, roughly) perpendicular to it. An additional salient property of the outbuilding's orientation is the fact that they – like the houses – predominantly avoid large parts of the SW-NE quadrants in the wind-rose diagrams (fig. 6.16).[53] As with the houses (fig. 6.15), specific (slightly different) orientations seem to have been predominantly avoided at the different sites.

The second argument in support of the conclusion that farmhouses and outbuildings were conceptually linked in Bronze Age perceptions, focuses on rebuilding. At De Bogen, Lienden and Tiel, locations could be indicated where outbuildings had been rebuilt repeatedly, yet they could often no longer be identified individually with sufficient certainty.[54] At Zijderveld and Dodewaard, the picture was much clearer. At least six granaries were rebuilt at Zijderveld and at least two at Dodewaard (fig. 6.17). This rebuilding is particularly significant as it shows

51 See the wind-rose diagrams fig. 6.39; 6.42; 6.45; 6.48; 6.50; 6.53 and 6.56.

52 *E.g.* Zijderveld house-site 1 (fig. 6.37, A), De Bogen house-sites 45AH and 30GH (fig. 6.43, E; K), see also Enspijk (Appendix II). At De Horden, outbuildings with a similar orientation could be reconstructed, but which have been tentatively interpreted as a preferred placement of granaries on former house locations (see sections 4.5.3; 6.3.9).

53 *Cf.* Therkorn (1986, esp. 33-35) and Kok (1998, 119) for avoidance in orientation as a significant property of (Roman) Iron Age period houses.

54 *E.g.* De Bogen house-site 28-1AH (fig. 6.43, A), Lienden house-site 14 (fig. 6.49, A) and at Tiel between house-sites 5 and 6 (fig. 6.55, F). See also Wijk bij Duurstede - De Geer house-site 2 (Appendix IV).

that is was important to maintain the same orientation as well as location when rebuilding. Both the orientation and location of outbuildings were presumably defined in relation to the nearby farmhouse.

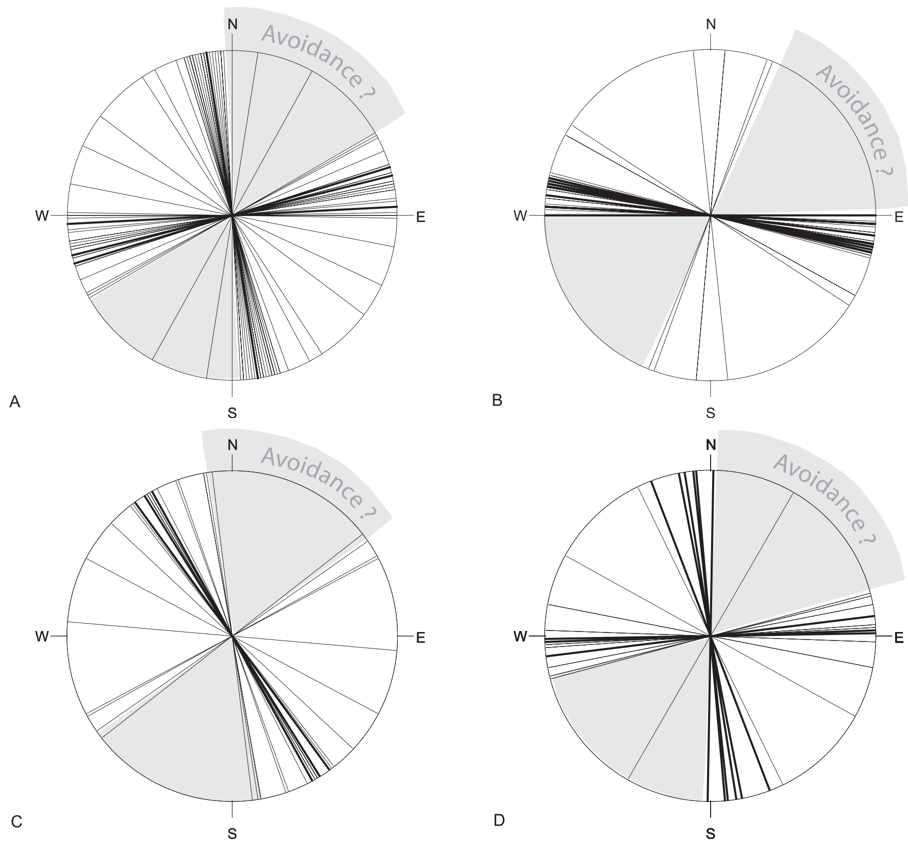


Fig. 6.16 Wind-rose diagrams for the outbuildings (thin black lines) and houses (thick black lines) at Zijderveld (A), Wijk bij Duurstede (B), Dodewaard (C) and Tiel (D). The predominantly avoided areas are indicated in light grey.

Third, two additional examples support the notion that houses and outbuildings were (conceptually) interrelated house-site elements. The first example concerns house-sites 2 and 3 from Tiel - Medel 8. As already discussed above (section 6.3.12), two nearly identical house-sites, but with a slightly different orientation were reconstructed (fig. 6.12, B-C). Both the lay-out (*i.e.* the distribution and orientation) and the content (*i.e.* the number and types of elements) appear to have been copied.[55] Such 'cloning' of house-sites may have been a more common phenomenon, but as the types of outbuildings involved are rather generic, it is hard to positively indicate other comparable 'cloned' house-sites with certainty. The differences in distribution patterns for the outbuildings between settlement sites may however be a weak proxy thereof.

The second example concerns a presumably Middle Bronze Age-B house-site from Wijk bij Duurstede - De Geer. The 'De Geer' excavations are situated *c.* 500 m north of Wijk bij Duurstede - De Horden and have unfortunately also not been published in full (see section 4.5 and Appendix IV). Despite moderate to poor feature preservation, two house-sites could be identified based on a distinct pattern of ditches (J. van Doesburg, pers. comm., Aug. 2006). At De Geer, these ditches were situated somewhat more distant from the house-walls. At house-site one, the ditch around the house had a small protrusion that seems to incorporate an area where several (if tentative) overlapping outbuildings can be reconstructed (fig. 6.18). Regardless of whether the extension of the ditch was purely functional

55 Note that the two 'extra' outbuildings near house 2 have a deviant orientation, possibly confirming the idea that they do not belonge to these house-sites (the site has also seen intensive Late Bronze Age occupation).

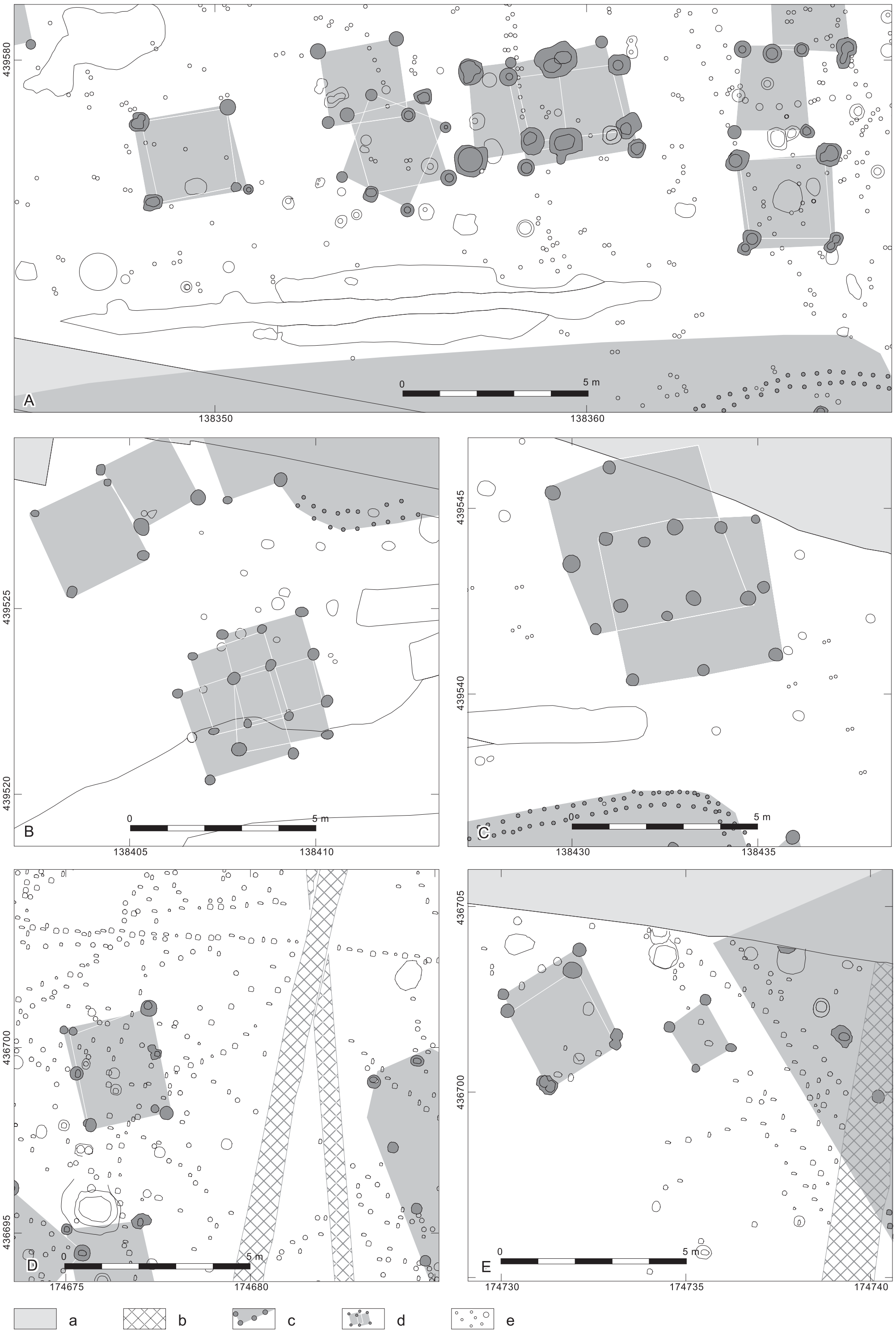


Fig. 6.17 Examples of granaries rebuilt on the same location with the same orientation at Zijderveld house-site 1 (A), house-site 3 (B, C), west of Dodewaard house-site 2 (D) and on Dodewaard house-site 1a/b (E); all to the same scale. For context see sections 4.2 and 4.7 and Appendices I and VI.

a: not excavated, b: recent disturbances, c: houses or barn-/shed-type outbuildings, d: rebuilt granaries, e: other features.

(*i.e.* a drainage function was needed) or whether (in addition) it was seen as conceptually connecting house and outbuildings, it remains the most tangible expression by Bronze Age farmers themselves that houses and outbuildings 'went together'.

Outbuildings and the size of the hypothetical house-site

The argumentation in this chapter is based on the spatial scale of the hypothetical house-site, which had been defined as a 50 by 50 m square. One may suspect, that the shape and size of the hypothetical house-site has influenced or even distorted the interpretation of the settlement site element distributions (fig. 6.19). For instance, the argument that outbuildings cluster near houses may be erroneous if the distribution of outbuildings is uniformly high for the entire settlement site, and the hypothetical house-site shows an unrepresentative selection thereof (*cf.* figs. 6.19; 6.21).

To asses this risk, a quantitative approach towards the suggested clustering of outbuildings is necessary. For this purpose, a nearest-neighbor analysis has been done for all outbuildings on a settlement site. For each outbuilding, the shortest distance between the outbuilding and the nearest house has been determined (as the crow flies, meter accuracy).[56] Thereafter, the distances measured have been classed at 5 m intervals and a histogram has been compiled (fig. 6.20, A-B). The top part of this figure shows the frequency (*i.e.* the numbers of outbuildings with a closest distance to a house) per 5 m class, up until 130 m (fig. 6.20, A).[57] Evidently, this is no random distribution.

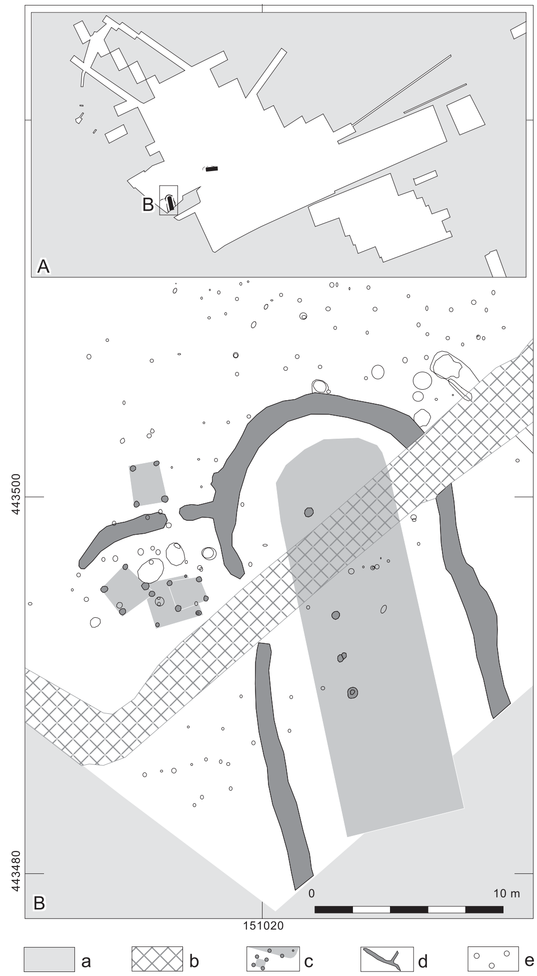


Fig. 6.18 Possible MBA-B house-site 1 at Wijk bij Duurstede - De Geer (B), for location see inset (A).

a: not excavated, b: recent disturbances, c: features of structures, d: ditch, e: other features.

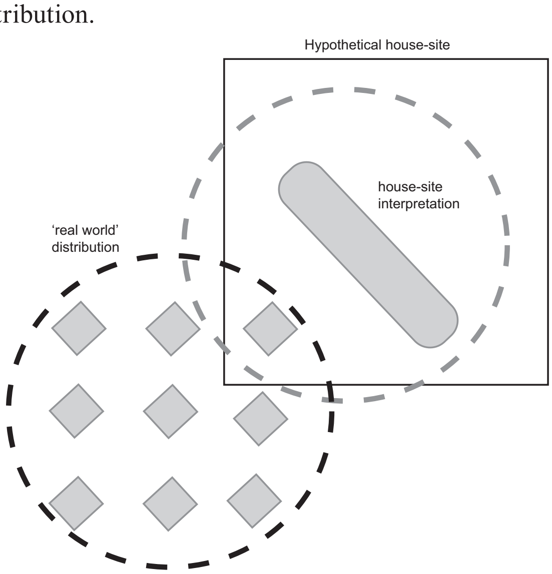


Fig. 6.19 Schematic diagram of how hypothetical house-site shape and size can affect interpretation.

56 The starting point was the centre of the posthole with the best location for the shortest distance, the end measurement was the nearest point of the reconstructed wall line. For houses where no wall lines had been preserved, a mean width of 6 m has been assumed (see fig. 5.26). Additionally, the distance to the second closest house has been measured. This may serve as a proxy for house density.

57 In reality, larger distances have been measured for two outbuildings, but these can no longer be meaningfully understood in relation to the houses and have been left out here. Generally, larger distances concern structures situated in small scale trenches or close to the excavation limits, which may explain why no houses have been recognized in the vicinity of these.

The lowermost graph (fig. 6.20, B) shows the individual class distributions for the different settlement sites. The comparable morphology of the graphs proves that the peak in the cumulative graph at the top is an accurate presentation of the distribution data. Undisputedly, outbuildings cluster near Middle Bronze Age(-B) farmhouses in the river area.

Based on the proposed dimension for hypothetical house-sites at 50 by 50 m, 71 % of all outbuildings are situated on a hypothetical house-site.[58] Furthermore, a steep drop is visible in the histogram-curves at 20-25 m, suggesting that this indeed is a distinct group.[59] The second, smaller peak between 55 and 85 m, may very well be composed of outbuildings that in reality belong to house-sites for which no house has been uncovered. As these are frequently located in small trenches or situated near the excavation limits (see the data in Chapter 4 and the Appendices), this is a plausible scenario. Consequently, the high number (71 %) of outbuildings on house-sites may suggest that the distance to the second peak is an indirect reflection of the distance between house-sites during the Middle Bronze Age(-B) in the Dutch river area (*cf.* section 6.5, table 6.3).[60]

Again, one may argue that the size of the excavated area in relation to the size of the house-site, leads to the erroneous conclusion that the second peak may be related to ill-mapped house-sites. In figure 6.21, a scenario is forwarded where a similar bi-modal distribution may be observed, while in reality the outbuildings were not part of additional house-sites.

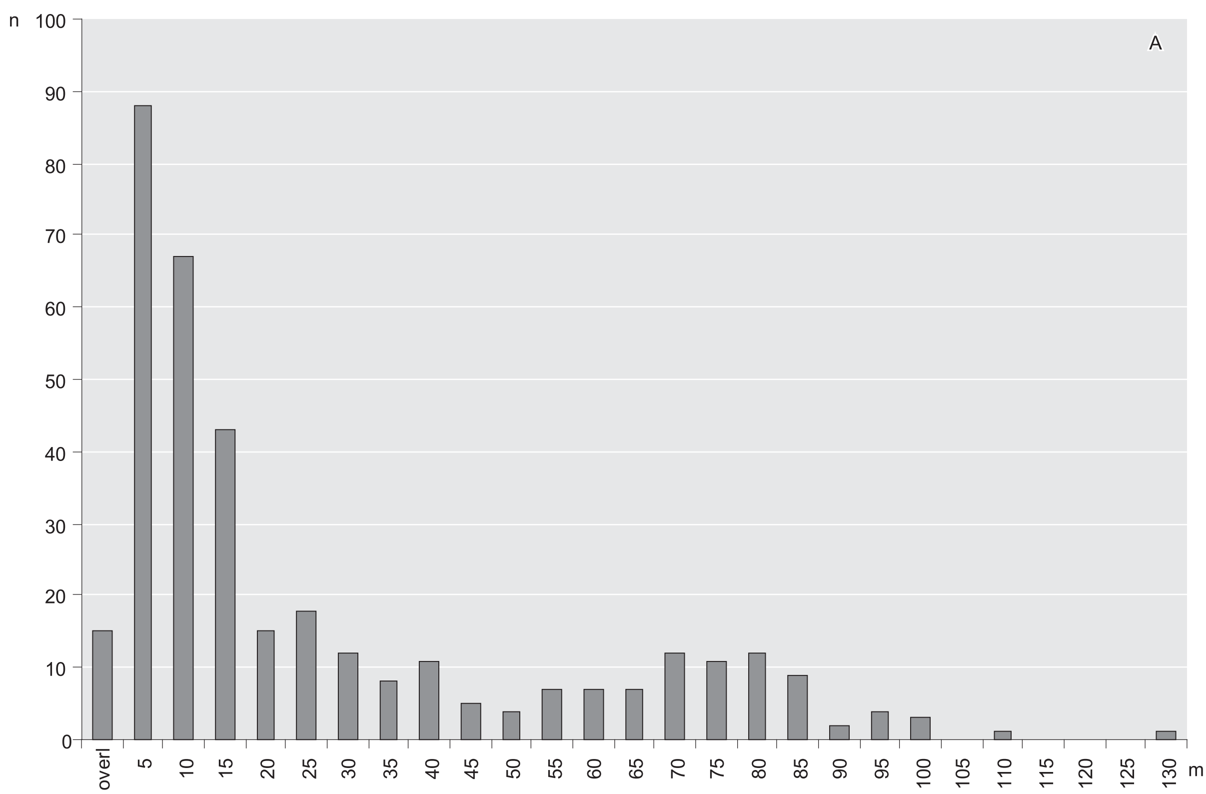


Fig. 6.20 Frequency of occurrence of outbuildings with a shortest distance to a house per 5 m class, shown for overlapping ('overl') outbuildings and those up to 130 m from houses. The second graph (overleaf) shows the individual histogram values for Wijk bij Duurstede - De Horden (WBD), Zijderveld (ZIJD), Dodewaard (DOD), Eigenblok (EBL), Lienden-Kesteren (KES) and Tiel - Medel 8 (TLM).

58 A total of 202 out of 283 outbuildings are situated with 25 m distance from a farmhouse.

59 If a moving average trend line is drawn for the data in graph 6.20, the steep drop may be argued to be situated at 35 to 45 m instead.

60 Again it should be stressed that with the palimpsest nature of both the sites in question, as well as that inherent in the VASO methodology (see section 6.2), these outbuildings may well date from other phases.

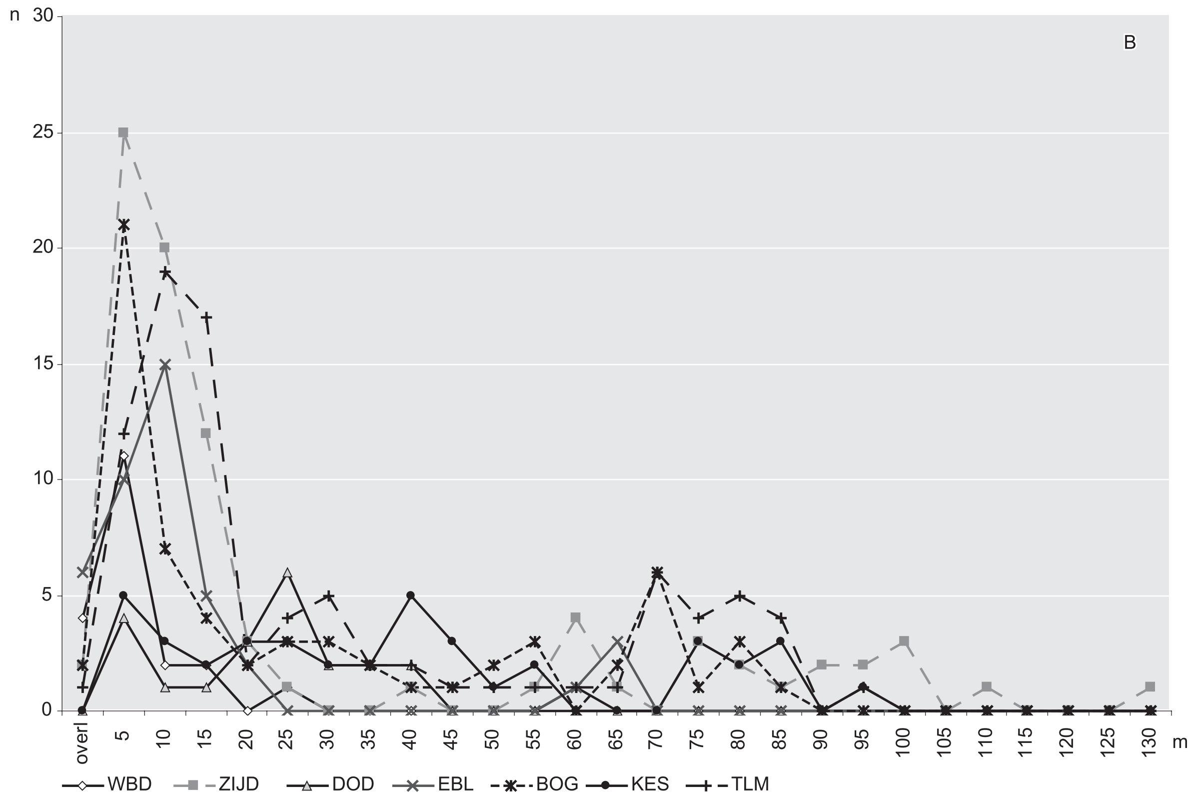


Fig. 6.20 (continued) Frequency of occurrence of outbuildings with a shortest distance to a house per 5 m class, shown for overlapping ('overl') outbuildings and those up to 130 m from houses. This graph shows the individual histogram values for Wijk bij Duurstede - De Horden (WBD), Zijderveld (ZIJD), Dodewaard (DOD), Eigenblok (EBL), Lienden-Kesteren (KES) and Tiel - Medel 8 (TLM).

To investigate whether alternative distributions, played out at larger spatial scales, may have affected the results of house-site analyses, another spatial research strategy was adopted. The interpreted excavation results (*i.e.* the base files compiled prior to VASO) were overlain with a 4 by 4 m grid.[61] As VASO has indicated that houses may very well have been spatially and conceptually central to prehistoric house-sites, the grid was rotated to align with the long sides of the farmhouse. The overall dimensions of this 4 by 4 m grid were 100 by 100 m, *i.e.* a factor four larger than the hypothetical house-site. The centre point of the grid was overlain with the centre-point of each Middle Bronze Age(-B) house.[62] Thereafter, for

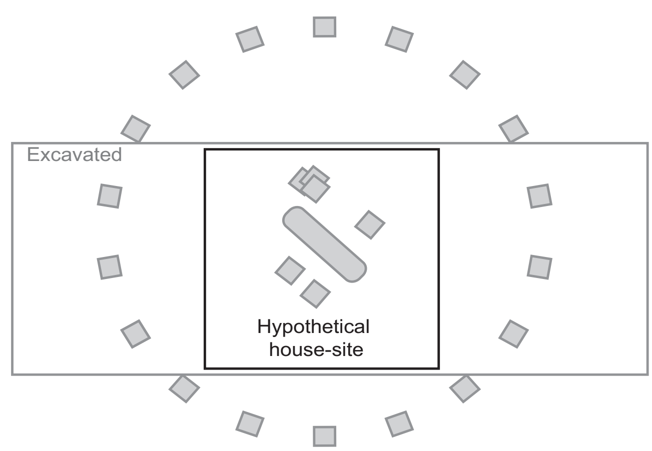


Fig. 6.21 Schematic diagram of how excavation and hypothetical house-site shape and size can affect interpretation, example of an alterative pattern resulting in a bi-modal distribution.

61 With a house width of 6 to 8 m and mean dimensions of 2 by 2 m for a four-post outbuilding, a 4 by 4 m grid starting from the centre of the house allows to accurately map whether outbuilding are situated just outside, or overlapping with the house walls. Larger grid cell size seems unwise, whereas more detailed analyses should be executed with the nearest-neighbor data instead of the raster data set.
62 The latter point being defined as the centre of gravity for the smallest inside shape which could be drawn when using all roof-bearing posts as nodes.

each grid-cell the numbers and types of outbuildings were documented.[63] This methodology allows an (somewhat crude) analysis of the distribution of house-site elements at a wider spatial scale (fig. 6.22).

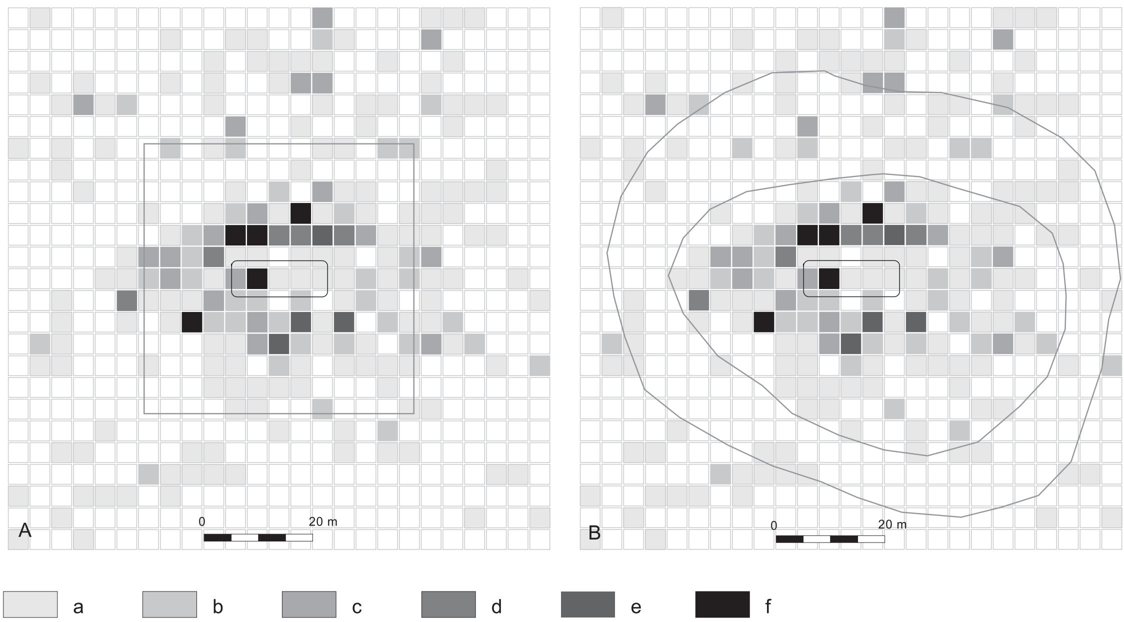
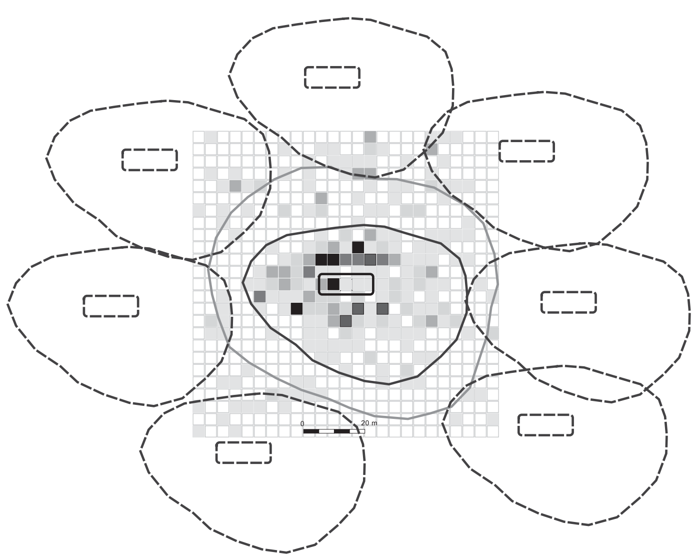


Fig. 6.22 Distribution of all outbuildings for all MBA(-B) house-sites discussed in this chapter. In (A) a hypothetical house and the dimensions of the hypothetical house-site are plotted, in (B) an interpretation of an 'empty' area around the main outbuildings cluster is offered.

a: one outbuilding, b: two outbuildings, c: three outbuildings, d: four outbuildings, e: five outbuildings, f: six to ten outbuildings.



It is clear that the main distribution of outbuildings is situated within the hypothetical house-site (*c.* 60 %),[64] although the distribution appears irregular to somewhat ovoid in morphology around the farmhouse (fig. 6.22, A).[65] The right hand side of figure 6.22 suggests an interpretation with a core area, an empty zone and a peripheral area. They comprise *c.* 66 %, 12 % and 21 % of the outbuildings respectively.[66] The outbuildings situated in the periphery also seem to cluster, and show again no random distribution.

Fig. 6.23 Schematic interpretation of the outbuilding distribution diagram (fig. 6.22).

63 The centre of gravity was determined as with the houses (*supra*) and determined to what grid cell a given outbuilding was assigned. As duplication is again a problem (see 6.3.4), these are not real numbers.
64 As duplication is again a problem (see 6.3.4), these are not real numbers. Comparison of these figures is however allowed. For 358 recorded outbuilding locations, 218 are within the hypothetical house-site.
65 The fact that the long axis of the ovoid distribution is in line with the longhouse axis may again be interpreted as a consequence of strong house-outbuilding interrelation.
66 In total 238, 44 and 76 recorded outbuildings respectively.

This is in support of the propositions made above that the distribution of the outbuildings is also related to the presence of farmhouses at higher spatial levels, and that the second peak may be related to incompletely excavated settlement sites (fig. 6.23).

Of course, it has to be checked whether individual sites do not severely distort the composite overlay for this distribution. As these distribution plots do not generally differ from the composite plot depicted in fig. 6.22, they have been omitted (but see fig. 6.35). Only the distribution plot for the Dodewaard outbuildings differs markedly, but this is explained by the narrow and long shape of the excavated area in combination with the proximity of several house-phases (fig. 6.35, F).

To conclude, a final problem must be addressed. Having argued above that houses and outbuildings were spatially and conceptually interrelated, does this imply that we have to interpret all outbuildings as relicts of (unrecognized or not fully uncovered) house-sites? This seems unwarranted. Their properties (rebuilding, orientation, integration by ditch systems) when placed next to farmhouses, do not exclude them from occurring elsewhere, with comparable or other properties, on settlement sites. To avoid the obvious objection that such outbuildings were part of undetected house-sites, these should preferably be located in isolation in extensively excavated areas that have yielded no house plans. The data set of outbuildings that conform to these criteria, is unfortunately slim. All too often settlement sites have been excavated in non-continuous and/or small trenches (see Chapter 4 and Appendices).

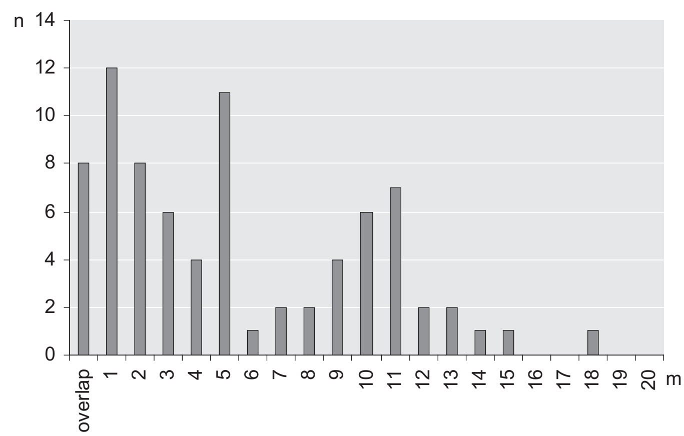


Fig. 6.24 Frequency histogram of shortest distance between outbuildings not part of MBA(-B) houses-sites and the excavation limit, overlapping (overlap) and classed per meter.

To quantify the severity of this problem, the shortest distance between an outbuilding (not part of a house-site) to the excavation limit has been recorded. For 78 'stray' or 'isolated' outbuildings, 8 overlapped with the excavation limits and the others are situated at 5.5 m mean distance from it (see fig. 6.24 for details).[67] Clearly, the small size of the various trenches complicates the interpretation of these outbuildings.

Nonetheless, some of these cases must be dealt with in more detail, as outbuildings do indeed in some cases occur in locations more spatially distant from houses. At Dodewaard, a cluster of stray outbuildings was situated *c.* 21 m east of house-phase 1a (fig. 6.1, A). Some of them are situated at *c.* 10 m from the excavation limits, but the orientation of several of them follow that of the Middle Bronze Age(-B) houses at this site. It is not unlikely that other house-phases are situated just to the east of the excavation limits. In the westernmost part of the Dodewaard excavation, again a cluster of outbuilding was recognized in relative isolation (fig. 6.25, A). Here, a large barn/shed type outbuilding was reconstructed with an orientation not unlike that of the Middle Bronze Age(-B) houses (see fig. 6.25, A, no 5). The span and spacing of this outbuilding is not unlike type-A2 houses elsewhere in the river area (notably Wijk bij Duurstede - De Horden; see section 4.5; Appendix IV). Possibly, this structure was another Middle Bronze Age house plan.[68] In this study, however, the interpretation as a barn/shed-type outbuilding as suggested by Theunissen & Hulst (1999a, 144-145) has been maintained, but the possibility remains that it was a house in reality. At Tiel - Medel 8, also some granary-type outbuildings were identified at a reasonable distance from the excavation limits (fig. 6.25, B). Whereas they may very well have been located in an 'isolated' position in prehistory,

67 Only one outbuilding has been left out. This concerns a barn/shed type outbuilding at Wijk bij Duurstede - De Horden house-site 9, which is situated 23 m from the house and 65 m from the excavation extents. This outbuilding was presumably also part of the house-site of house 9 (see Chapter 4; fig. 4.28).

68 It is however the only A2-type house among clear-cut A1 houses (see section 5.2.3.3). This, and the slightly deviant orientation could indicate that it belonged to a somewhat earlier or later occupation phase, but definitive evidence is absent.

two comments must be made. Firstly, a tentative Late Bronze Age house is situated close-by (fig. 6.25, B no 4) to which these outbuildings may have belonged.[69] Alternatively, a large barn/shed type outbuilding with an orientation identical to that of the Middle Bronze Age-B houses was also part of the cluster (fig. 6.25, B no 52). Possibly, this outbuilding represents a farmhouse of a yet unknown type. As no direct dates, comparable structures or associated artefacts are known for outbuilding 52, the interpretations of this cluster of outbuildings as being either situated in an isolated position and dating the Middle Bronze Age-B, or as part of the Late Bronze Age outbuildings around possible house 4, remain equally plausible.

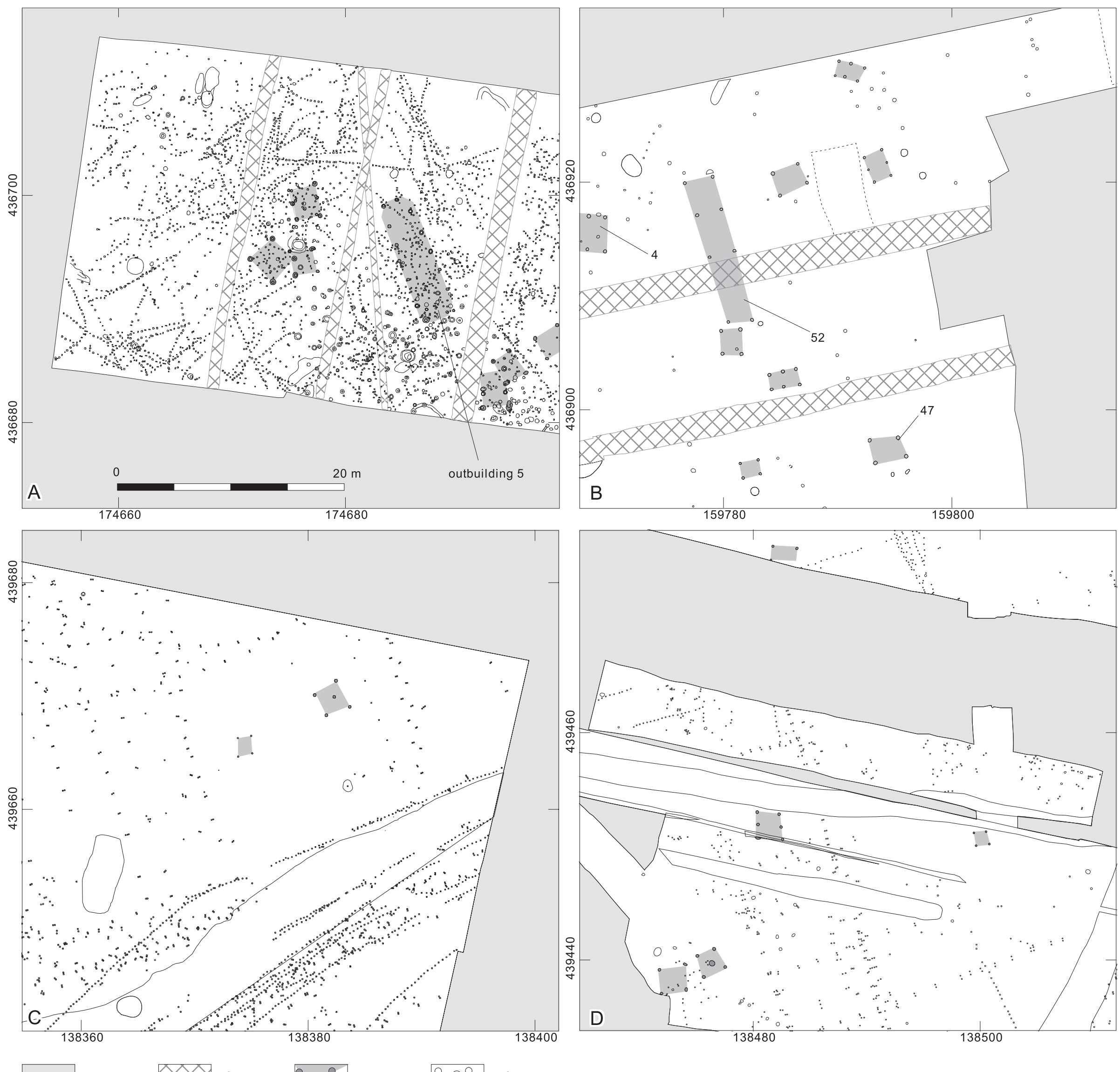


Fig. 6.25 Examples of granaries in relative isolation and distant position from the excavation limits at Dodewaard (A), Tiel - Medel 8 (B), Zijderveld; north of house-site 1 (C) and Zijderveld; southeast of house-site 3 (D), all to the same scale.

a: not excavated, b: recent disturbances, c: features associated with structures, d: other features.

69 From one of the postholes of outbuilding 47, two fragments (10 g) of possible Iron Age sherds were recovered (original documentation). As no pottery with distinct Early Iron Age characteristics have been uncovered (Arnoldussen 2007), a Late Bronze Age date for these fragments seems plausible.

At Zijderveld, there are two locations where granary-type outbuildings appear in relative isolation (fig. 6.25, C; D). It is unclear whether the outbuildings depicted in figure 6.25 (C) are Bronze Age or Iron Age in date, as in this part of the site Early Iron Age occupation also took place (Theunissen & Hulst 1999b, 160-164; Appendix I). Although the orientation of the largest five-post outbuilding is more in line with the nearby Early Iron Age house, it also still corresponds reasonably well (< 15 degrees deviation) to the type-2 fence-lines which are though to date to the Middle Bronze Age occupation phase. The granary-type outbuildings in the south-east part of the Zijderveld excavation, most likely date to the Middle Bronze Age-B (fig. 6.25, D). They are situated in an area where two vegetation horizons wedge-out (Arnoldussen 2003), indicating that a thin layer of clay sedimentation covered the Middle Bronze Age-B occupation traces.[70] The low feature density documented and the absence of Iron Age house plans, renders it plausible that this area was subjected to gradual drowning during the Middle Bronze Age-B (see Chapter 2) and that the Iron Age occupation was confined to the highest parts of the levee- (and covering) deposits in the northern parts of the Zijderveld excavations. It unfortunately cannot be excluded that these outbuildings date from the Iron Age, as two ditches yielding Iron Age ceramics were also uncovered in that area (Knippenberg & Jongste 2005; Appendix I). The ditches may alternatively be the only features dug down deep enough to have penetrated the Middle Bronze Age vegetation horizons.

In short, the evidence for granary-type outbuildings placed in isolation (*i.e.* at large (> 25 m) distance) from the houses is present, but weak. Their isolated position may be challenged if (less-typical) structures are re-interpreted as houses (*e.g.* Dodewaard, Tiel) or when longer-term occupation is considered (*e.g.* Tiel, Zijderveld). Nonetheless, it remains at least plausible that a number of smaller outbuildings were situated in areas considered by Bronze Age communities as 'placed beyond the house-site'. These outbuildings could (but need not) have served different functions compared to those placed more closely to the houses, which are generally interpreted as storage facilities (section 5.4). The more distant outbuildings may, in addition or alternatively, have contained fodder, or agricultural tools or objects that were preferably stored more closely to the areas where fields and pastures were situated. Both the exact function and the distribution of such outbuildings remains unfortunately rather unclear. It can only be stated that granary-type outbuildings by no means reflect an even distribution. At the more extensively excavated settlement sites (*e.g.* Zijderveld, De Bogen, De Horden), large areas (approximation the size of hypothetical house-sites) have been uncovered where no outbuildings were recognized, despite sufficient feature preservation.

6.4.3 Fences, fence-systems and their relations to house-sites

Fences are frequently interpreted as features that were part of, or even delimited, later prehistoric house-sites (table 3.2 and section 5.5).[71] The results from the nineteen-seventies excavations at Zijderveld are usually interpreted as the best example thereof (*e.g.* Fokkens 2005b, 425). The notion that fences may have delimited prehistoric house-sites was based on the observations by Theunissen (1999, 168-169) that type-1a fences seemed to cluster near house-sites, and that some fence-lines seemed to represent rounded 'corners' enclosing more or less rectangular areas around the houses (*cf.* figs. 4.1 and 5.45). Although it is very likely that – perhaps more by consequence than by intent – fence-lines may have bounded prehistoric house-sites, I will argue that this was by no means their only, or most typical, function. Rather, fences were used for landscape parcelling at spatial scales which surpass that of the house-site.

The best-case scenario? The Zijderveld fence systems

The rounded corners of stretches of fence at some Bronze Age house-sites (*e.g.* fig. 4.1; fig. 4.9, A) might suggest that these were intended to enclose a particular area. A fully enclosed area, has however seldom been found.[72] Instead, rounded corners in fence trajectories *suggest* rather than *confirm* that these were intended to enclose particular plots. Consequently, the 'rounded corners' of the Zijderveld fence-system(s) need to be seen in proper perspective.

70 Unfortunately, it is unclear from which vegetation horizons the postholes of the granaries became visible.

71 *E.g.* Roymans & Fokkens 1991, 10; Hessing 1991, 44; Fokkens 1991, 96; Schinkel 1994, 24; 1998, 26; 2005, 523; 524-535; Theunissen 1999, 112; 194; Woltering 2000, 263.

72 But see Theunissen and Hulst (1999b, 164 fig. 4.36 no 1) for a *c.* 7 by 12 m rectangular fenced of area. Within this area, a post-configuration (tentatively interpreted as a round structure) with a post dated to Middle Bronze Age-A (GrN-5376: 3370 ± 80 BP; *op. cit.*, 165) was recognized. See also Knippenberg & Jongste (2005, 72-75) for a possible oval *c.* 7 by 10 m ditch that may have contained an area enclosed by fences on its inside.

Fig. 6.26 Location and type-composition of fence 'bundles' at Zijderveld.

a: not excavated, b: reconstructed trajectory of the residual gully of the Zijderveld fluvial system, c: structures, d: type-1a(b) fences, e: type-2 fences.

Curvilinear fence-lines (*i.e.* all but the moderately straight lines) form only a minority (*c.* 30 %) of the total fence-lines reconstructable. Put otherwise: nearly 70 % of the Zijderveld fence-lines are relatively straight (*cf.* fig. 5.45).

Second, curved fences cluster near the higher parts of the landscape, where also most Iron Age features and structures were recognized. This implies that the risk of misdating these fence-lines to the Middle Bronze Age may be slightly higher, but this will play no major part in the discussions below. It is more important to stress that in the direct vicinity of houses 3 and 4 – and to a lesser extent, house 2 – curved fence-lines are almost absent. As other types of fences *are* present, the absence of curved fence trajectories is not a problem of feature preservation, but indicates that stretches of fence with rounded corners (hinting at enclosed areas) were by no means a *condicio sine qua non* for Middle Bronze Age house-sites.

Third, the location of the curved type-1a fences around Zijderveld house 1 may suggest some problems of contemporaneity. If the distribution of granary-type outbuildings correlates to the extent of Middle Bronze Age houses-sites (as is indeed suggested by the data from Zijderveld as well as other Middle Bronze Age settlement sites from the river area; *supra*) the NNW-SSE fences connected to the rounded corners seem to cross-cut the outbuilding distribution around the houses. Moreover, some of these fences cross-cut the house ground plan proper, or – if the alternative reconstruction for the house suggested in this study is used (*cf.* Appendix I, figs. I.9; I.10) – are situated between 1.5 and 3 m from the eastern short side entrance. This area next to the entrance is generally left clear for practical reasons, and such close proximity of house and fence-lines may argue against contemporaneity.

Lastly, the claimed unbalanced distribution of fence types (type-1a near houses and type-2 in more distant areas (Theunissen 1999, 168-169; Knippenberg & Jongste 2005, 58) can be challenged. Both close to the houses, and in more distant locations, groups of parallel orientated fences (here labeled 'bundles') comprising different types of fences can be identified. Furthermore, several type-1a bundles can be identified at significant distances from the farmhouses (fig. 6.26, *cf.* fig. 5.45). The mixed-type nature of the fence 'bundles' suggests that fences of different types may have had similar functions, or at least that the fence-type was open to choice. The opposite interpretation however, need not be dismissed completely. It may have been the case that – if specific types of fences were used to set apart pieces of land with different (intended future) uses – that the mixed-types bundles indicate a continuity of plot sizes and dimensions, whilst the plot function changed. This may suggest that it was considered important not to disrupt preexistent (systems of orientation reflected in) landscape structuring, as has also been argued for the houses (see section 6.4.1).

Having questioned previous interpretations of the Zijderveld fence-systems, an alternative interpretation should be considered. It is proposed here that the Zijderveld fence-systems are best described as reflecting at least two phases of landscape structuring (or if one prefers; parcelling) with slightly different orientations. The two main (Bronze Age) phases both consist of a bi-axial perpendicular system of fence-lines with NNW-SSE and WSW-ENE as their dominant axes. Across most of the site, the high feature density – or alternatively the small excavation extents – does not allow to disentangle the two phases. Only in the extreme north and southeast of the excavations can two different systems of orientation be identified with any certainty (fig. 6.27). The curvilinear stretches of fence discussed earlier, as well as the houses and outbuildings, cannot be assigned to a particular phase on acceptable grounds. For the moment, it must remain open that one or both phases belonged to the Middle Bronze Age-B occupation phase at Zijderveld. In both phases, the fence-systems comprise predominantly moderately straight fence-lines, of which continuous lengths up to 50 m could be documented.[73] As these fences are generally confined by the excavation extents, it may be assumed that several of them were much longer.[74] Both axes seem to be equally well represented, indicating that 'perpendicularity' was a significant property of such fence systems (as, again, was argued for the houses). Few fence-lines, and almost none of the bundles, cross-cut Middle Bronze Age-B house plans (but see the discussion for house-site 1 above). This pleads in favor of contemporaneity, and suggests that while fence(-system)s did not *define* Middle Bronze Age house-sites at Zijderveld, at the very least they *respected* them. The clustering of bundles comprising the highest numbers of (predominantly type-1a) fence-lines near the Middle Bronze Age-B houses, cannot be ignored. Most likely, these represent subdivisions of, and additions to, the wider bi-axial fence systems. Here, proximity to the farmhouse presumably caused a more articulated functional differentiation of space (*e.g.* milking areas, livestock pens, dung- or refuse heaps) within, respecting, and as an integral part of the larger fence systems (*cf.* fig. 5.53, A). The larger numbers of fences in the bundles indicate that for some reason, it was important to replace these fences more often, in addition to stressing the importance of their continuity in placement. In these two properties, the continuity in place and frequent rebuilding, the Zijderveld fences are comparable to the outbuildings, in which similar patterns of rebuilding are reflected (see section 6.3.6, *cf.* fig. 6.17, A-C).

73 Knippenberg and Jongste (2005, 58) suggest that some type-2 fences may be reconstructed with lengths of 240 m. This is based on connecting fences from the trenches to the southwest of the A2 motorway to fences in the trenches to the northeast.
74 *Cf.* fig. 4.19, c-g; fig. 5.54, d; sections 6.3.8 and 6.3.12.

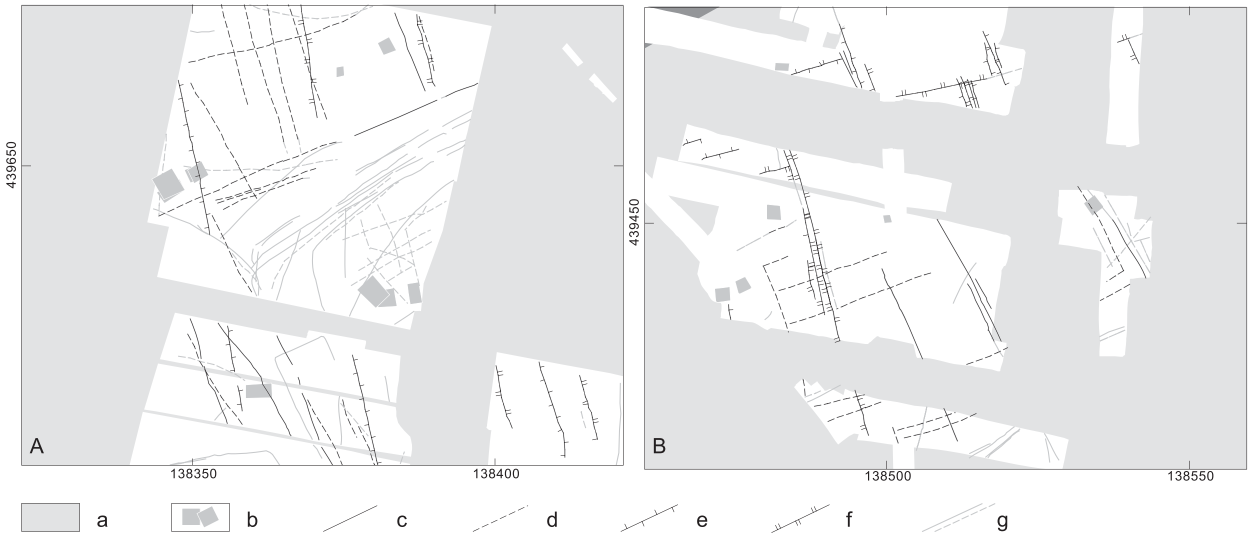


Fig. 6.27 Two orientation systems reconstructable for the Zijderveld fences in the north (A) and southeast (B) of the Zijderveld excavations.

a: not excavated, b: structures, c: system 1, type 1a(b) fences, d: system 1, type 2 fences, e: system 2, type 1a fences, f: system 2, type 2 fences, g: unassigned fences.

To conclude, the Zijderveld fence systems share several properties with the houses and outbuildings at Zijderveld. They conform to (two?) nearly identical systems of orientation, are bi-axial in nature, and both fences and granary-type outbuildings in close proximity to houses are frequently rebuilt. Furthermore, the fence systems seem to predominantly spatially respect or even emphasize the house-sites. These properties all hint at a meaningful interrelation between the two. Delimiting house-sites does however *not* seem to be the primary function of the fence systems at Zijderveld. Rather, the fence-systems parceled the landscape in an extensive bi-axial system, within which house-sites were situated and articulated.

Fences and fence systems at the other Middle Bronze Age settlement sites

At Eigenblok, fence systems of a spatial scale beyond that of the house-site are hard to reconstruct. This is in the first place a problem of scale, as the excavation limits can be found within 10 m for all of the Middle Bronze Age houses. However, there are faint indications that fences were perhaps more related to house-sites. Firstly, the house of house-site 1 had a somewhat deviant orientation compared to the other houses (*cf.* fig. 5.37, B) and some of the fence-lines around this house conform to the house in orientation, suggesting that these were possibly contemporaneous and (conceptually) interrelated. Secondly, different types of fences are rarely found together at the Eigenblok house-sites. At house-sites 1, 2 and 4, only type-1a fences are encountered, whereas at house-site 5 only type-2 and other types of fences occur. Only at house-site(s) six are both type-1a and type-2 fences found. Yet, despite these indications, only for house-site 1 can it be argued with any certainty that fences may have delimited the house-site. In this study, the type-2 fences at house-site 5 are interpreted as extending beyond, rather than as defining the house-site (*contra* Hielkema, Prangsma & Jongste 2002, 142). The ‘corners’ suggested by the excavators are all situated very near to the excavation limits and most likely represent intersections of fence-lines that extend beyond the excavation extents. At house-sites 2 and 4, fences cannot evidently be interpreted as house-site defining features, or as elements of a more large-scale fence system. Nonetheless, the fence-lines at house-site two can be followed for over 35 m in length and clearly extend beyond the house rather than surround it. The stretches of fence to the southeast of the short side of houses 2a/b have been interpreted as cattle droves, facilitating the movement of cattle into the farmhouse (Hielkema, Prangsma & Jongste 2002, 105).

In short, the Eigenblok excavations display a varied use of fences in relation to house(-site)s. In the shape of the fences at house-site 1 and the types of fences used at all house-sites, some individual (household?) choices may be reflected. From the difference in orientation of the fences between house-site 1 and the other house-sites, it may be concluded that at this site, the orientation of the houses 'overruled' any – if ever present – system of fence orientation played out at larger spatial scales.

At the De Bogen excavations, a use of fences not unlike that at Zijderveld (*i.e.* bi-axial fence-systems extending beyond, but incorporating the house-sites) can be reconstructed. None of the fence-lines reconstructed at the various De Bogen sites could be interpreted as a house-site boundary. Rather, the fence-lines have been interpreted as belonging to (at least) two larger fence systems. The fence systems differed in orientation and in the types of fence constructions used (see section 6.3.7). Whereas fences of both type-1a and type-2 could regularly be followed for over 40 m, some stretches of type-2 fences may have exceeded hundred meters in length. Besides the long dimensions and straight trajectory, the fact that they rarely conform in orientation to the Middle Bronze Age farmhouses is also typical of the De Bogen fence-lines. Only at site 45, are fence-lines orientated more or less perpendicular to the Middle Bronze Age houses, but the intentionality thereof is questionable (fig. 6.28, B). At site 30, roughly parallel fences of different types are found close to each other, suggesting that boundaries could be (re)created by fences of different types. In addition, the many fence-lines at the latter site are all predominantly at 'non-corresponding' angles to the three Middle Bronze Age farmhouses and surround none of them (fig. 6.28, A). These observations explain why the VASO plot for the fences at the De Bogen excavations provides such an incoherent distribution (figs. 6.43, N and 6.28). Therefore, fences are presumably not primarily related to house-sites at De Bogen.

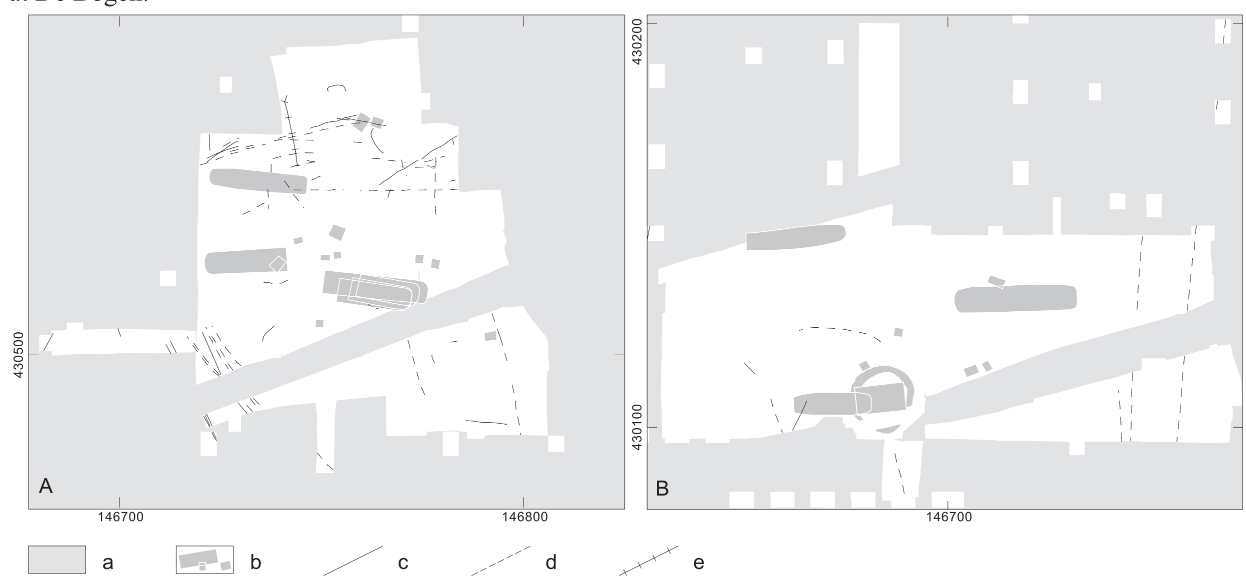


Fig. 6.28 Fence-lines and structures at De Bogen sites 30 (A) and 45 (B).
a: not excavated, b: structures, c: type-1a fences, d: type-2 fences, e: palisade.

As the excavations at Wijk bij Duurstede and Lienden have yielded no fences, the data on fence systems from one additional Middle Bronze Age settlement site in the river area, called Enspijk - A2 (section 4.3.3 and Appendix II) will be discussed in brief instead. There, similar properties could be documented for the fences as at the settlement sites discussed above. At Enspijk, despite adequate feature preservation, no fences could be identified that seemed to unambiguously surround house(site)s. This may partially be a consequence of the small width of the excavation, but most likely reflects the real distribution of fences in prehistory (fig. 6.29, A). To the northwest of the houses, several more or less parallel type-2 fence-lines were documented, whereas in the southeast predominantly type-1a fences were recognized (fig. 6.29, B and C respectively). Most of the fences have a SW-NE or NW-SE orientation, but this is not all too rigidly adhered to. In addition, a type-2 fence in the centre of the excavation has a distinct WSW-ENE orientation that is shared by a four-post outbuilding whose ground plan the fence overlaps. Presumably, there were several (Bronze Age?) phases of use of this area. For the individual fences it remains unclear to which house- or occupation-phase they belonged. In any case, the bundles of fences in the north and south do indicate that some land-divisions had to be redefined over and over, without making radical changes in the location, orientation and types of the plot-boundaries used previously.

Fig. 6.29 Structures and fence-lines at the excavation Enspijk – A2 (after Ter Wal 2005b).
a: not excavated, b: features belonging to structures, c: other features, d: type-1a fences, e: type-2 fences, f: other fence types.

The differential distribution of the fences may have been related to the height (and/or lithology) of the micro-topographic landscape, with type-2 fences at the higher more sandy parts and type-1a fences in the more lower-lying clayey areas (Ter Wal 2005b, 25).[75] Interestingly, this interpretation may also hold true for the Eigenblok fences. At Eigenblok sites five and six, type-2 fences are most frequently found. These two sites are situated on top of the highest parts of the former Eigenblok fluvial system's levee deposits. The other Eigenblok sites, where type-1a fences dominate, are situated on top of somewhat lower-lying crevasse-splay deposits.[76] At Zijderveld, the excavated area is nearly entirely situated on top of the eponymous fluvial system's levee deposits.[77] Possibly, this may explain the occurrence of type-2 fences in all parts of the Zijderveld excavations. At the De Bogen excavations, which are all situated on (stacked) crevasse splay deposits, both type-1a and type-2 fences have been recognized in different parts (*i.e.* heights) of the micro-topographic landscape (section 4.4.3; Appendix III; Meijlink & Kranendonk 2002). This indicates that the occurrence of type-2 fences is by no means exclusively tied to locations with levee-deposits in the subsoil. A relation between type-2 fences and relative height or lithology (as reflected by vegetation, land-use, or land-use potential), may nonetheless still be valid. Type-1a fences appear to be situated in both higher (more sandy) and lower-lying (more clayey) areas. The latter appear to be sometimes more frequently rebuilt when situated in areas bordering lower-lying zones of the micro-topographic landscape.[78]

Middle Bronze Age fence-systems: bi-axial landscape structuration

I have concluded that a (bi-axial) system of orientation may have steered the orientation of houses, outbuildings and fences alike upon construction. With respect to the orientation of the houses, I have shown that settlements as close-by as within 5 km from each other may display different systems of orientation. To explain such differences, two scenarios may be considered.

The joint orientation of houses, outbuildings and fences represented and communicated the dominant axes of an individual settlement site. These built-up constituents can be classified as being part of the man-made parts of the cultural landscape. It is possible that the orientation of the (built-up part of) the cultural landscape was of a confined spatial extent. Based on the observations in Chapter 4 and on the analyses of the fences above, it is clear that such systems could in some cases be larger than several hundreds of meters. Possibly, there were areas between settlement sites which were not as intensively built-up, compared to those closer to the settlement site, or where the orientation of settlement site elements was not of equal importance. If this was the case, it is understandable that at *c.* 5 km distance, the exact orientation of the built-up landscape was diluted (fig. 6.30, A). However, it remains hard to accept that for communities for whom (farmhouse) orientation was evidently of importance – and who would certainly have had knowledge of the nature of the built-up landscape at walking distance from their

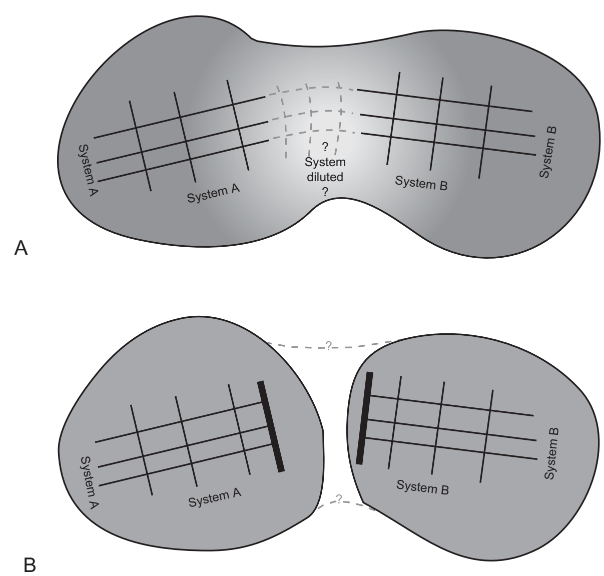


Fig. 6.30 Two scenarios for linkage between different orientation of (parts of) the cultural landscape; A: diluting of (adherence to) a system of orientation, no conceptual conflicts, B: deliberately expressed and possibly emphasised differences in orientation; conceptually contrasted.

75 The type-1a fences in the southeast may have delimited or concentrated near the Enspijk residual gully that was situated at that point (Feiken 2005, esp. 15 fig. 6).

76 See section 4.3.4; Appendix II; Jongste & Van Wijngaarden 2002.

77 See section 4.2.3; Appendix I; Knippenberg & Jongste 2005.

78 *E.g.* bordering the Enspijk residual gully (fig. 6.28, C; Feiken 2005), bordering an elongated depression (crevasse gully?) in the northwest part of the Zijderveld excavations (possibly a cattle drove; Theunissen & Hulst 1999b, 169-170).

own settlement site – exact replication of a system of orientation was, whilst strived for, not achieved. Therefore, an alternative interpretation must be considered.

In this second scenario, it is argued that the difference in orientation reflects deliberate conscious choices by the inhabitants of Bronze Age settlement sites. It may have been important for local communities to visually express a degree of separateness through opting for a different orientation of their built-up parts of the cultural landscape (fig. 6.30, B). At the boundaries in particular, such differences needed to be emphasized (*cf.* Cohen 1985, 12). Reflecting group identity was possibly an (additional) property of the extensive fence systems such as that to the south of the houses at Tiel (Van Hoof & Meurkens 2007), the type-2 fence-lines and some of the palisades at the east part of De Bogen (section 4.4.3, Appendix III) or the fences to the (north and) south of the Enspijk houses (section 4.3.3; Appendix II).

Fences and farmsteads: a conclusion

It is evident that fences can rarely be interpreted as having been erected principally to surround individual Middle Bronze Age(-B) house-sites. Only in two cases, is there sufficient evidence to assume that fence-lines may once have bounded individual house-sites. These two examples are Eigenblok house-site 1 (fig. 6.7, A), and – albeit less convincing – Zijderveld house-site 1 (fig. 6.6, A). This scarcity of clear fenced-off house-sites does not mean that Middle Bronze Age houses were never surrounded by fences. On the contrary, fences are frequently found on house-sites and often show clear spatial relations (*i.e.* avoidance or correspondence in orientation) to nearby houses. Accordingly, some of them may well *de facto* have bound-up Bronze Age house-sites, but they need not have been initially erected for this purpose. The crucial distinction is that the presence of fences that were principally constructed to surround house-sites, cannot be argued for. The fact such 'house-site girding' fences have not been uncovered at settlement sites where feature-preservation and excavation extents were adequate, is in support of this proposition.

The examples from Zijderveld and De Bogen in particular, demonstrated that the spatial interrelations between fences and houses are played out (and should be studied at) a spatial scale larger than that of the hypothetical house-site. In the areas between and around individual house-sites, systems of linear and curvilinear fences may be the dominant type of feature recovered. Fence-lines frequently can be followed in moderately straight trajectories of 40 to over 100 m. The excavation plan of Zijderveld in particular, illustrates the density and extent (presumably over several hundreds of meters, possibly continuous) to which the accessible parts of the micro-topographic landscape around house-sites were parcelled.

This parcelling with fence systems is frequently biaxial and generally more or less perpendicular.[79] Possibly, the fence systems represent the largest spatial scale on which information on the 'proper' orientation of settlement site elements was reflected or even transferred. The interplay of house-, outbuilding- and fence orientation is (in absence of more and better dates) prone to become a chicken-and-egg conundrum. Initial bi-axial fence systems may have steered house-orientation just as well as *vice versa*, and much more diverse scenarios were presumably in effect. These could comprise the gradual in-filling (compartmentalization) of initially laid-out systems, revisions, extensions and the like (*cf.* section 8.2.1; Johnston 2005). Only seldom do feature preservation and feature density allow reconstruction of major changes in the orientation or placement of fence systems. At De Bogen and Zijderveld, and possibly also Dodewaard, the orientation of stretches of fence hint at (at least) two different phases of land parcelling, whose exact dating and sequencing unfortunately escape us.

Fences were frequently rebuilt. The fact that fences of different types (especially type-1a and type-2) occur in close proximity and with a similar orientation, suggests that either the fences could be replaced with another type (yet retaining their function) or that – if fence type was coupled to plot function – the location of plot boundaries did not drastically alter upon a functional change of the plot. A few cases of rather discrete distributions of fence-types have been brought to the fore (*e.g.* Eigenblok, Enspijk), but the proposition that type-2 fences occur more frequent at greater distance from house-sites (Theunissen & Hulst 1999b, 168) remains as yet unsubstantiated. Nonetheless, the type-2 fences may have had a more limited distribution than the type-1a fences. At some Middle Bronze Age(-B) settlement sites (*e.g.* Enspijk, Eigenblok), the type-2 fences were documented on the highest parts (sandy) of the

79 As was also the case with the houses and to a lesser extent with house-outbuilding combinations (*supra*).

micro-topographical landscape, whereas the type-1a fences occurred both in higher and lower parts. As the height and lithology of the micro-topographical landscape (as a proxy for ground- and floodbasin-water levels) are related to agricultural usability, a different function for the (parcels bound by the?) different fence types may still be reflected. To put it more succinctly; a direct correlation between houses and the fences in their direct vicinity frequently cannot be established, indicating that it is generally unclear whether these fences surrounded a house-site. Moreover, stretches of fence extend far beyond the direct vicinity of the houses, suggesting that their primary function was to parcel the wider landscape. This system of landscape parcelling commonly shares its orientation with the houses. Additionally, this system of landscape parcelling seems to acknowledge landscape features (*e.g.* such as residual gullies) and seem to meaningfully integrate other (and/or older) built-up structures such as houses in a single cultural landscape.

6.4.4 The distribution and contents of pits on Middle Bronze Age house-sites

Pits are frequently, yet not invariably, discovered on Bronze Age settlement sites. Usually, their spatial relation to houses is unclear, but nonetheless it is generally assumed that pits may very well have been part of Middle Bronze Age(-B) house-sites.[80] Generally, their distribution is not determined by close-proximity to Middle Bronze Age(-B) farmhouses, but extends significantly beyond the houses (*e.g.* Fokkens 1991, 96; *infra*). In order to investigate the spatial interrelations of house(-site)s and pits, the latter have been incorporated in the VASO plots for the different Middle Bronze Age settlement sites.[81] As has already been argued above (section 5.7), the function of most pits remains unknown, so that only pits, possible refuse pit (*i.e.* over 500 g of artefacts) [82] and possible wells will be discussed at this point.

At Zijderveld, several pits were identified on the four house-sites, but these generally contained no or few finds (< 200 g; Hulst 1967a, 3; Theunissen & Hulst 1999b, 169). These pits are found close to (or even underlying the) house walls as well as in more distant locations. Only a single larger pit to the north of house 4 (fig. 6.37, D) and the drinking pools at house-site 3 contained a sufficient amount of artefacts to postulate a secondary function as refuse dumps (Knippenberg & Jongste 2005, 63-69). The low numbers of pits in general on these house-sites with good feature preservation indicates that pits did not occur in large numbers on Middle Bronze Age house-sites here.[83] Rather, pits seem to be part of a more general distribution of pits, which may show somewhat higher numbers of pits in the northern (*i.e.* higher) parts of the settlement site (fig. 6.31). Only for the drinking pool that may have been fed by the house 3 roof's watershed (see section 3.4.2; Appendix I) can a clear-cut relation between houses and pits be established. For all others, the interpretation of their interrelations must remain ambiguous. At Eigenblok, the pits frequently overlap with the house ground plans, but have yielded no indications that they were contemporaneous to them. The original function of most of the pits was hard to establish. Only two of the over hundred pits deeper than 10 cm contained more than 500 g of artefacts and may have been used (secondarily) as refuse dumps.[84]

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80 *E.g.* Van Regteren Altena, Buurman & IJzereef 1982, 25; Roymans & Fokkens 1991, 10; Hessing 1991, 44; Schinkel 1994, 27; Theunissen 1999, 194; Hermsen 2003, 66; Meijlink 2002b; 762; Berkvens, Brandenburgh & Koot 2004, 68; 76.

81 The selection of features as 'pits' per site was different. For Dodewaard and the pre-2003 excavations at Zijderveld, no feature-types distribution was known. Surface area in the excavation plans had to be used as a proxy, and interpretations rely heavily on Theunissen & Hulst 1999a-b. For the parts of Zijderveld excavated in 2003 and 2005, Tiel - Medel, Eigenblok and De Bogen, pits could be identified by their feature-type as recorded in the (digital) excavation data-sheets. For clarity (*i.e.* to exclude natural features and enhance visual pattern recognition with large data sets) only pits deeper than 10 cm have been incorporated for these sites. For Wijk bij Duurstede - De Horden no full excavation report or digital data were readily available (see Appendix IV), which means that only pits in the immediate (*i.e.* < 20 m) vicinity of the houses have been included in the VASO plot.

82 The 500 g of finds used here as a threshold value for possible refuse pits is arbitrary, but not insignificant. The content of pits at Bronze Age settlement sites in the river area is generally less than 500 g, but often complemented by a small group of features with weight contents of over 500 g to 1 kg. The latter may have been used (secondarily) for the disposal of settlement site debris. For example, of the 20 pits uncovered in the Zijderveld 2005 excavations, only four contained more than 200 g (of which three more than 1.8 kg; original fieldwork documentation). See also the unequal distribution of pit contents at Eigenblok (*infra*).

83 For the 2003-2005 excavations, only 7 of the total 30 pits (excluding wells and drinking pools) are situated close (< 20 m) from the houses. In other words; the majority of pits (*c.* 77 %) is situated beyond 20 m of the houses.

84 One pit at site 4 (4KL14; s226.180) contained 368 g burned clay and a stone (129 g; Hielkema, Prangsma & Jongste 2002, 122) and one pit at site 5 (5KL32; s14.114) contained 544 g animal bone, 445 g pottery and several other finds (*ibid.*, 139).

Fig. 6.31 Location of pits and tentative pits at Zijderveld.
a: not excavated, b: houses, c: tentative pits, d: pits, e: drinking pools, f: possible (unlined) wells.

Fig. 6.32 Location of pits at Eigenblok sites 1 to 4 (A), 5 (B) and 6 (C).
a: not excavated, b: houses, c: pits, d: well, e: burnt areas.

This argues against an interpretation of (secondary) refuse pits for the majority of these pits. Their distribution does indicate that they occur frequently near houses, but as generally only small areas around the houses have been excavated, this cannot be interpreted as a true clustering (fig. 6.32). Moreover, at site 3 no house plan but various pits could be identified, which also supports the interpretation that pits occur both near, and more distant from houses. Possibly, larger pits were preferably dug to the (north)west of the Eigenblok houses.

For the pits in the Dodewaard excavation, no preferred location in relation to the houses could be argued. The interpretation of Theunissen and Hulst (1999a, 148) that most pits are situated near the margins of the areas with the highest feature density is correct, but this apparent distribution may be influenced by the small width (< 30 m) of the excavated area. Like at Zijderveld and Eigenblok, the pits are relatively few in number and contained no or few finds (*loc. cit.*).

At the De Bogen excavations, similar patterns to those at Zijderveld, Dodewaard and Eigenblok could be documented (*supra*, esp. fig. 6.10). Pits were frequently encountered on house-sites, but showed no evident spatial relation to the nearby farmhouses (*contra* Hielkema, Brokke & Meijlink 2002, 189). Possibly, at spatial scales above that of the hypothetical house-sites, the larger pits show some clustering (*ibid.*, 159). Like at Zijderveld and Eigenblok, pits with many (> 500 g) recovered artefacts are scarce. Wells were mostly discovered outside the hypothetical house-sites and seem to cluster in certain parts of the landscape. Such clusters of wells could have a time-depth exceeding that of the Middle Bronze Age(-B) occupation phase currently under study.

At Wijk bij Duurstede, very few Middle Bronze Age pits are presently known, but these show a distinct clustering near two houses (see section 4.5.3, esp. fig. 4.26, C-D). These pits, again, contained few finds (Hessing 1991, 44; Appendix IV). The distribution of pits near Wijk bij Duurstede - De Horden house 3 correspond to the house in size and orientation. These properties, combined with the relatively exclusive occurrence of such pits near houses, allow one to postulate that pits and houses could be interrelated entities at this settlement site. The absence of such pit(cluster)s at the other Wijk bij Duurstede house-sites, indicates that pit(cluster)s were optional and not essential elements of Middle Bronze Age(-B) houses-sites.

The distribution of the pits at Lienden is relatively even and of a relatively low density (section 4.6; Appendix V, esp. fig. V.20). Consequently, only few pits can be identified on the two reliable Middle Bronze Age(-B) house-sites. At this site, it is not so much the placement, but the contents of the pits that stand out. Over 20 pits contained more than 500 g of artefacts. The location of these 'rich' pits is (weakly) correlated with the height of the micro-topographic landscape.

At Tiel - Medel 8, a similar situation was documented. A significant (*c.* 14 %) part of the pits at this site contained more than 500 g of archaeological remains, but only three pits were situated within hypothetical house-sites. For the modest overall numbers of pits recorded at the Tiel - Medel houses-sites, no preferred location in relation to the house-sites could be identified. Rather, clusters of Middle Bronze Age(-B) pits, some containing over 2.5 kg of artefacts, appear to be situated in areas outside the hypothetical house-sites. The same argument holds true for the ten possible Bronze Age wells at this site, of which three were situated within hypothetical house-sites (*supra*; De Leeuwe & Van Hoof 2007). Much like at De Bogen, the two wells situated within the house-site of house 8 appear to be part of a bigger cluster of wells, that reflects a use-life surpassing that of the Middle Bronze Age(-B) occupation period(s).

	pits few in nr few finds	pits many nos. few finds	pits many nos. many finds	wells
even or clustered beyond house-sites	Dodewaard Zijderveld Eigenblok ?	Eigenblok ? De Bogen Tiel ?	Lienden Tiel ?	Zijderveld De Bogen Tiel
clustered on house-sites	Wijk bij Duurstede-De Horden	n.a.	n.a.	Eigenblok ?
none (?)	n.a.	n.a.	n.a.	Dodewaard Lienden De Horden

Table 6.2 Simplified interpretation of the different settlement sites by the numbers, contents and locations of pits and wells.

Most of the differences underlying the interpretation of the sites in table 6.2 are gradual, rather than categorical. Nonetheless, some properties are shared among several different settlement sites, whereas others occur only on a limited number or individual settlement site. The latter obervation may hint at local group decision making. From the above arguments and table 6.2 it is clear that pits generally contained few finds on all sites. Unfortunately, this low artefact content and generic shape of most pits does not allow interpretation of their original function with certainty (see section 5.7). The low artefact contents suggest that a (secondary) use of such pits as refuse dumps, like for some of the pits at Lienden and Tiel, was not the chief or sole incentive to dig these in the first place. At Zijderveld and Lienden, there are some indications that the density of pits was correlated to relative height of the micro-topographic landscape.[85] Additionally, pits cannot be proven to cluster (*i.e.* be preferentially located) near houses at most settlement sites. Only a single house-site at Wijk bij Duurstede - De Horden (fig. 6.46, C), provides a convincing exception to the rule (fig. 4.24).

Drinking pools for livestock could be identified at Zijderveld and Eigenblok, where they were situated close to the houses.[86] This data set is however too small to determine whether this proximity to the houses was a favoured property or not. The distribution of wells at De Bogen and Tiel has been interpreted as being steered by the presence of usable aquifers rather than by the presence or absence of house(-site)s. Consequently, the presence of wells on the Eigenblok and Zijderveld house-sites is likely to be ‘coincidental’.

To conclude, it is evident that pits, pits secondarily used as refuse dumps, drinking pools and possible wells could occur close to houses, but there are no indications that they occured predominantly – let alone exclusively – near houses.[87] These features are accordingly best typified as house-site components, as opposed to house-site constituents.

6.4.5 High quality house-sites: multi-site VASO

In the beginning of this chapter the criteria for the evaluation of the applicability for VASO use for Middle Bronze Age house-sites were indicated (table 6.1). This allows to complement the analyses undertaken for the sites individually, with an analysis that uses only the best-quality house-sites from the various excavations. This may outline patterns of house-site ordering that are (only, or more visibly) present with house-sites of best suitability to VASO analysis. Consequently, here an analysis of the ten house-sites best suitable to VASO will be presented (fig. 6.34) to investigate whether any not yet previously patterns become visible. Based on the criteria in table 6.1, house-sites 2 to 4 from Zijderveld, house-sites 1 and 5 from Eigenblok, 1b and 2 from Dodewaard and De Horden house-site 9 were selected. As several options of comparable quality were open for the last two entries, it was decided to incorporate two house-sites from not yet listed settlement sites (house-site 2 from Enspijk and house-site 2 from Tiel-Medel 8).

Clearly, previously documented patterns can again be observed. Fences do not evidently defined house-sites, but seem to be part of larger systems that however frequently conform in orientation to the farmhouse or are orientated perpendicularly to it (fig. 6.34, C; g-i). The outbuildings occur in a zone around the farmhouse, with slight indications for more dense clusters near the farmhouses’ long sides and left from the short side entrances (fig. 6.34, D; b-c). No far-reaching inferences can be made on the distributions of the other settlement site elements (fig. 6.34, d-g). This confirm the validity of the inferences made for the individual sites.

The correspondence between the multi-site VASO plot (fig. 6.34) and those of the individual sites (figs. 6.37 to 6.59), confirms that no distinct patterns that were potentially visible on high-quality sites but that have been obscured in single-site VASO plots have been overlooked. Moreover, the similarity between the multi-site VASO plots and the single-site VASO plots indicates that certain principles of house-site structuring were similar (or shared) on a supra-local scale.

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85 Possibly, the original (*e.g.* storage?) function of these pits benefited from a relatively higher position in relation to groundwater tables, which may explain why they are more commonly found on micro-topographic elevations.

86 Knippenberg & Jongste 2005, 63-69; Hielkema, Prangsma & Jongste 2002, 122, *cf.* section 5.7.

87 Figure 6.60 shows a VASO plot towards magnetic north with the distributions of pits, wells, drinking pools and those features possibly used secondarily as refuse pits at Zijderveld, Eigenblok, Wijk bij Duurstede - De Horden and Lienden. From this plot, the inter-site diversity (*e.g.* in types and presences of pits) is clear, but also the fact that only at Wijk bij Duurstede (fig. 6.60, C), pits cluster near the houses and were presumably part of a farmstead. See figure 6.10 for the situation at De Bogen.

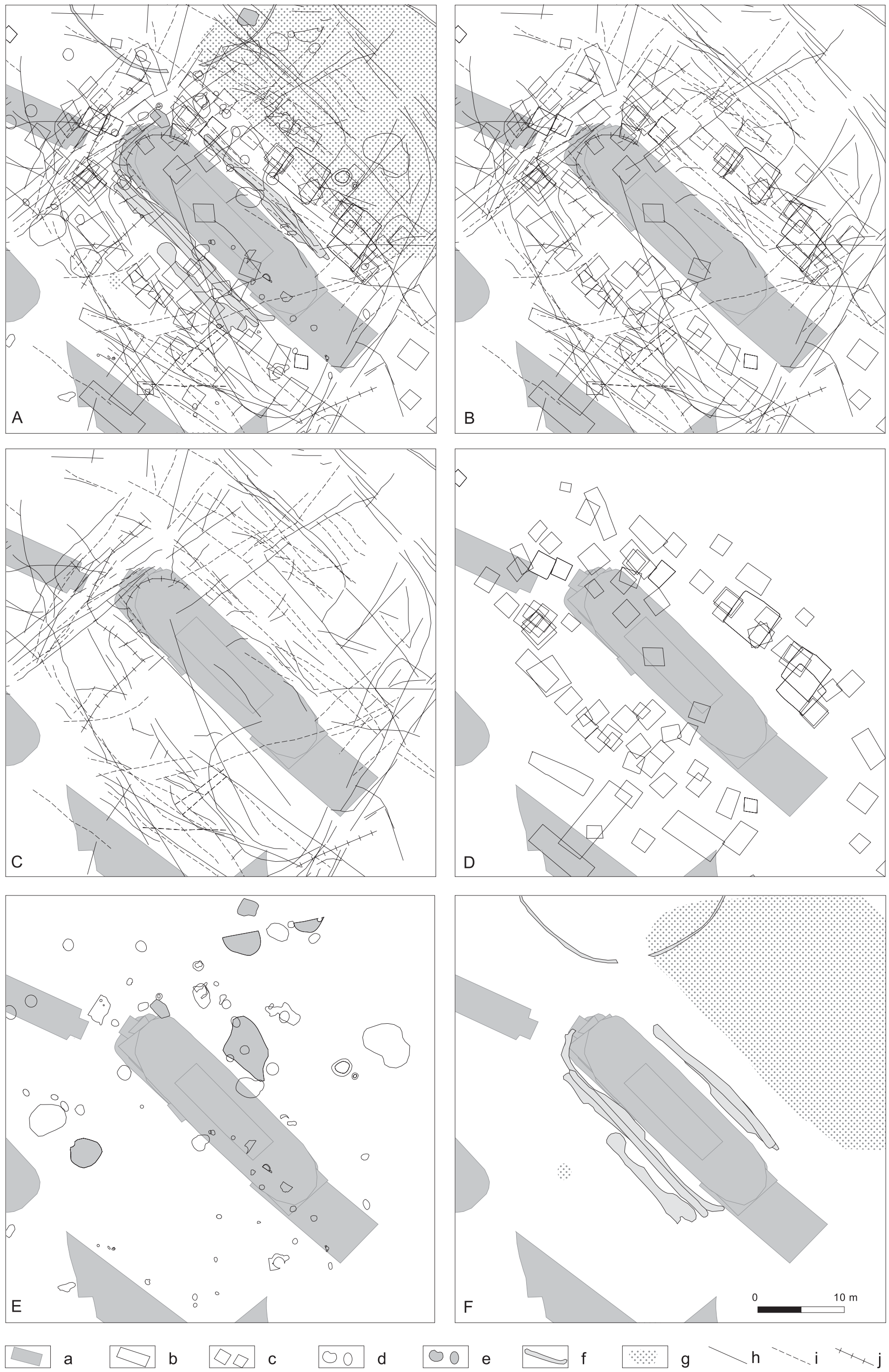

Fig. 6.34 Multiple (best quality) site VASO plot for all elements (A), houses, outbuildings, fences and palisades (B), houses, fences and palisades (C), houses and outbuildings (D), houses, pits and wells (E) and houses, ditches and hoof-imprints (F).

a: houses, b: barn/shed type outbuildings, c: granary-type outbuildings, d: pits, e: wells and watering holes, f: ditches, g: type-1a fences, h: type-2 fences, i: other fence types and palisades.

6.5 On the reality of Bronze Age farmsteads

The analyses of Bronze Age house-sites with a methodology of Visual Analysis of Spatial Overlays (VASO) have shown that several ordering principles can be outlined for Bronze Age house-sites. Moreover, I have shown that particular properties of house-sites (such as the clustering of outbuildings around houses or the avoidance of a general NE-SW orientation) were shared between different Middle Bronze Age settlement sites in the Dutch river area. Despite such sharing, I have shown that during the Middle Bronze Age various preferences in house-site structuring were open to manipulation at settlement site level in the Dutch river area (fig. 6.14). This suggests that while the *types* of conventions may have been more widely shared, such conventions were – presumably very consciously – articulated and materialized locally.[88]

Yet more importantly, do such conventions and local reflections thereof permit the use of the interpretative label 'farmstead' (table 3.2; section 3.2.1) for such structured house-sites? The conclusions offered below are initial answers to this question and the aim of defining the nature of Bronze Age house-sites, which is one of the major research questions of this study (Chapter 1). Unfortunately, the VASO methodology used in this chapter – in overstepping all problems of contemporaneity (section 6.3.4) – predominantly stresses shared patterns. Although this provides much needed insight into the generic nature of Bronze Age house-sites, it also results in an unwanted a-temporal perspective. By ignoring and simplifying diachronic variations, an undesirable 'flattening' of house-site time-depth has occurred. Therefore, a more diachronic perspective on the dynamics and life-histories of house-sites will be introduced in the next chapter (section 7.3.2). At this point, however, the information on the nature of Bronze Age house-sites in the river area from a more generic (and inherently temporally static) perspective is presented first.

The distribution of Middle Bronze Age farmhouses as a possible indicator of house-site size

In the distribution of the Middle Bronze Age farmhouses themselves, some information of Bronze Age landscape structuration is encoded. The overbuilding of houses by other Bronze Age farmhouses is nearly absent in the data for the Dutch central river area.[89] Well over 90 % of the Middle Bronze Age(-B) farmhouses were thus constructed at some distance from other houses at a given settlement site. I have indicated above that, save for a few exceptions, these houses generally all conform to a shared, single bi-axial system of orientation.[90]

In addition, I have argued that shared (house) orientation – even if it cannot be proved to reflect contemporaneity – at least reflects an importance not to disrupt (pre-)existing orientations of landscape structuring. In any case, the distances between the individual houses at a given settlement site do reflect deliberate inhabitant behaviour. The lack of overbuilding may indicate either that a certain distance had to be maintained in relation to co-existing farms when erecting a new one, or alternatively that it was considered unfavourable ('taboo'?) to construct new houses on former house-sites in this region (*cf.* Borna-Ahlkvist 2002, 195). Therefore, the minimum distance between houses may be a correlate of house-site size (table 6.3).

Excluding the two house-sites from Lienden, which are 560 m apart, for the remaining Middle Bronze Age(-B) house-sites in the Dutch river area a second house-site can be found between 10 to 80 m in over 86 % of the cases (mean value excluding Lienden *c.* 53 m; table 6.3).[91] This may indicate that the size of Middle Bronze Age-B house-sites could have varied in dimensions from 10 to 40 m (*c.* 23 m mean) distance from the house (wall). This corresponds well to the overall (ovoid, *c.* 50 by 70 m) distribution of the granaries around all houses (fig. 6.22, B).

88 For example, one such shared general convention may be translated as 'house orientation is an important property that is shared by the houses within a settlement', but the selected orientation differs markedly and presumably deliberately *between* settlements. Similarly, a general shared convention such as 'granaries are preferably placed within 35 m from the farmhouse and correspond to it in orientation', is articulated locally in the preferred location of these outbuildings in relation to the house (fig. 6.14).

89 For the definition of 'overbuilding' see fig. 3.3; section 3.2.3. Enspijk - A2 (Ter Wal 2005b; section 4.3.3), and possibly De Bogen houses 45BH/45HH (section 4.4.3; Appendix III) and Tiel - Medel 8 house 8 (Van Hoof & Jongste 2007) may be interpreted as the exceptions to this rule.

90 Section 6.4.1. Exceptions may be house 2 at Enspijk (Ter Wal 2005b; section 4.3.4), house 1 at Eigenblok (section 4.3.5 and Appendix II) or house 3 at Tiel - Medel 8 (Van Hoof & Jongste 2007).

91 Frequency analysis shows that nearly 60 % of these houses are located at 10 to 50 m from another Middle Bronze Age farmhouse.

Consequently, based on the distribution of both other houses and possibly accompanying outbuildings, an area of 10 to 25 or even 40 m around the house walls is an acceptable size estimate for Middle Bronze Age-B house-sites.[92]

Moreover, the mean inter-house distance for the distribution of the Middle Bronze Age house-sites in the Dutch river area (*c.* 53 m) is half the distance frequently assumed for Middle Bronze Age house-sites to be situated apart (*c.* 100 m).[93] This indicates that a diffuse spread of house-sites – which is seen as characteristic for a settlement model of wandering farmsteads (section 3.3.2) – need not apply here.

Quite to the contrary, the relatively close proximity of houses, combined with their shared house-site properties (*e.g.* house orientation and placement of outbuildings) suggests that the Middle Bronze Age(-B) settlement pattern in the river area was one of multiple, closely spaced, interrelated (and/or contemporary) houses (*cf.* Meijlink 2002b, 803).

Although inter-house distances may provide a crude size-estimate for Middle Bronze Age(-B) house-sites, the shape of the Middle Bronze Age-B house-sites remains essentially unknown. The curved fences around the farmhouse at Eigenblok site 1 (fig. 6.40, A) fall within the size-limits suggested above, but it has been argued above that fences are not reliable indicators of house-sites.

site	house-site (hs)	min. distance 2nd (nearest) hs	min distance 3rd hs
Zijderveld	1	28	55
Zijderveld	2	28	106
Zijderveld	3	55	106
Zijderveld	4	160	165
Eigenblok	1	72	199
Eigenblok	2	72	129
Eigenblok	4	78	129
Eigenblok	5	78	212
Eigenblok	6.1	14	344
Eigenblok	6.2	14	366
De Bogen	28-4	74	463
De Bogen	28-1	74	359
De Bogen	45bh	35	37
De Bogen	45ah	31	35
De Bogen	45ch	31	37
De Bogen	29b2/3h	166	173
De Bogen	30b-eh	20	25
De Bogen	30gh	15	20
De Bogen	30ah	15	25
De Horden	1	35	38
De Horden	2ab	25	38
De Horden	3	25	33
De Horden	4/5	35	45
De Horden	6/7	66	67
De Horden	8	137	153
De Horden	9	68	90
De Horden	10	91	98
De Horden	11	185	196
De Horden	12	33	47
Dodewaard	1ab	23	56
Dodewaard	2	23	25
Tiel-Medel 8	1	33	46
Tiel-Medel 8	2	12	33
Tiel-Medel 8	3	12	46
Tiel-Medel 8	5	15	198
Tiel-Medel 8	6/7	15	218
Tiel-Medel 8	8	64	71
Lienden	15p	560	n.a.
Lienden	14d	560	n.a.

Table 6.3 Minimum distance in meters between Middle Bronze Age(-B) house-sites in the Dutch river area for the different settlement sites.

In addition, the ovoid shape of the outbuilding distribution in figure 6.22 should not be considered representative for the shape of the house-site. The different shapes of the outbuilding distributions per site (fig. 6.35) show that sufficient variation exists not to interpret the individual distributions as being identical in shape.[94] Evidently, some variation in the placement of outbuildings between different settlement sites may have been common, yet all still conformed to a more general distribution pattern for outbuildings on Bronze Age sites in the Dutch river area (section 6.4.2).

Furthermore, it is important to realize that the lack of knowledge on the shape of Middle Bronze Age(-B) house-sites is not a result of inadequate feature preservation or methodological issues. Had Middle Bronze Age-B farming communities wished to physically delimit their house-sites by means of earth-fast structures such as fences, palisades or ditches, the conditions of excavation would have allowed them to be recognized at most settlement

92 Based on the 10-40 m suggested by the house distribution and the 50 by 70 distribution corrected for a mean house width of 6 m and length of 20 m (see section 5.2.3.4; fig. 5.26).

93 Roymans & Fokkens 1991, 16 ('at least 100 m'); Theunissen 1999, 192 table 4.12 ('*c.* 100 m'); Jongste 2002b, 591 ('100-300 m').

94 Moreover, note how the elongated and narrow shape of the excavation at Dodewaard (fig. 6.35, F) determines (or distorts) the distribution.

sites.[95] The absence of structures intended principally to delimit Bronze Age farmsteads in the Dutch river area, needs to be taken at face value: they cannot be reconstructed because they were never there.[96]

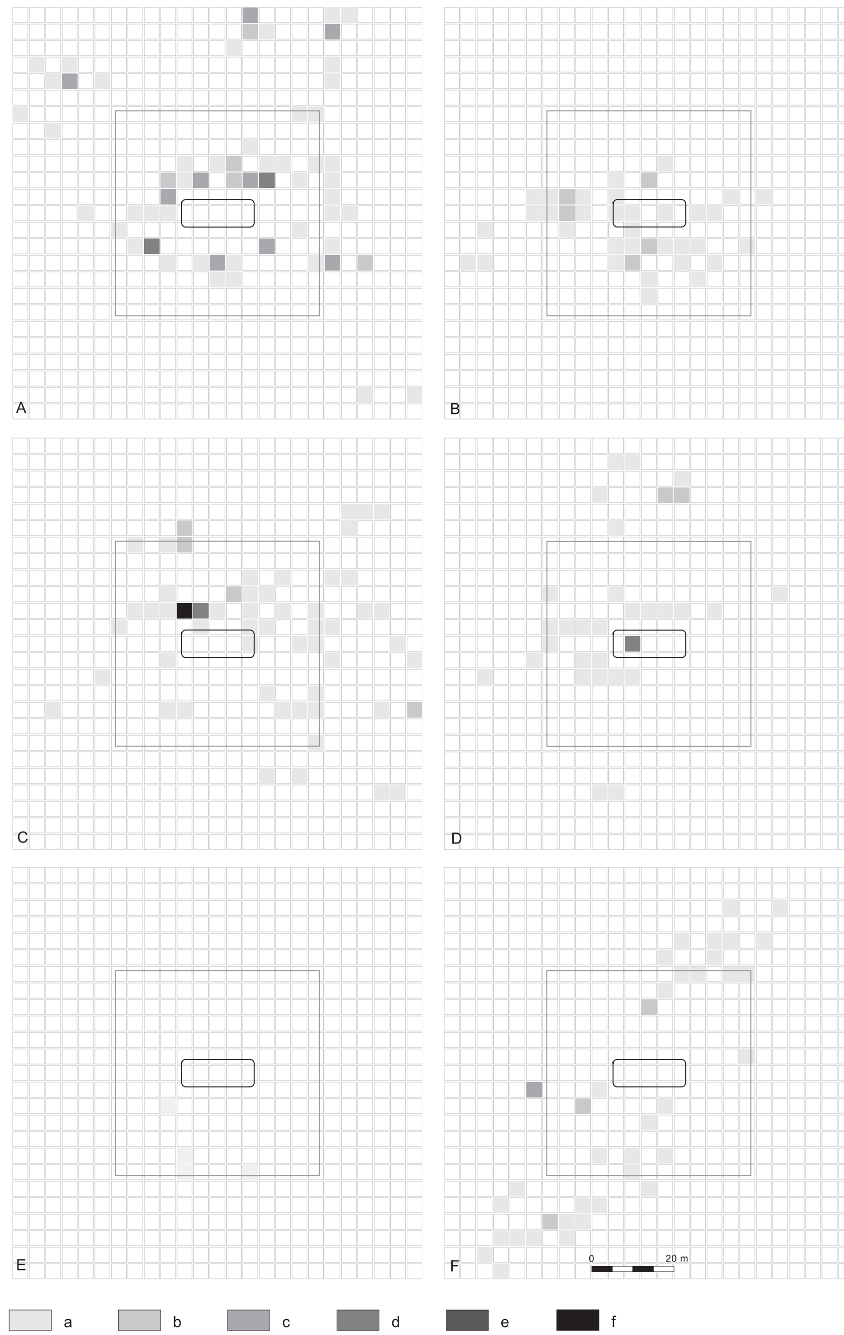

Fig. 6.35 Distribution of all outbuildings for the overlain Middle Bronze Age(-B) housesites of Zijderveld (A), Eigenblok (B), De Bogen (C), Wijk bij Duurstede (D), Lienden (E) and Dodewaard (F), plotted against a generic Bronze Age house and 50 by 50 m hypothetical house-site.
a: one outbuilding, b: two outbuildings, c: three outbuildings, d: four outbuildings, e: five outbuildings, f: six to ten outbuildings.

95 Only at Wijk bij Duurstede and at parts of Meteren - De Bogen, may feature preservation have been inadequate to preserve shallow stake postholes or shallow ditch features.

96 While fences frequently seem to respect (and thus reflect) areas directly around the houses, I have argued (section 6.4.3) that this was not their principal function and that they only *de facto* delimited house-sites. Accordingly, no exception is made for fences in this statement. See also Streiffert (2005, 4). Of course one has to allow for the possibility of house-site defining structures of no or low archaeological visibility such as vegetation (*i.e.* hedges), clearances (*cf.* Rapoport 1990, 147) or even (partly) notional boundaries (*cf.* Van Meijl 1993, 214; Whitelaw 2003 (1994), 225 or the Jewish *eruv* boundaries; Chapter 5, note 269).

Borderless house-sites: an association game

Having argued above that clear-cut archaeologically visible boundaries are not to be expected for Middle Bronze Age house-sites in the Dutch river area, establishing the possible contents of house-sites becomes a difficult task. Essentially, one has to determine meaningful spatial interrelations between houses and other settlement site elements without relying solely on proximity. For all possible house-site elements, their distribution in relation to houses must be checked with the general distribution across settlement site space and must furthermore be interpreted in light of the available evidence on their suspected function and the nature of the physical landscape within which the different elements are situated.

For the fences, it has already been suggested above that these can occur alone or in bundles both near, and more distant from the farmhouses. Some fence-lines share their orientation with nearby houses, which may hint at a deliberate interrelation. As the fences frequently continue beyond the estimated house-site size, it is plausible that a single or comparable set of (cosmological or physical?) structures guided the orientation of houses and fences alike. Although the orientation of fences and houses may have been mutually guided by one another in cases of close proximity, they are not mutually interdependent. In other words; whilst frequently spatially acknowledging each other, the distribution of fences and houses is essentially unrelated. Whereas in rare cases fences may have defined house-sites (*e.g.* Eigenblok house-site 1), fences predominantly served other purposes.

Several arguments have been forwarded to support the claim that houses and outbuildings were joint entities on house-sites and that outbuildings cluster near houses. I have shown that within the 50 by 50 m hypothetical house-site, as well as on larger spatial scales, outbuildings predominantly cluster near houses. Beyond a zone of 10 to 40 m from the farmhouses, outbuildings occur infrequently and are predominantly situated near the excavation extents. I have suggested that the majority of them are best interpreted as belonging to unexcavated house-sites. Furthermore, not only do outbuildings cluster near the houses, but they also have been shown to be predominantly orientated parallel to one of the farmhouse's axes of orientation. Lastly, in respecting the placement, orientation and the type of the outbuildings when rebuilding it,[97] the Bronze Age builders have left us tangible evidence that they themselves had distinct mental templates of 'where what kind of outbuilding should be built'. Outbuildings are, like the houses proper, the unique settlement site element that define and constitute house-sites. No other settlement site element is found in so frequent and so exclusive an association with Middle Bronze Age farmhouses as are granary-type outbuildings.

Following from the above, pits are best regarded as farmstead components, as they are no quintessential part of Middle Bronze Age(-B) house-sites. Whereas at some settlement sites more pits are documented than at others, pits containing large quantities of artefacts are generally scarce.[98] In the Dutch river area, pits on Middle Bronze Age(-B) settlement sites show a distribution that is generally *not* related to the presence of houses.[99] Possibly, pits were at some sites dug somewhat more frequently at the highest parts of the micro-topographic landscape, but at other sites their distribution appears rather even.[100] Some drinking pools for cattle have been found close to the houses, but are (yet) too few in numbers to assume this to be their preferred location.[101]

The distribution of wells is also better interpreted as being related to preconditions of the physical landscape (*i.e.* the presence of useable aquifers) as opposed to being related to house-sites. Whereas some wells were found quite close-by to houses, the fact that at other sites wells cluster in specific locations (with clusters spanning multiple archaeological periods) suggests that their distribution was not steered by the presence of a house. To reverse the argument, for 90 % of the Middle Bronze Age(-B) houses in the Dutch river area no wells were found at short (< 20 m) distances. Additionally, the presence of (older) palisades and funerary structures at short distances from

97 Possibly also when rebuilding an entire house-site? *cf.* fig. 6.12, C.

98 *Contra* Fokkens 2005a, 362. Contrary to this statement (*loc. cit.*), pits do not facilitate house-site recognition.

99 Save for one significant exception; Wijk bij Duurstede - De Horden house-site 3 (fig. 4.24).

100 The evidence from Tiel, and possibly also from Lienden, suggests that pits that contained more finds are actually situated more distant from house(-site)s. Note in this respect that the pits at De Horden house-site 3 (fig. 4.24) also contained very few finds.

101 For livestock herding sedentary communities, it may have been favorable that the condition of the water in the drinking pools, as well as the condition of the animals making use of it, could be easily checked on a regular basis, by locating drinking pools next to the houses.

houses has been documented.[102] As with the cattle hoof-imprints, ard-marks and several other phenomena whose contemporaneity is often unclear, it is impossible to ascertain whether these phenomena were ever conceived of as being part of the house-site (*cf.* section 8.2.3.3). In addition, various activity areas and yet unrecognized agricultural structures are likely to have been part of Bronze Age house-sites.[103] It is equally important to note that various phenomena that may be expected, have not been found (section 5.9). Especially the locations of craft-production, most notably ceramic production and metal-working, were either not situated near the houses or have not yielded archaeologically visible traces.

To conclude, a final possible correlate (proxy) for Middle Bronze Age(-B) houses-sites can be forwarded. This concerns artefact distributions. Where Middle Bronze Age(-B) house-sites in the river area have not been affected by severe later anthropogenic or fluvial erosion, they appear to be characterized by large quantities of artefacts. For instance, the well preserved vegetation horizon with embedded finds of the upper (*i.e.* Middle Bronze Age-B) occupation level at Eigenblok site 5 contained over 207 kg of domestic refuse.[104]

The distribution of this debris was not uniform. Rather, the house plan forms the centre of a distribution pattern that mimics properties of the house in shape and orientation (fig. 6.36). As pottery was the dominant find category in weight for Eigenblok house-sites 5 and 6 (65.2 and 71.6 % respectively; Jongste 2002a, 28 table 1.2), the pottery distribution plots for these two sites are here considered representative for the overall distribution. Their dimensions fit well with the assumed dimensions of house-sites postulated above.

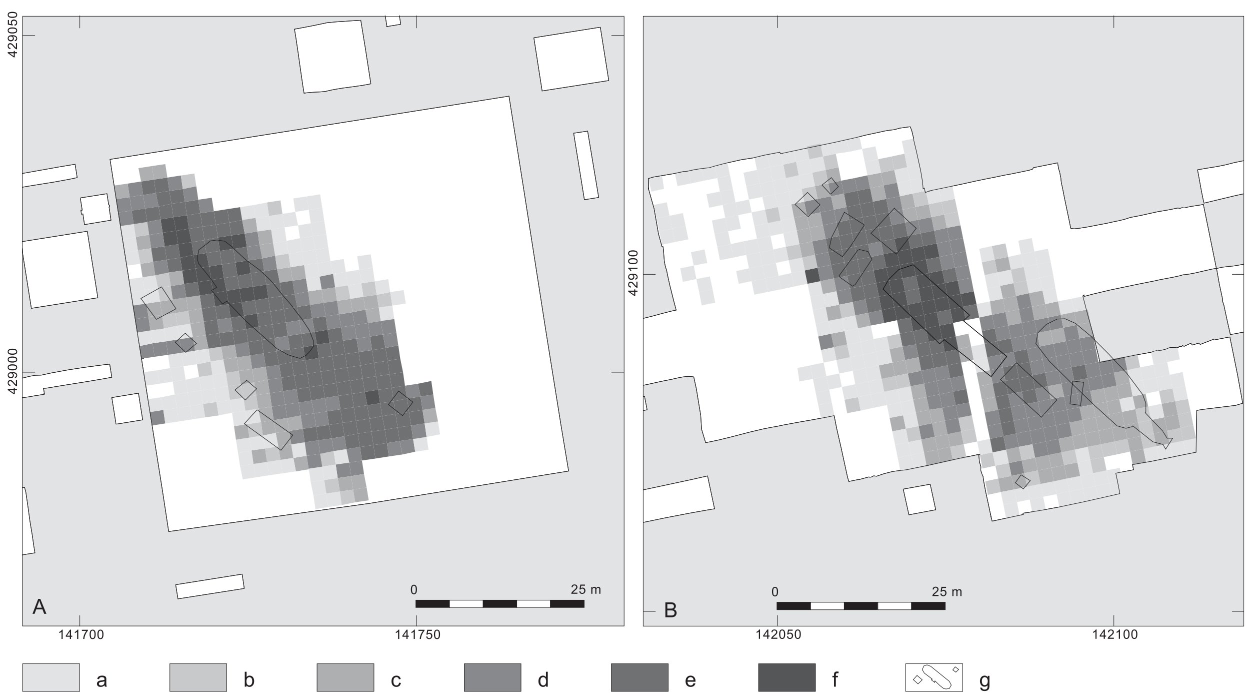

Fig. 6.36 Pottery distribution plots for Eigenblok sites 5 (A) and (B), after Bloo & Schouten (2002, 257 fig. 4.16 and 261 fig. 4.18).
a: 0-30 g, b: 30-50 g, c: 50-140 g, d: 140-360 g, e: 360-1 kg, f: 1-4.5 kg, g: houses and outbuildings.

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102 On palisades see section 5.5. On the interrelation between houses and funerary sites see section 8.2.3.3; Bourgeois & Arnoldussen 2006; Bourgeois & Fontijn 2008 and Meijlink 2008.
103 *Cf.* references in note 3.
104 As the main excavated area was *c.* 230 square meters, this approximates 900 g per square meter. For Eigenblok site 6 similar values can be calculated (lower levels negligible, upper level features contain 1.4 % in weight, upper find-layer the remainder of 197 kg; *c.* 340 g / square m; based on Jongste 2002a, 28 table 3.28 and original documentation). Note that the table headings for tables 6.26 and 6.28 (*op. cit.*) are incorrect.

This strong correlation between artefact densities and house-sites observable at Eigenblok (fig. 6.36) may also be valid for other settlement sites with adequate preservation conditions.[105] At Dodewaard, the artefact densities could only be plotted by trench, but show a similar relation (Theunissen & Hulst 1999a, 149 fig. 4.21a). Additionally, it means that such house-sites may be more easily recognized during campaigns of prospective archaeological coring (*cf.* section 2.7).[106] The excavations at Zijderveld and Tiel illustrate that absence of occupation layers which are rich in archaeological materials, does not preclude the presence of various house-sites with good feature preservation (section 4.2.3; Van Hoof & Jongste 2007).

In the sections above I have argued that only houses and outbuildings can be considered house-site constituents. Fences and pits are (optional) house-sites components, whose distribution is generally not limited to house-sites. In addition, artefact densities have been suggested to correlate to Middle Bronze Age(-B) house-sites. These results show that (somewhat disappointingly) few structuring principles for Middle Bronze Age house-sites can be outlined. Based on the VASO results, Bronze Age house-sites are characterized mainly by house-outbuilding interrelations. It may be challenged whether this is 'enough' or 'meaningful enough' house-site structuring to merit the use of an interpretative label such as a farmstead. Essentially, this is a terminological matter for archaeologists amongst themselves to debate. However, I will argue later-on (section 8.2.2) that to Bronze Age farmers, 'farmsteads' entailed more than just physical or conceptual interrelations between houses and outbuildings.[107]

The results presented in this chapter on the systematic analysis of Bronze Age house-site structuring in the river area, should be complemented by more qualitative analysis of house-site structuring (Chapter 4; section 8.2.2), but should also take problems of chronology and archaeological visibility into account.

First, it must be stressed that the observable patterns (as yet) only apply to Middle Bronze Age-B house-sites, since no clear-cut Middle Bronze Age-A house-sites are presently known (see section 5.2.2). Rather than simply dismissing this observation as attributable to an inadequate data set, I feel we should reverse the argument. Evidently, Middle Bronze Age-A house-sites do not consist of similarly recognizable constituents (houses, outbuildings, fences), or they are of a structure and spatial distribution that we, for whatever reasons, fail to detect. Perhaps not dissimilar (or even related to?) the emergence of the regular Middle Bronze Age-B longhouse from the 15th century onward, house-sites with structured spatial relations between houses and outbuildings do not occur prior to the start of the Middle Bronze Age-B. A related phenomenon may occur in the ensuing Late Bronze Age period. For example, at Tiel - Medel 8 it could be shown that – despite relatively well-recognizable house plans and even larger numbers of easily recognizable outbuildings – no house-site ordering similar to that of the preceding Middle Bronze Age-B occupation phase could be indicated.[108] Both observations suggest that the house-site ordering documented in this chapter was a veritable Middle Bronze Age-B system of landscape usage, that presumably differed significantly from that of preceding and ensuing archaeological periods (*cf.* Arnoldussen & Fontijn 2006; Chapter 7).

Second, the limits of archaeological detectability should be stressed once more. Middle Bronze Age house-sites were first and foremost zones of domestic (and) agricultural productivity (*cf.* Abrahams 1991, 83-83; Voorhorst 1996, 14). To describe such areas of entwined social and technical activities, Ingold (1993, 158) coined the term 'taskscapes'. Unfortunately, of the (daily and seasonally different) activities presumably carried out in it (*e.g.* milking, crop-, fodder- or manure processing, hide-, wood- and stone-working, textile production and food-processing *et cetera*), only artefacts, some cattle hoof-imprints and various features whose former origins escape us, remained. Nonetheless, Bronze Age house-sites were multi-purpose activity zones, of which unfortunately only a palimpsest image of their spatial and functional components can be studied from an archaeological perspective.

It has become clear that commonly held notions of what prehistoric farmsteads may have looked like, may have been overly steered by the use of sub-modern farmsteads as analogies. The methodology forwarded in this chapter allows to use the available data for Bronze Age house-sites themselves, rather than indirect sources, to

105 But see also the more complex situation at Lienden (Appendix V, esp. figs. V.21 and V.22).
106 It is thus no coincidence that Eigenblok sites 1 to 4, which were discovered during prospective coring, have nearly all yielded Middle Bronze Age(-B) house plans (see Van Zijverden 2002a; Appendix II).
107 Based the role of the house-site within the structured nature of the wider environment around the houses as well as the range of activities taking place at farmsteads, whose importance is here not discussed in detail (see section 8.2.2).
108 Compare the VASO plots for the Middle (figs. 6.54 and 6.55) to those for the Late Bronze Age (figs. 6.57 and 6.58) at Tiel - Medel 8.

qualitatively compare Bronze Age house-sites in order to outline common patterns. Some of these observations, differ distinctly from established views.[109] The presence of delimiting features such as fences or ditches, a rectangular lay-out and barn/shed-type outbuildings that characterize (sub)modern farmsteads, could not be documented for Middle Bronze Age farmsteads in the river area. That Bronze Age farmers themselves nonetheless perceived the importance of having a structured house-environment, could be concluded from the observed rebuilding of houses and, more frequently, granary-type outbuildings on the near same spot with the near same orientation. Therefore, the view of Dutch Middle Bronze Age(-B) societies as being focused on 'having everything in its right place' (*cf.* Arnoldussen & Fontijn 2006, 308; Fontijn 2007, 79-81), seems in any case to apply to the placement of outbuildings in relation to farmhouses. It is this interrelation that must – for now – be viewed as the essential archaeological characteristic of Bronze Age farmsteads. Hopefully, this limited interpretation of the structure of Bronze Age farmsteads can be extended in the future and refined by additional specific research.

109 *Cf.* sections 1.4; 3.2.2; 6.3.1.

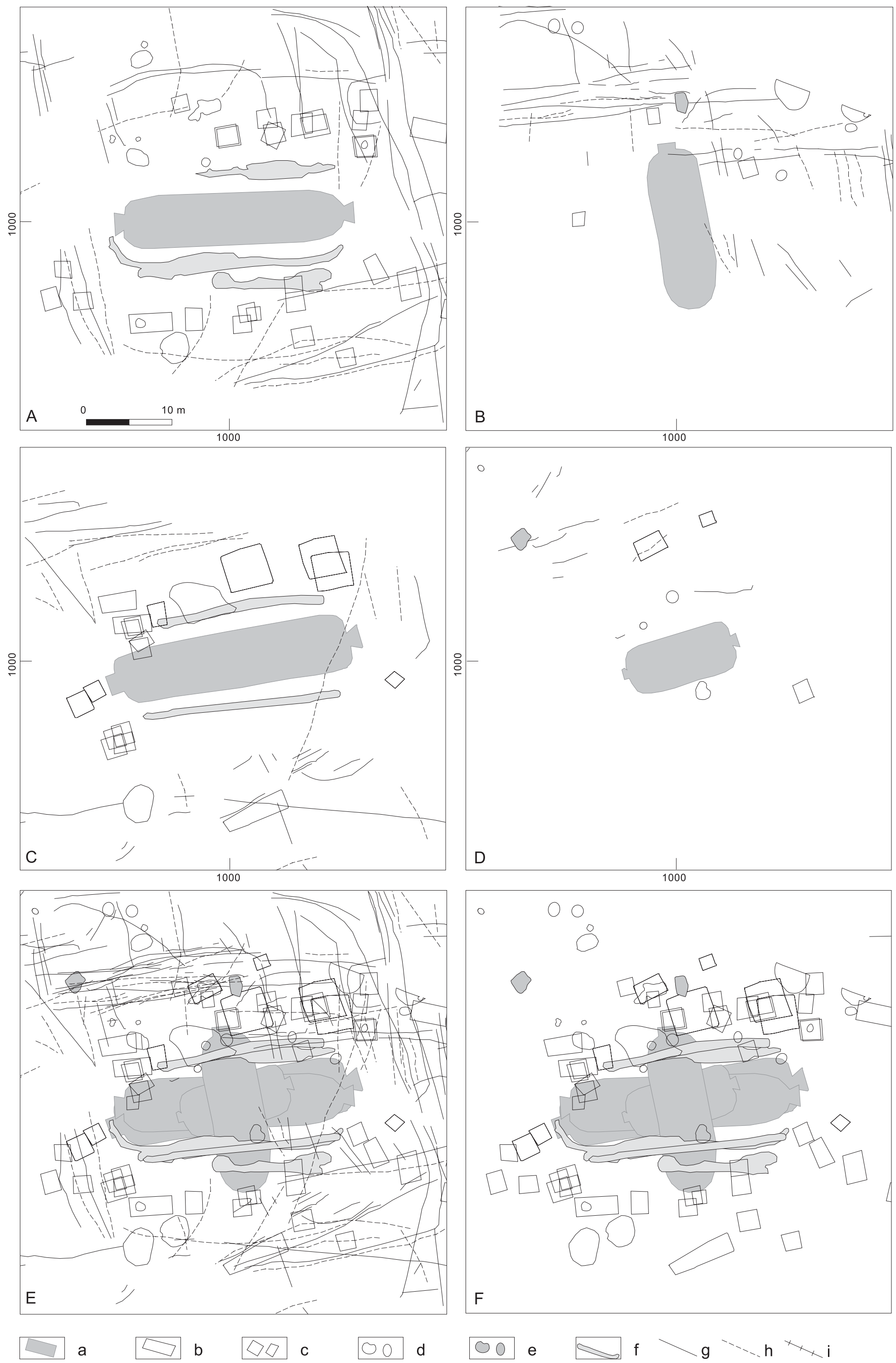

Fig. 6.37 VASO plot towards magnetic north for Zijderveld house-sites 1 (A), 2 (B), 3 (C) and 4 (D) and the VASO plot for all elements (E) and the houses, outbuildings, ditches, pits and wells (E).

a: houses, b: barn/shed-type of outbuildings, c: granary-type of outbuilding, d: pits, e: wells, f: ditches, g: type-1a fences, h: type-2 fences, i: other types of fences.

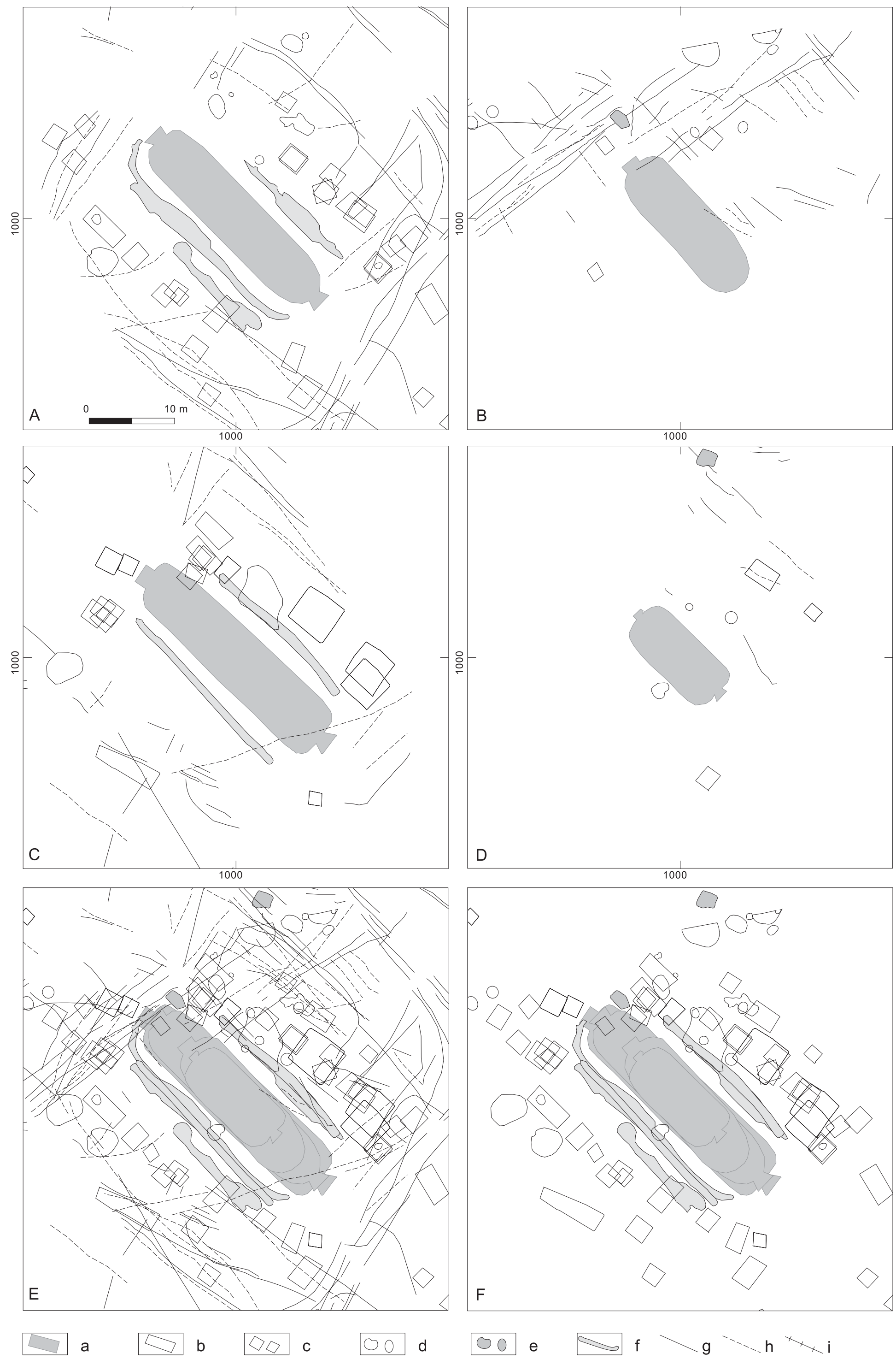

Fig. 6.38 Rotated VASO plot for Zijderveld house-sites 1 (A), 2 (B), 3 (C) and 4 (D) and the VASO plot for all elements (E) and the houses, outbuildings, ditches, pits and wells (E).

a: houses, b: barn/shed-type of outbuildings, c: granary-type of outbuilding, d: pits, e: wells, f: ditches, g: type-1a fences, h: type-2 fences, i: other types of fences.

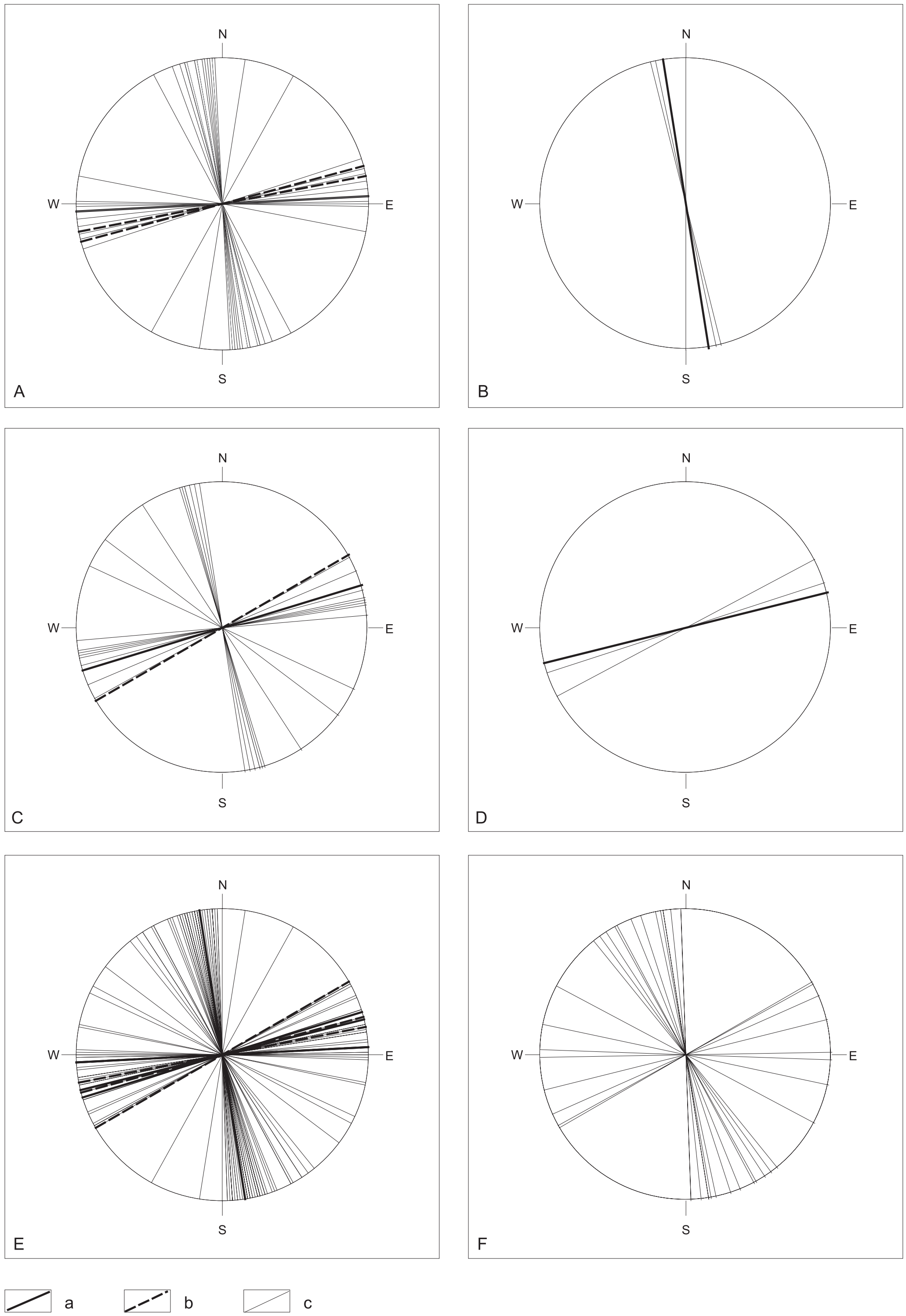

Fig. 6.39 Wind-rose diagrams for Zijderveld house-sites 1 (A), 2 (B), 3 (C) and 4 (D), all house-sites combined (E) and of the outbuildings not part of the house-sites (F).

a: houses, b: barn/shed-type outbuildings, c: granary-type outbuildings.

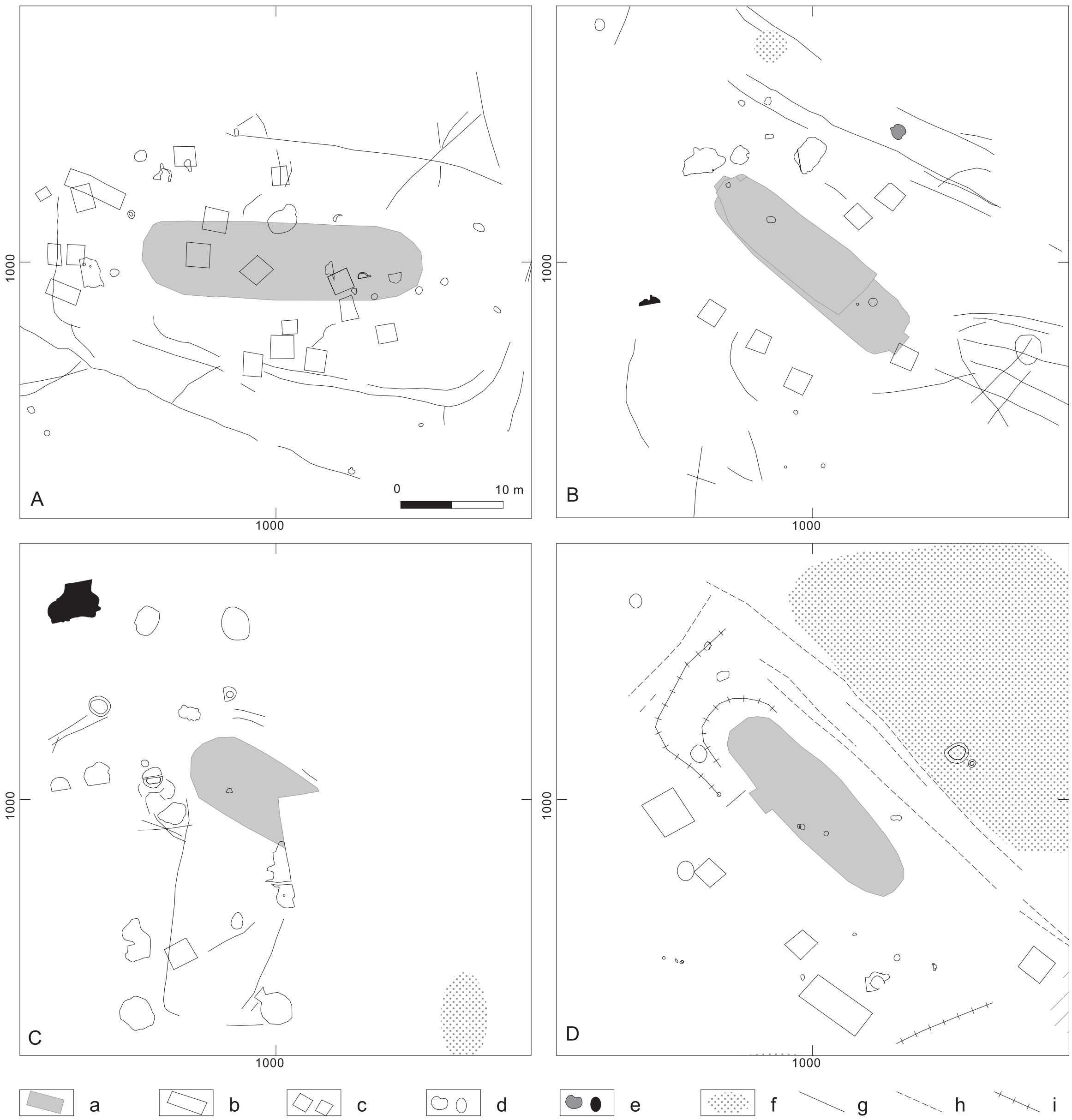

Fig. 6.40 VASO plot towards magnetic north for Eigenblok house-sites 1 (A), 2ab (B), 4 (C), 5 (D), 6a (E), 6b (F) and the VASO plot for all elements (G) and the houses, outbuildings, pits and wells (H).

a: houses, b: barn/shed-type of outbuildings, c: granary-type of outbuilding, d: pits, e: wells (light shade) and burnt patches (dark shade), f: cattle hoof-imprints, g: type-1a fences, h: type-2 fences, i: other types of fences.

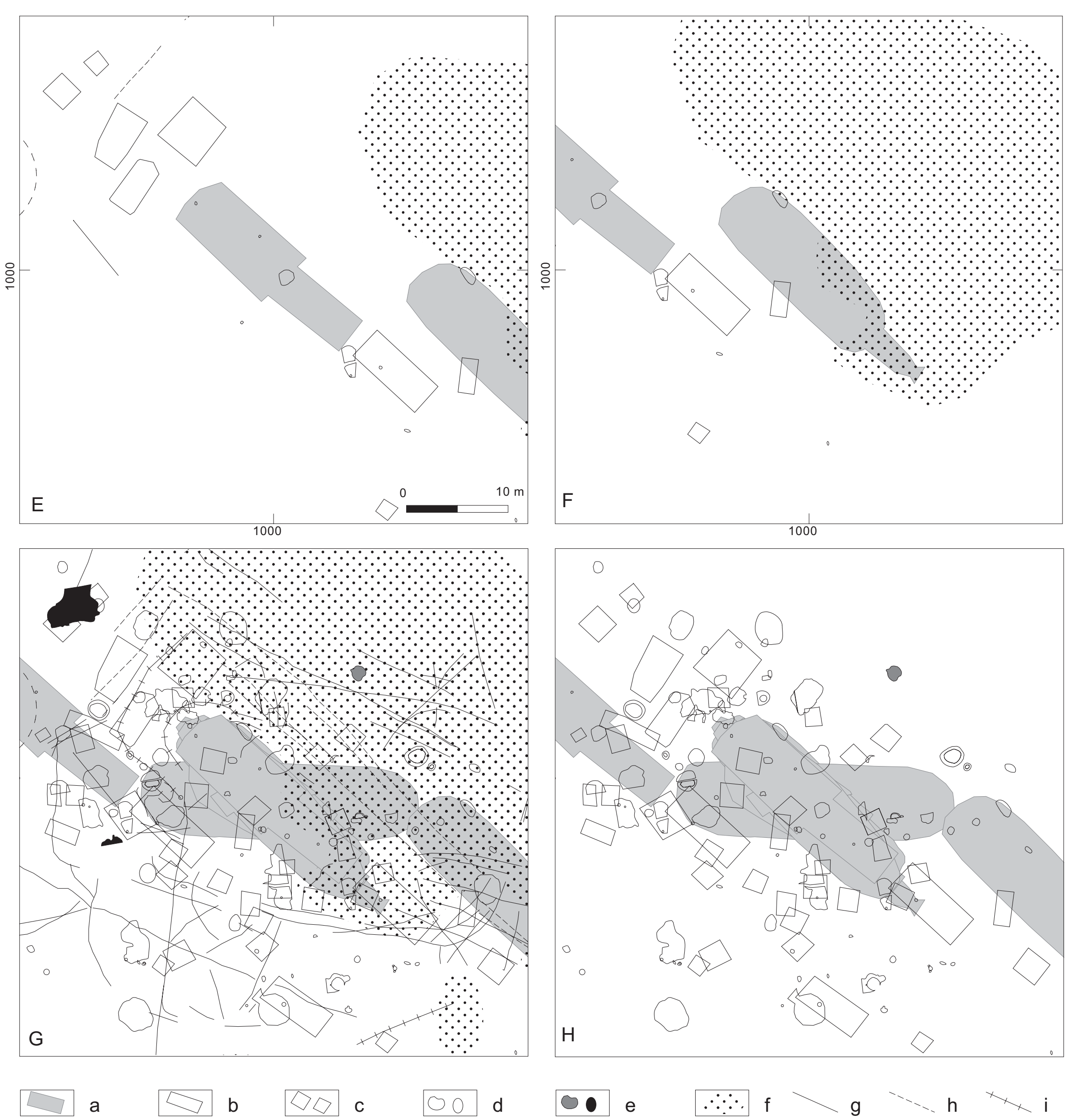

Fig. 6.40 (continued) VASO plot towards magnetic north for Eigenblok house-sites 1 (A), 2ab (B), 4 (C), 5 (D), 6a (E), 6b (F) and the VASO plot for all elements (G) and the houses, outbuildings, pits and wells (H).

a: houses, b: barn/shed-type of outbuildings, c: granary-type of outbuilding, d: pits, e: wells (light shade) and burnt patches (dark shade), f: cattle hoof-imprints, g: type-1a fences, h: type-2 fences, i: other types of fences.

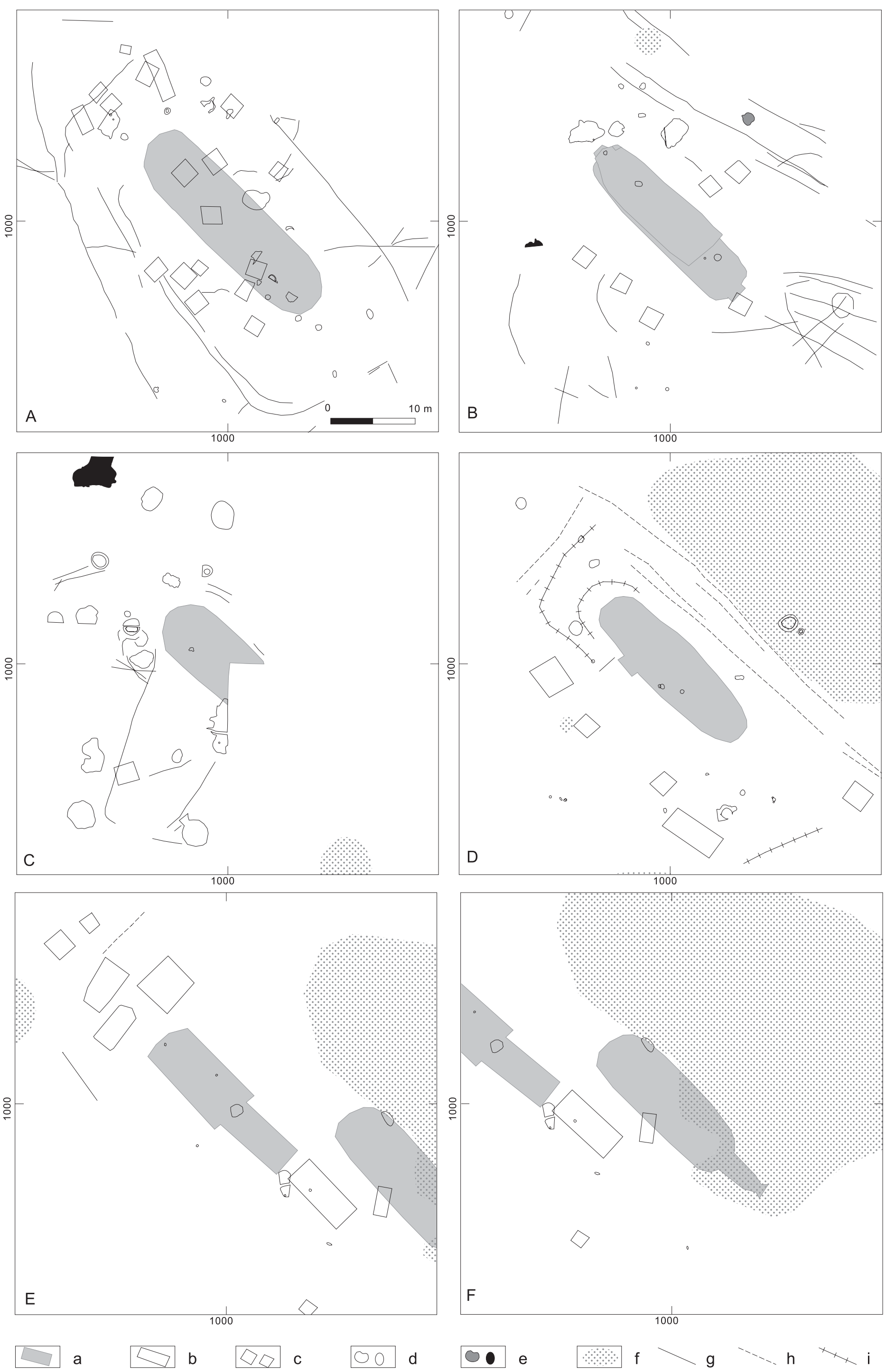

Fig. 6.41 Rotated VASO plot for Eigenblok house-sites 1 (A), 2ab (B), 4 (C), 5 (D), 6a (E), 6b (F) and the VASO plot for all elements (G) and all minus the hoof-imprints and burnt patches (H), the houses, outbuildings, fences, pits, wells and burnt patches (I), the houses and outbuildings (J), the houses and fences (K) and the houses, pits, wells and burnt patches (L).

a: houses, b: barn/shed-type of outbuildings, c: granary-type of outbuilding, d: pits, e: wells (light shade) and burnt patches (dark shade), f: cattle hoof-imprints, g: type-1a fences, h: type-2 fences, i: other types of fences.

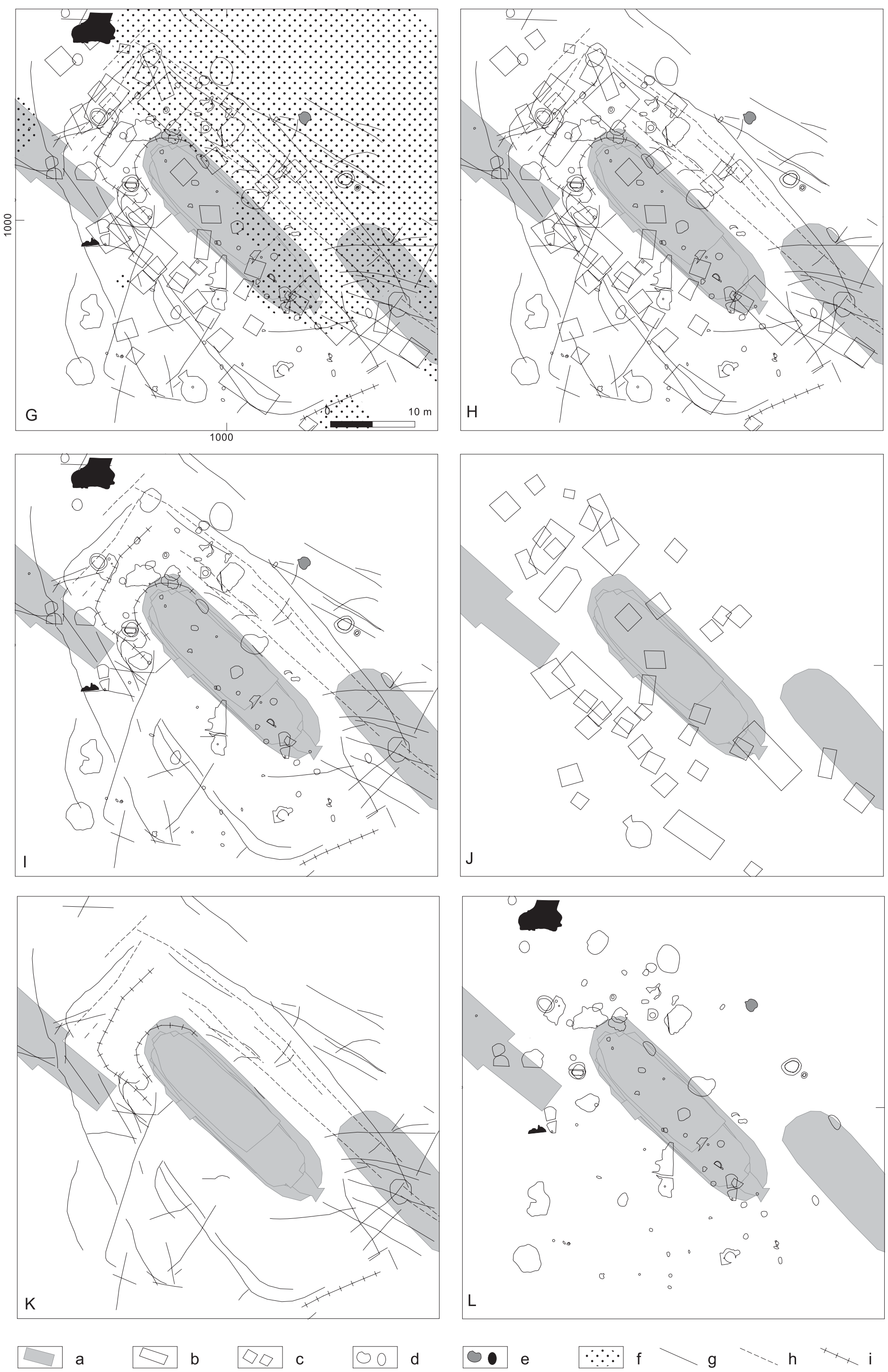

Fig. 6.41 (continued) Rotated VASO plot for Eigenblok house-sites 1 (A), 2ab (B), 4 (C), 5 (D), 6a (E), 6b (F) and the VASO plot for all elements (G) and all minus the hoof-imprints and burnt patches (H), the houses, outbuildings, fences, pits, wells and burnt patches (I), the houses and outbuildings (J), the houses and fences (K) and the houses, pits, wells and burnt patches (L).

a: houses, b: barn/shed-type of outbuildings, c: granary-type of outbuilding, d: pits, e: wells (light shade) and burnt patches (dark shade), f: cattle hoof-imprints, g: type-1a fences, h: type-2 fences, i: other types of fences.

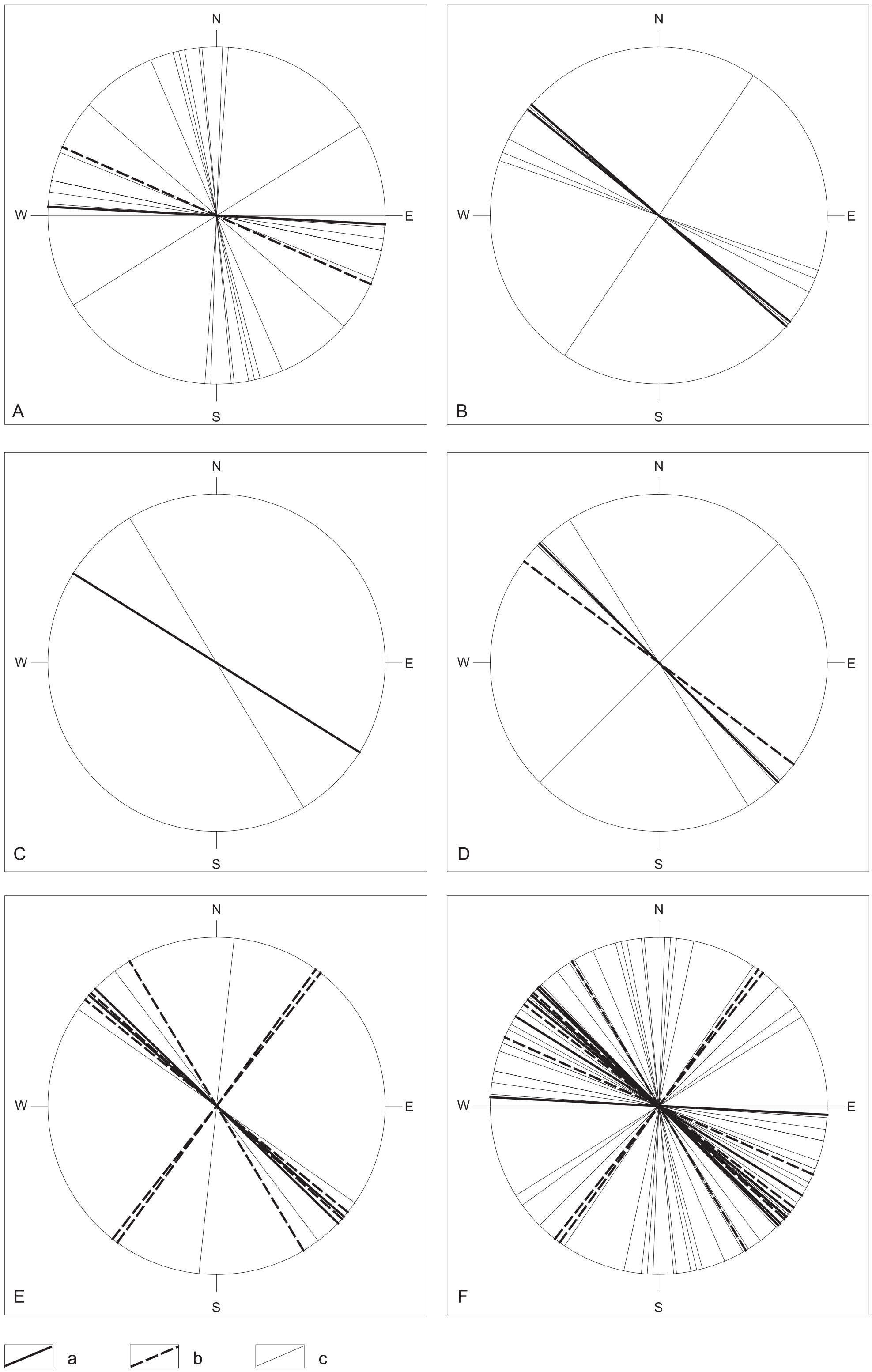

Fig. 6.42 Wind-rose diagrams for Eigenblok house-sites 1 (A), 2ab (B), 4 (C), 5 (D), 6ab (E) and all house-sites combined (F). a: houses, b: barn/shed-type outbuildings, c: granary-type outbuildings.

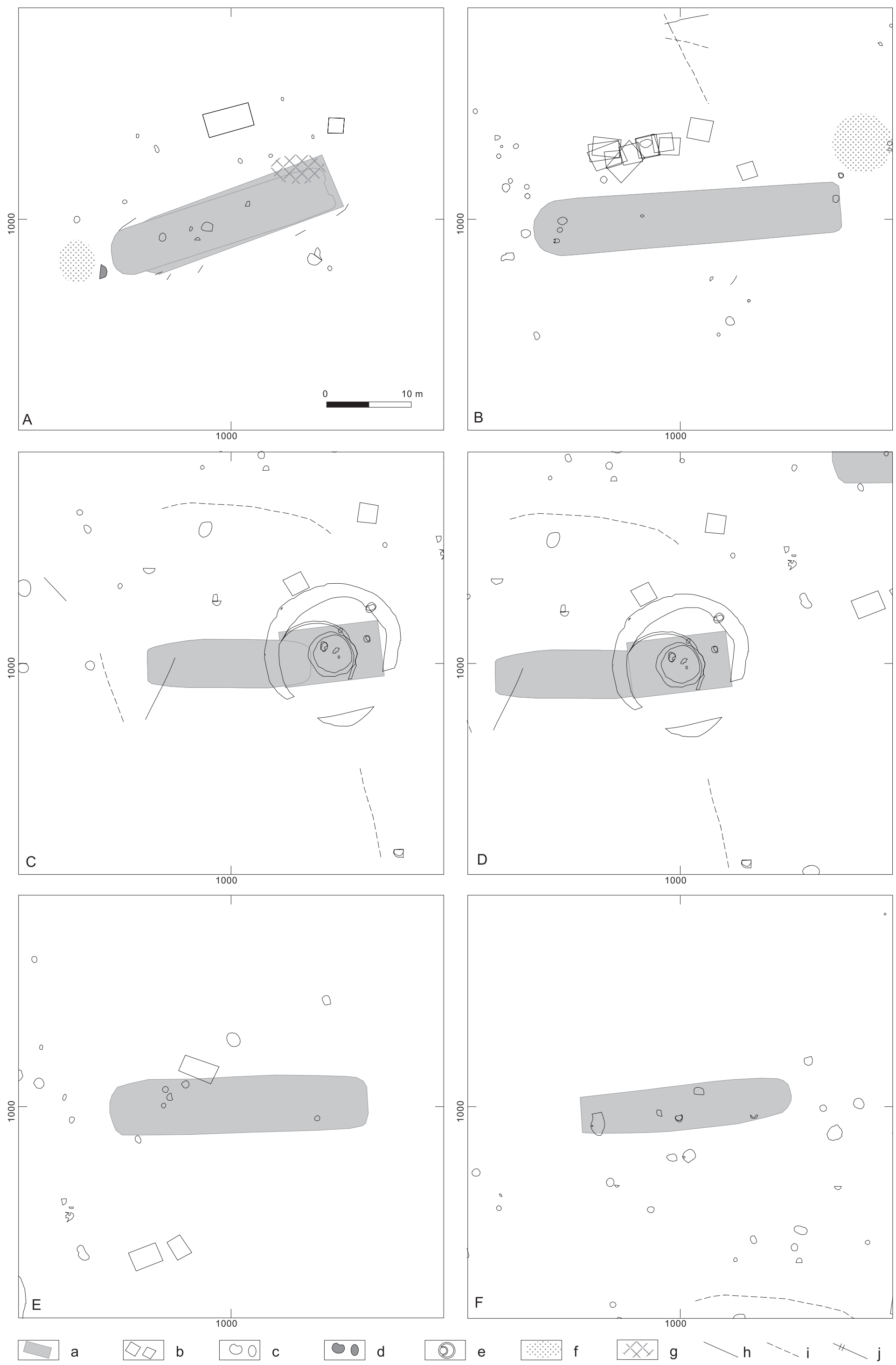

Fig. 6.43 VASO plot towards magnetic north for De Bogen house-sites 28-4CH (A), 28-1AH (B), 45BH (C), 45HH (D), 45AH (E), 45CH (F), '45DH' (G), 29B2/3H (H), '29AH' (I), 30BH-EH (J), 30GH (K), 30AH (L) and the VASO plot for all elements (M) and the houses, fences and palisades (N), the houses and outbuildings (O), the houses, pits and funerary sites (P) and the houses and hoof-imprints and ard-marks (Q).
a: houses, b: outbuildings, c: pits, d: wells, e: funerary site, f: cattle hoof-imprints, g: ard-marks, h: type-1a fences, i: type-2 fences, j: palisades.

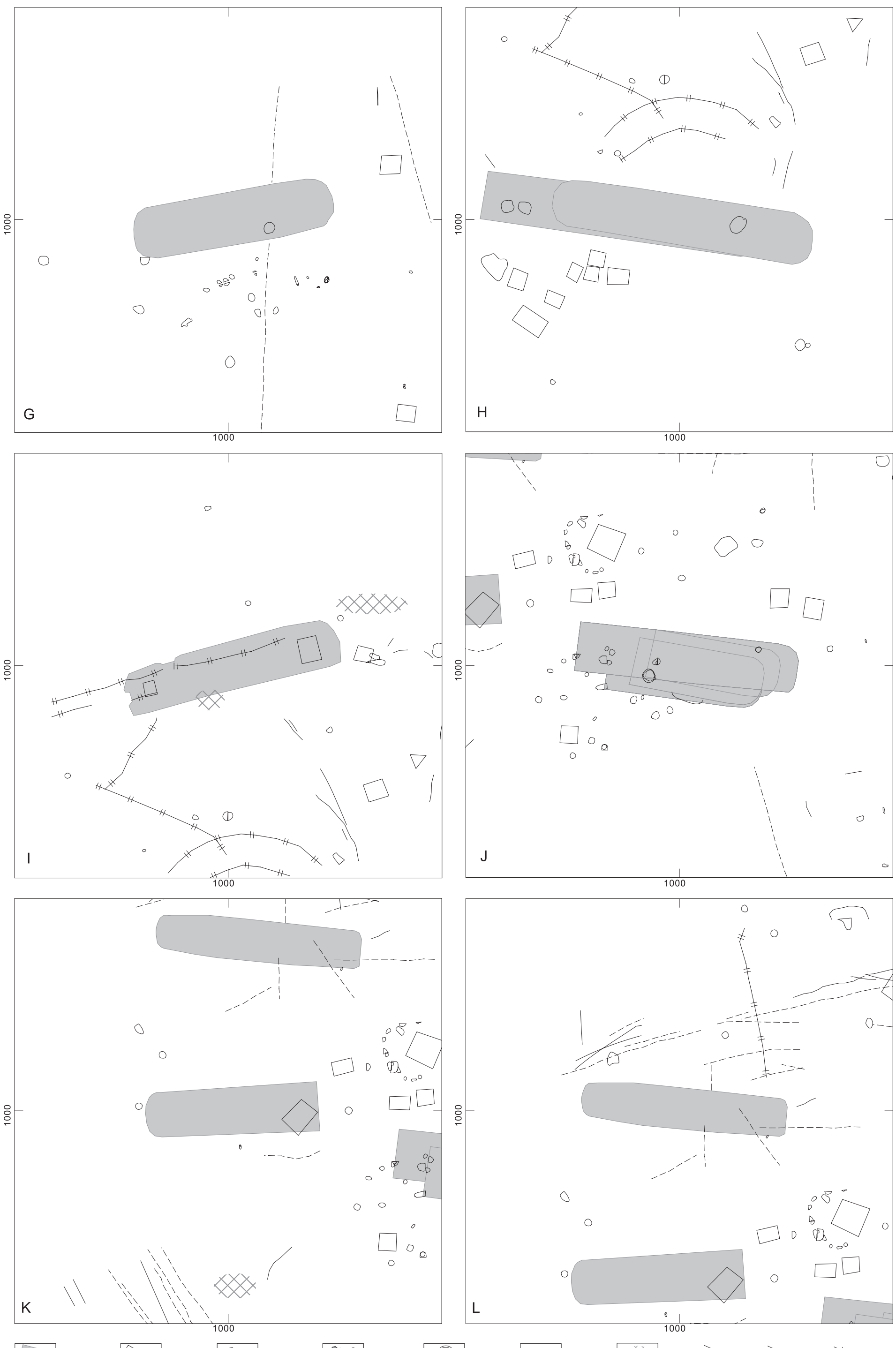

Fig. 6.43 (continued) VASO plot towards magnetic north for De Bogen house-sites 28-4CH (A), 28-1AH (B), 45BH (C), 45HH (D), 45AH (E), 45CH (F), '45DH' (G), 29B2/3H (H), '29AH' (I), 30BH-EH (J), 30GH (K), 30AH (L) and the VASO plot for all elements (M) and the houses, fences and palisades (N), the houses and outbuildings (O), the houses, pits and funerary sites (P) and the houses and hoof-imprints and ard-marks (Q).
a: houses, b: outbuildings, c: pits, d: wells, e: funerary site, f: cattle hoof-imprints, g: ard-marks, h: type-1a fences, i: type-2 fences, j: palisades.

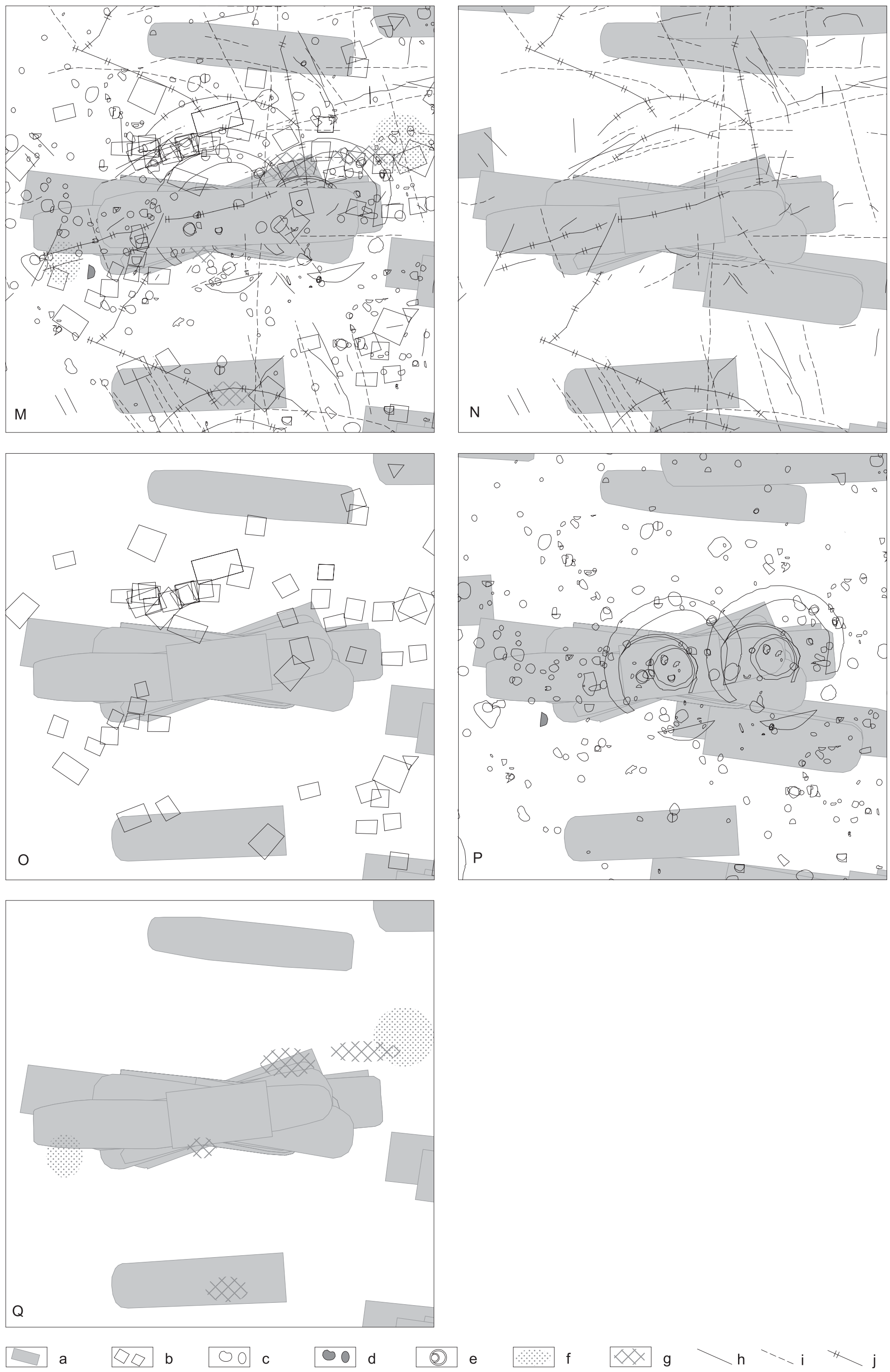

Fig. 6.43 (continued) VASO plot towards magnetic north for De Bogen house-sites 28-4CH (A), 28-1AH (B), 45BH (C), 45HH (D), 45AH (E), 45CH (F), '45DH' (G), 29B2/3H (H), '29AH' (I), 30BH-EH (J), 30GH (K), 30AH (L) and the VASO plot for all elements (M) and the houses, fences and palisades (N), the houses and outbuildings (O), the houses, pits and funerary sites (P) and the houses and hoof-imprints and ard-marks (Q).
a: houses, b: outbuildings, c: pits, d: wells, e: funerary site, f: cattle hoof-imprints, g: ard-marks, h: type-1a fences, i: type-2 fences, j: palisades.

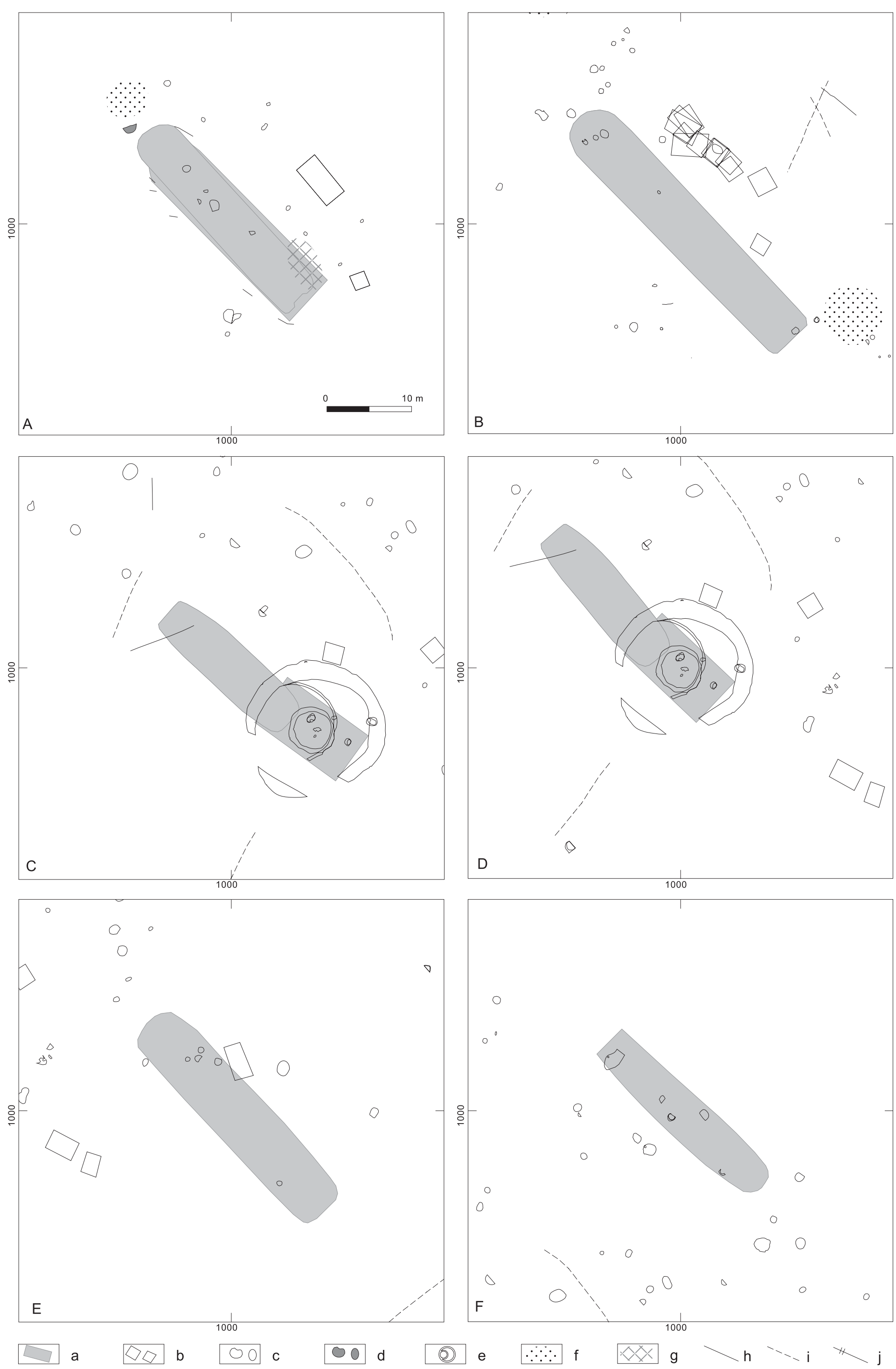

Fig. 6.44 Rotated VASO plot for De Bogen house-sites 28-4CH (A), 28-1AH (B), 45BH (C), 45HH (D), 45AH (E), 45CH (F), '45DH' (G), 29B2/3H (H), '29AH' (I), 30BH-EH (J), 30GH (K), 30AH (L) and the VASO plot for all elements (M) and the houses, fences and palisades (N), the houses and outbuildings (O), the houses, pits and funerary sites (P) and the houses and hoof-imprints and ard-marks (Q).

a: houses, b: outbuildings, c: pits, d: wells, e: funerary site, f: cattle hoof-imprints, g: ard-marks, h: type-1a fences, i: type-2 fences, j: palisades.

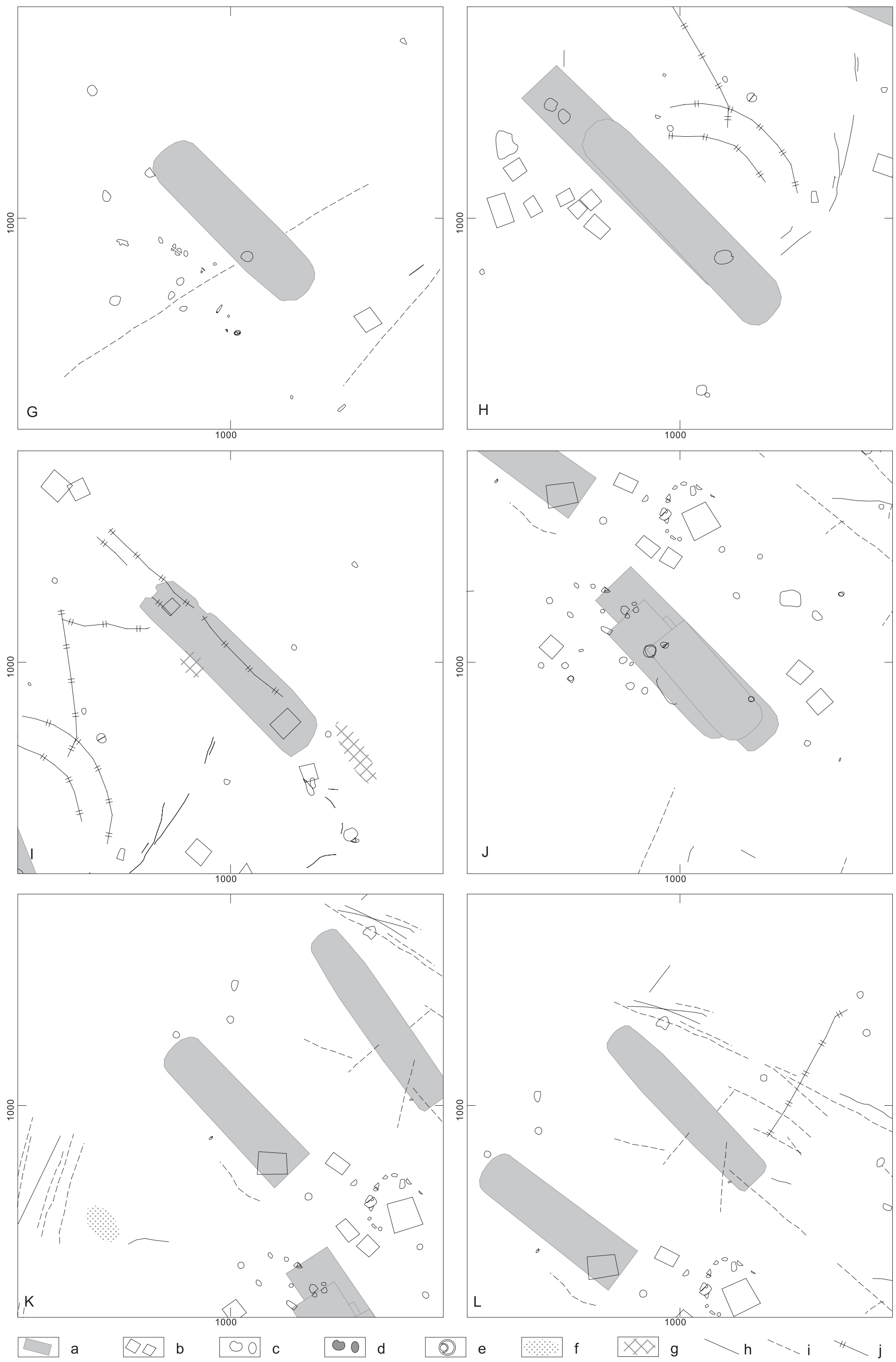

Fig. 6.44 (continued) Rotated VASO plot for De Bogen house-sites 28-4CH (A), 28-1AH (B), 45BH (C), 45HH (D), 45AH (E), 45CH (F), '45DH' (G), 29B2/3H (H), '29AH' (I), 30BH-EH (J), 30GH (K), 30AH (L) and the VASO plot for all elements (M) and the houses, fences and palisades (N), the houses and outbuildings (O), the houses, pits and funerary sites (P) and the houses and hoof-imprints and ard-marks (Q).
a: houses, b: outbuildings, c: pits, d: wells, e: funerary site, f: cattle hoof-imprints, g: ard-marks, h: type-1a fences, i: type-2 fences, j: palisades.

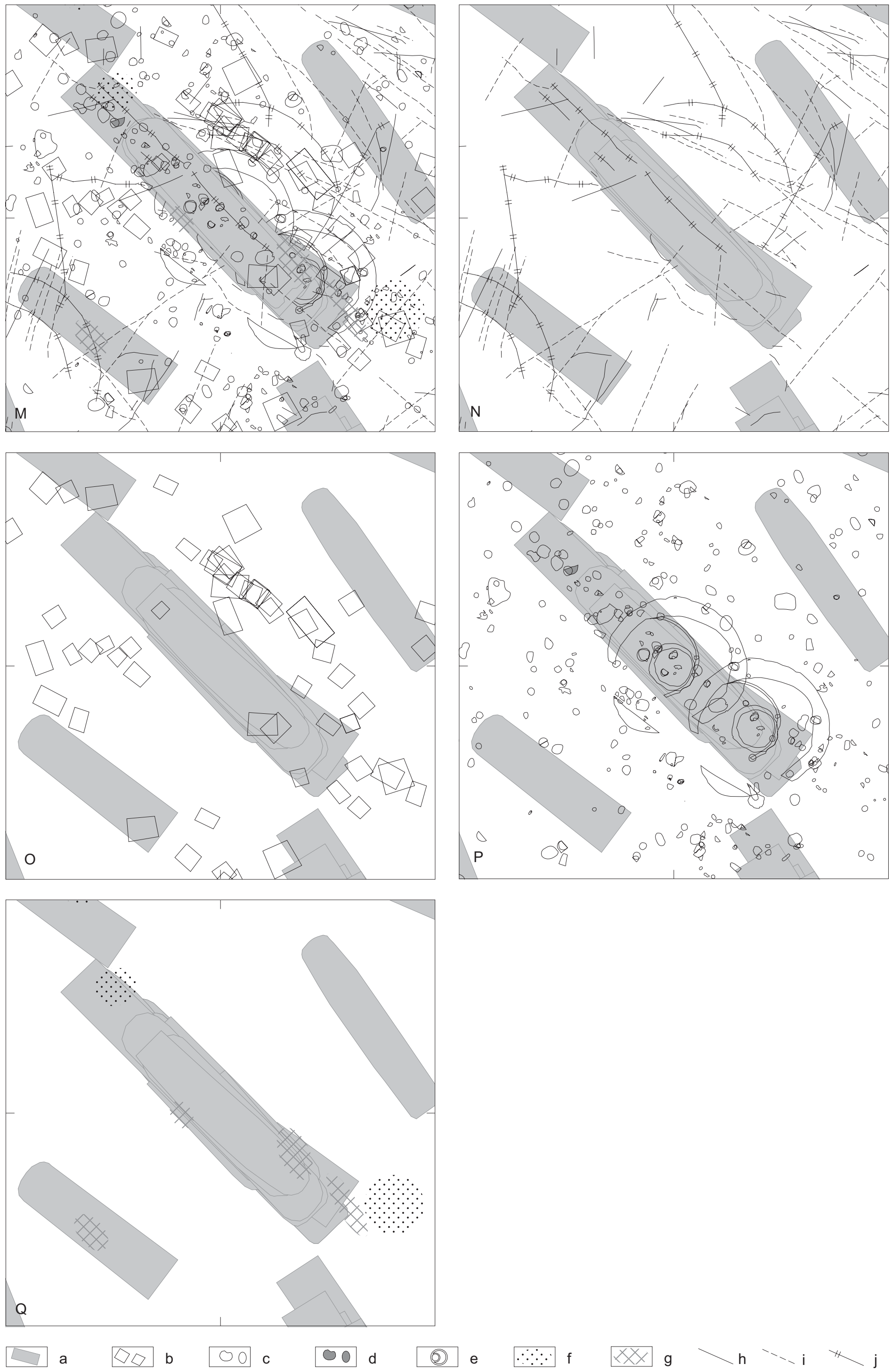

Fig. 6.44 (continued) Rotated VASO plot for De Bogen house-sites 28-4CH (A), 28-1AH (B), 45BH (C), 45HH (D), 45AH (E), 45CH (F), '45DH' (G), 29B2/3H (H), '29AH' (I), 30BH-EH (J), 30GH (K), 30AH (L) and the VASO plot for all elements (M) and the houses, fences and palisades (N), the houses and outbuildings (O), the houses, pits and funerary sites (P) and the houses and hoof-imprints and ard-marks (Q).
a: houses, b: outbuildings, c: pits, d: wells, e: funerary site, f: cattle hoof-imprints, g: ard-marks, h: type-1a fences, i: type-2 fences, j: palisades.

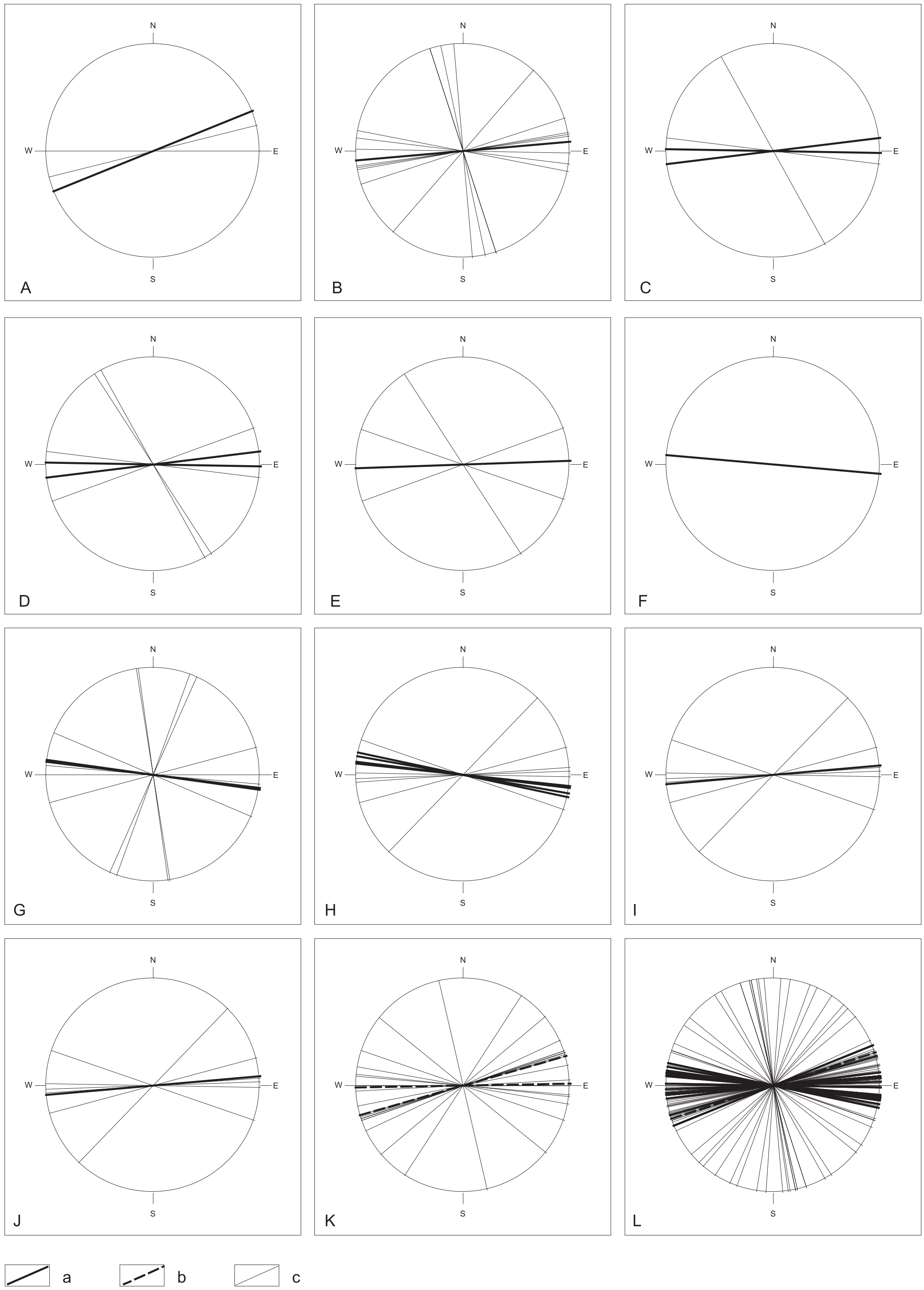

Fig. 6.45 Wind-rose diagrams for De Bogen house-sites 28-4CH (A), 28-1AH (B), 45BH (C), 45HH (D), 45AH (E), 45CH (F), 29B2/3H (G), 30BH-EH (H), 30GH (I), 30AH (J), outbuildings not assigned to house-sites (K) and all combined (L).

a: houses, b: barn/shed-type outbuildings, c: granary-type outbuildings.

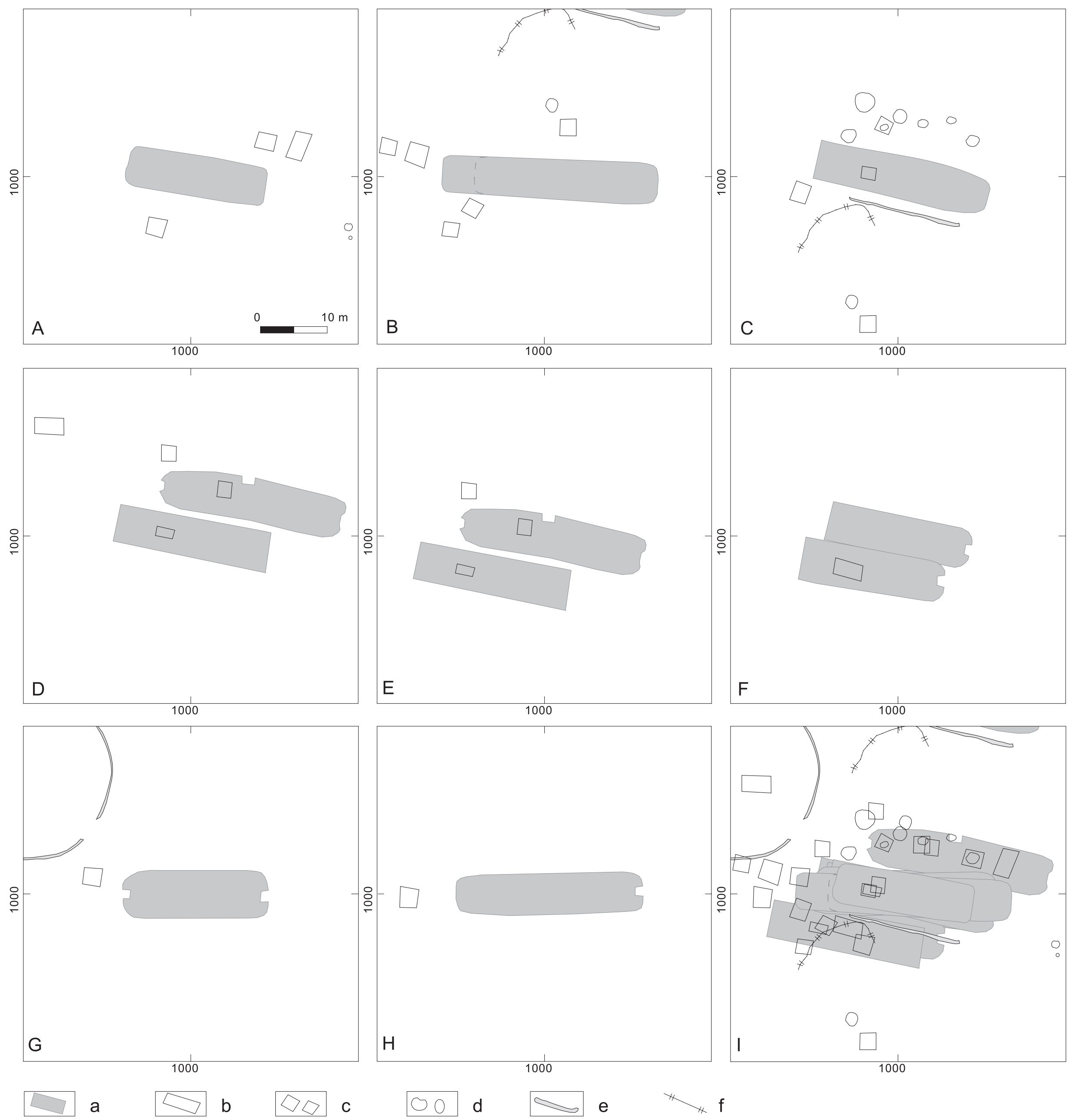

Fig. 6.46 VASO plot towards magnetic north for De Horden house-sites 1 (A), 2ab (B), 3 (C), 4 (D), 5 (E), 7 (F), 9 (G), 10 (H) and the VASO plot for all elements (I).

a: houses, b: barn/shed-type outbuildings, c: granary-type outbuildings, d: pits, e: ditches, f: palisade.

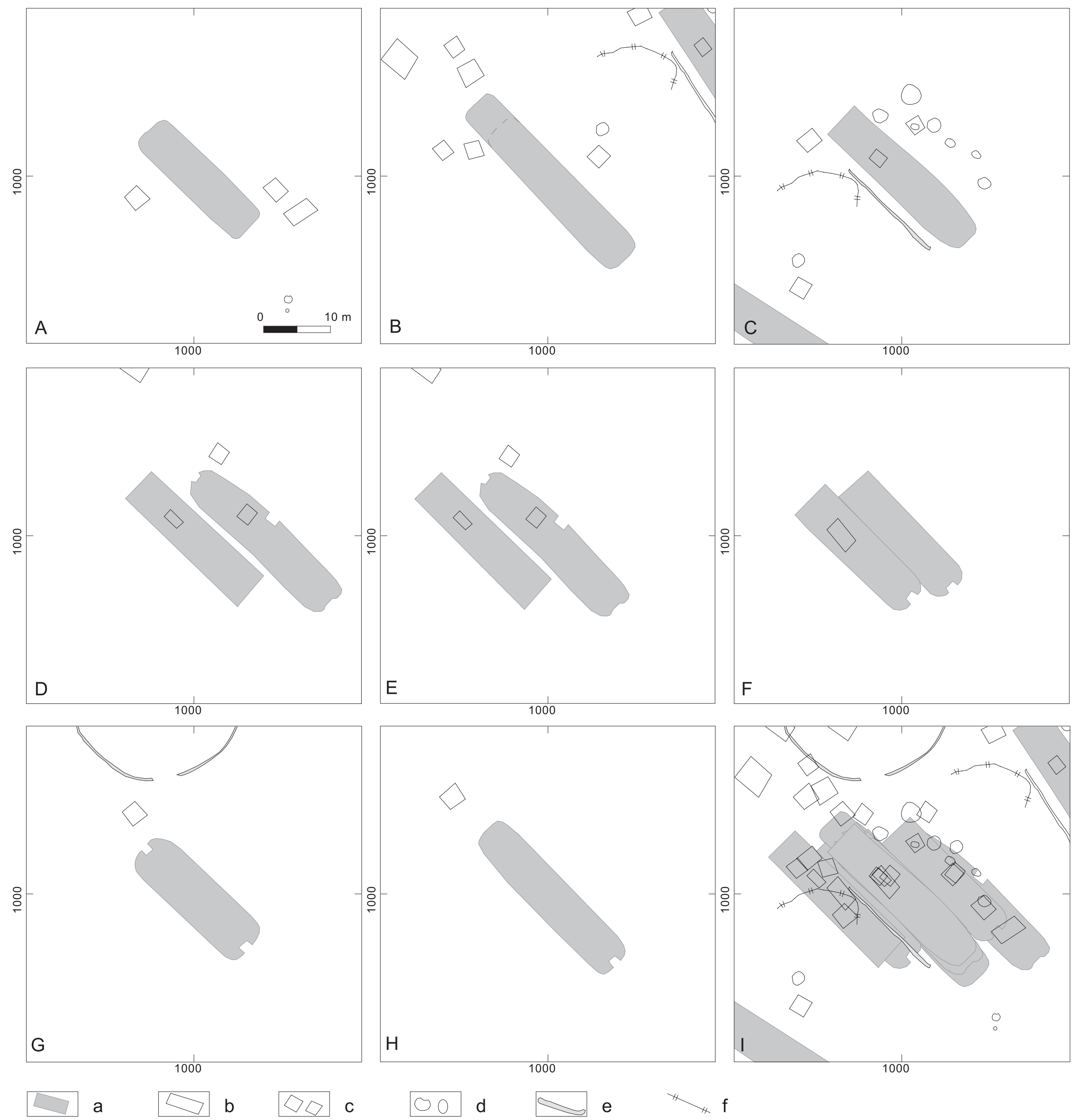

Fig. 6.47 Rotated VASO plot for De Horden house-sites 1 (A), 2ab (B), 3 (C), 4 (D), 5 (E), 7 (F), 9 (G), 10 (H) and the VASO plot for all elements (I).

a: houses, b: barn/shed-type outbuildings, c: granary-type outbuildings, d: pits, e: ditches, f: palisade.

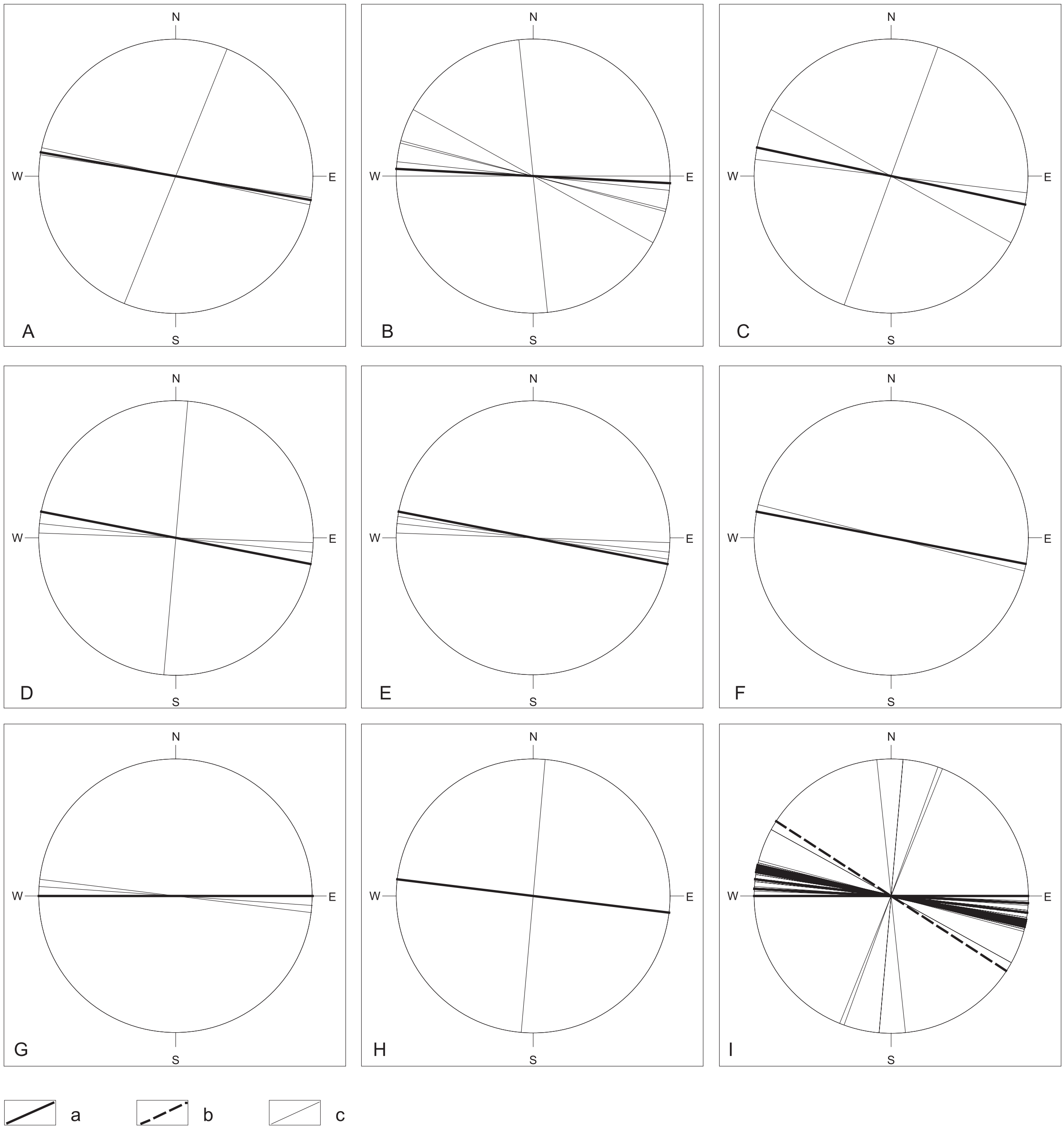

Fig. 6.48 Wind-rose diagrams for De Horden house-sites 1 (A), 2ab (B), 3 (C), 4 (D), 5 (E), 7 (F), 9 (G), 10 (H) and all combined (L).
a: houses, b: barn/shed-type outbuildings, c: granary-type outbuildings.

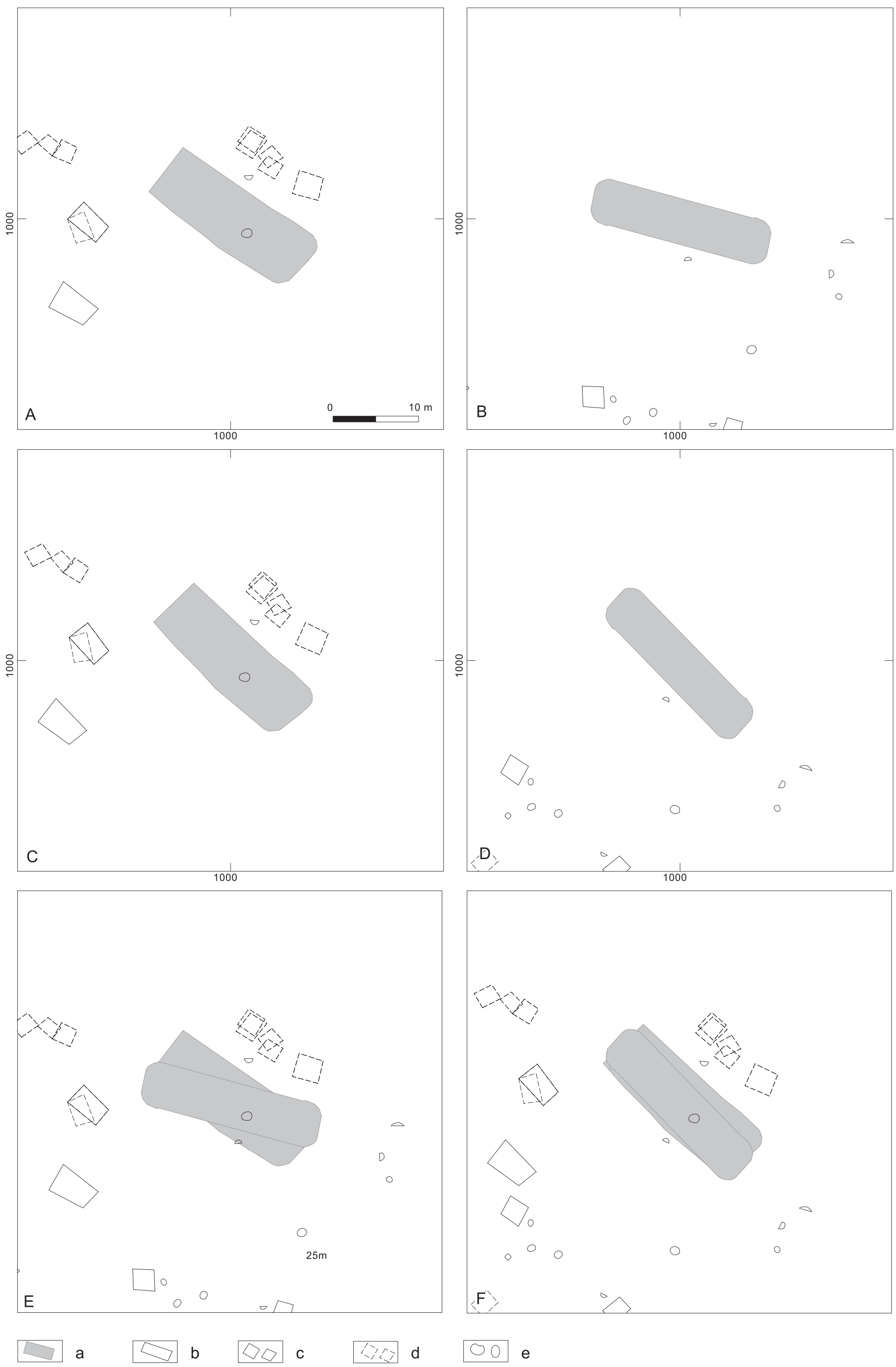

Fig. 6.49 VASO plot towards magnetic north for Lienden house-sites 14D (A), 15P (B), and rotated plots for 14D (C), 15P (D), and overlay plots towards magnetic north (E) and rotated overlay plot (F).

a: houses, b: barn/shed-type outbuildings, c: granary-type outbuildings, d: hypothetical outbuildings, e: pits.

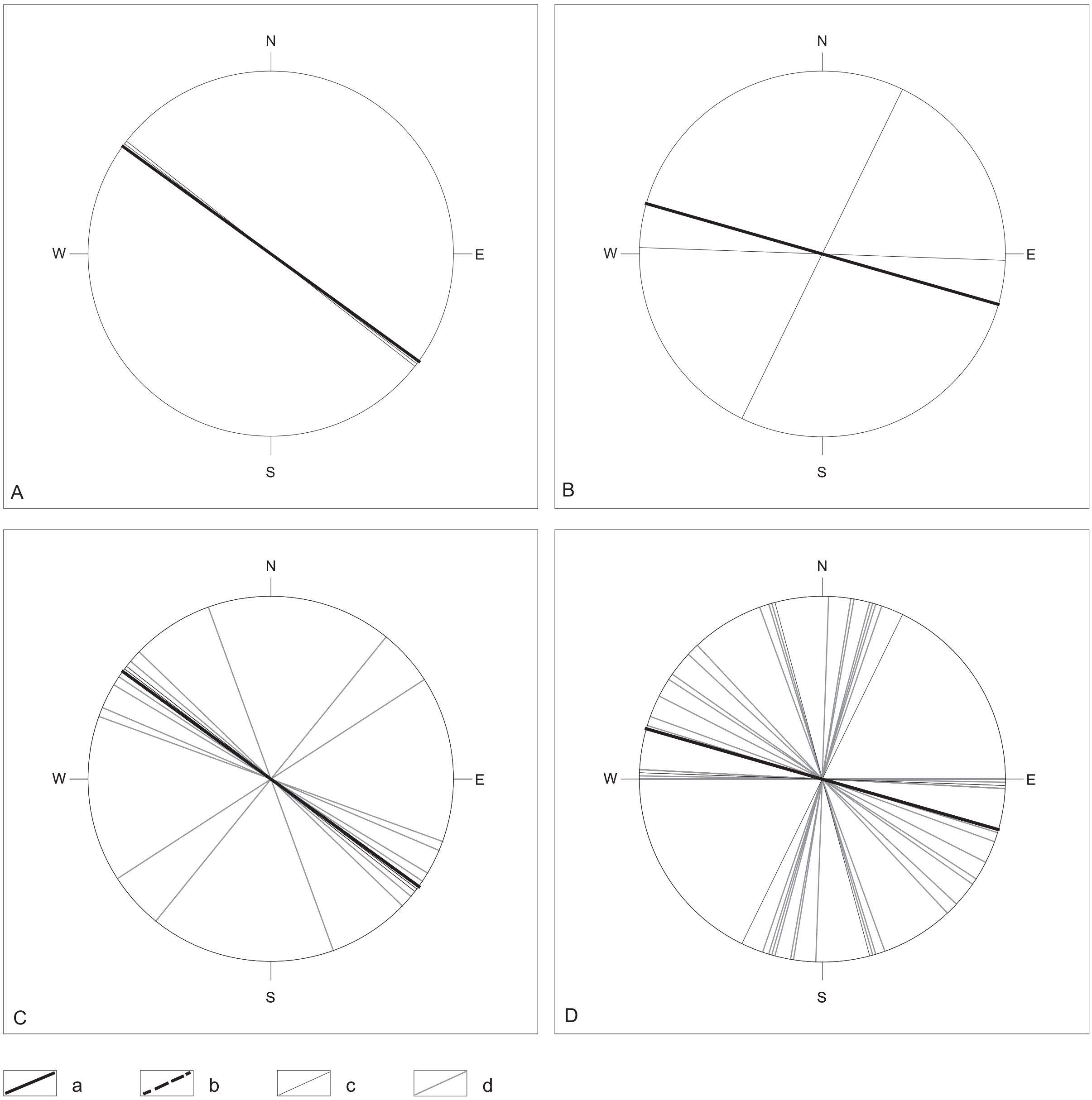

Fig. 6.50 Wind-rose diagrams for Lienden house-sites 14D (A), 15P (B), 14D all (including hypothetical) outbuildings (C) and 15P with all (including hypothetical) outbuildings (D).

a: houses, b: barn/shed-type outbuildings, c: granary-type outbuildings, d: hypothetical outbuildings.

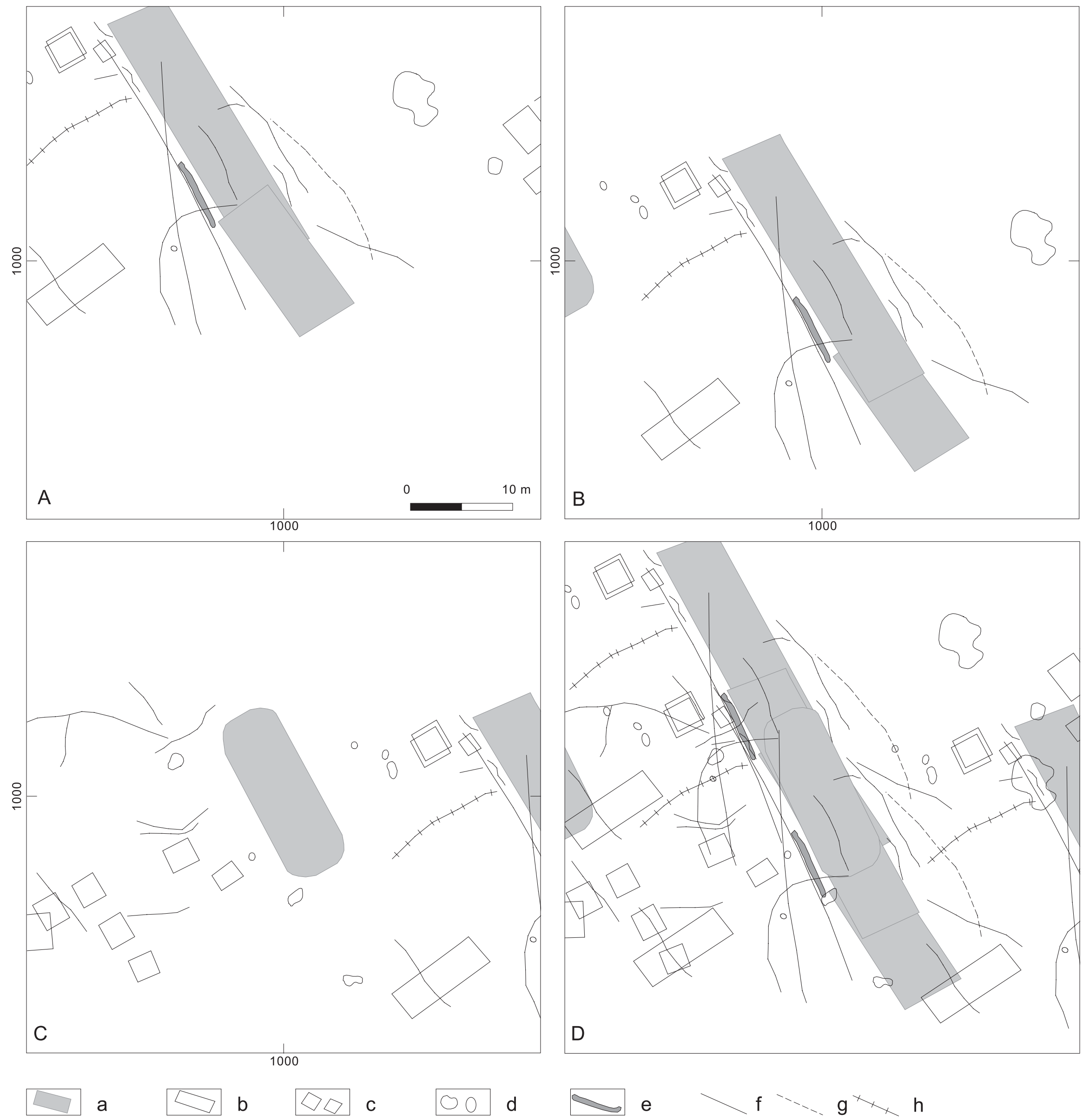

Fig. 6.51 VASO plot towards magnetic north for Dodewaard house-sites 1a (A), 1bc (B), 2 (C) and the VASO plot for all elements (D).

a: houses, b: barn/shed-type of outbuildings, c: granary-type of outbuilding, d: pits, e: ditches, f: type-1a fences, g: type-2 fences, h: type-3 fences.

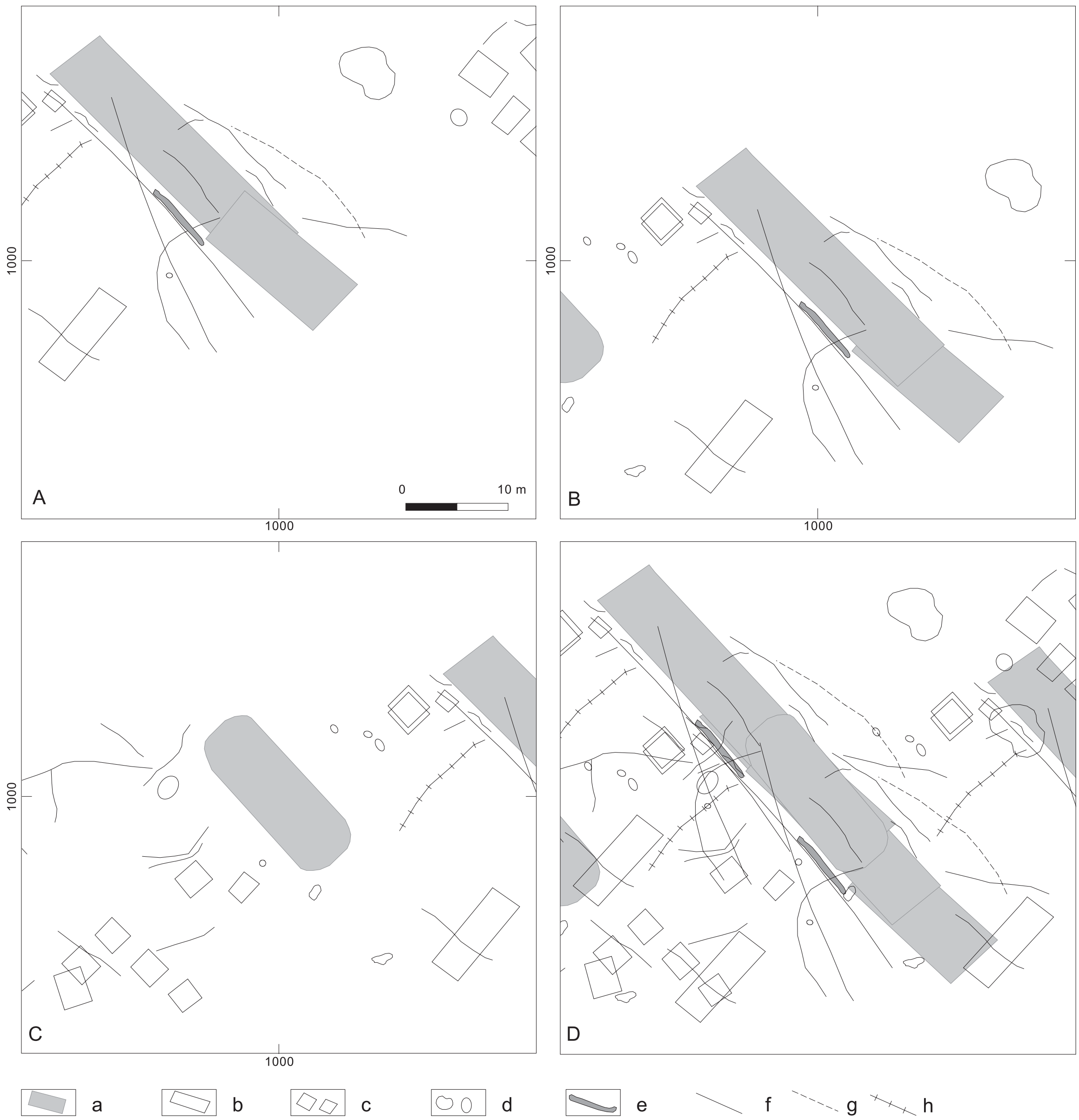

Fig. 6.52 Rotated VASO plot for Dodewaard house-sites 1a (A), 1bc (B), 2 (C) and the VASO plot for all elements (D).

a: houses, b: barn/shed-type of outbuildings, c: granary-type of outbuilding, d: pits, e: ditches, f: type-1a fences, g: type-2 fences, h: type-3 fences.

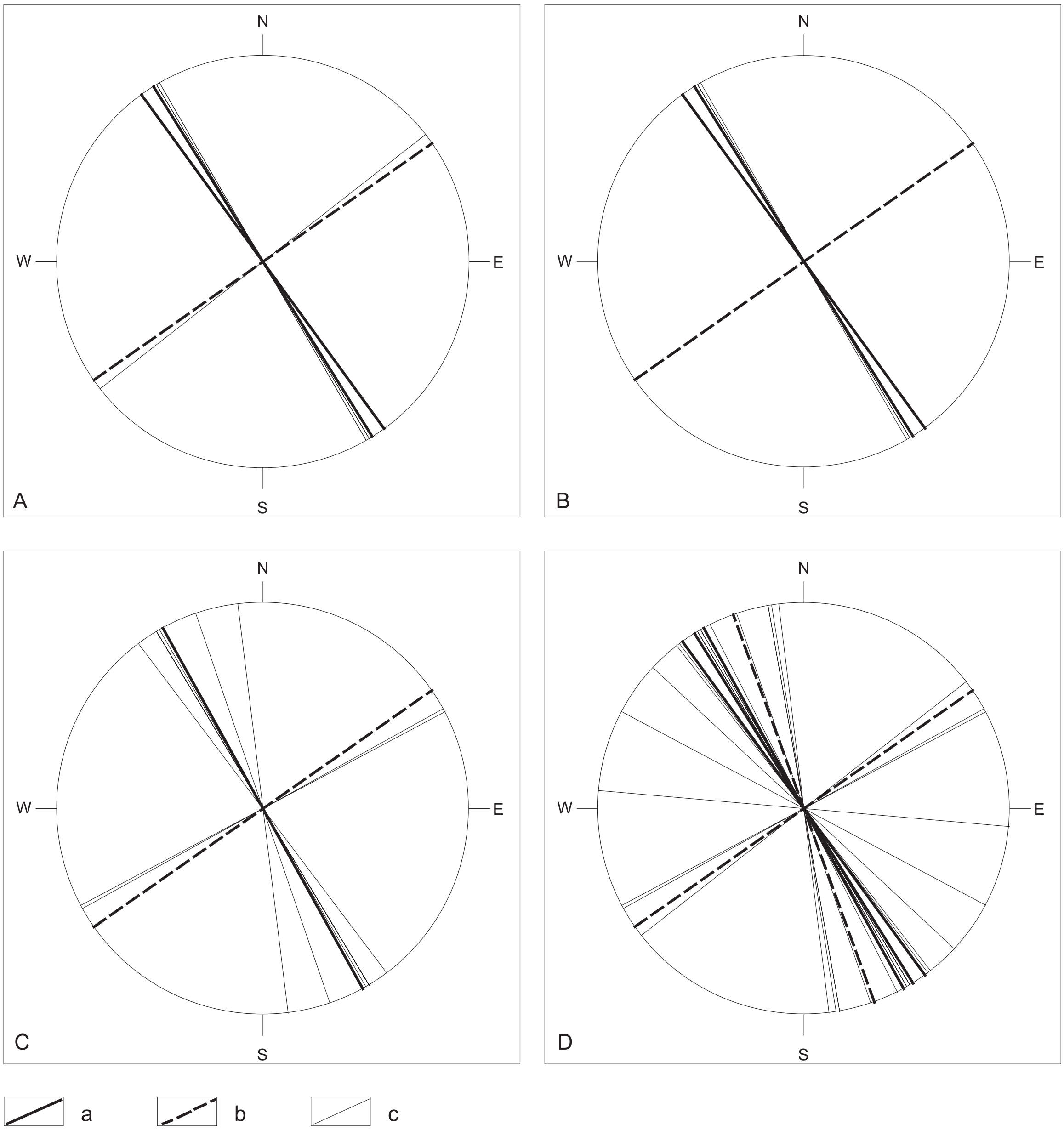

Fig. 6.53 Wind-rose diagrams for Dodewaard house-sites 1a (A), 1bc (B), 2 (C) and all combined (D). a: houses, b: barn/shed-type outbuildings, c: granary-type outbuildings.

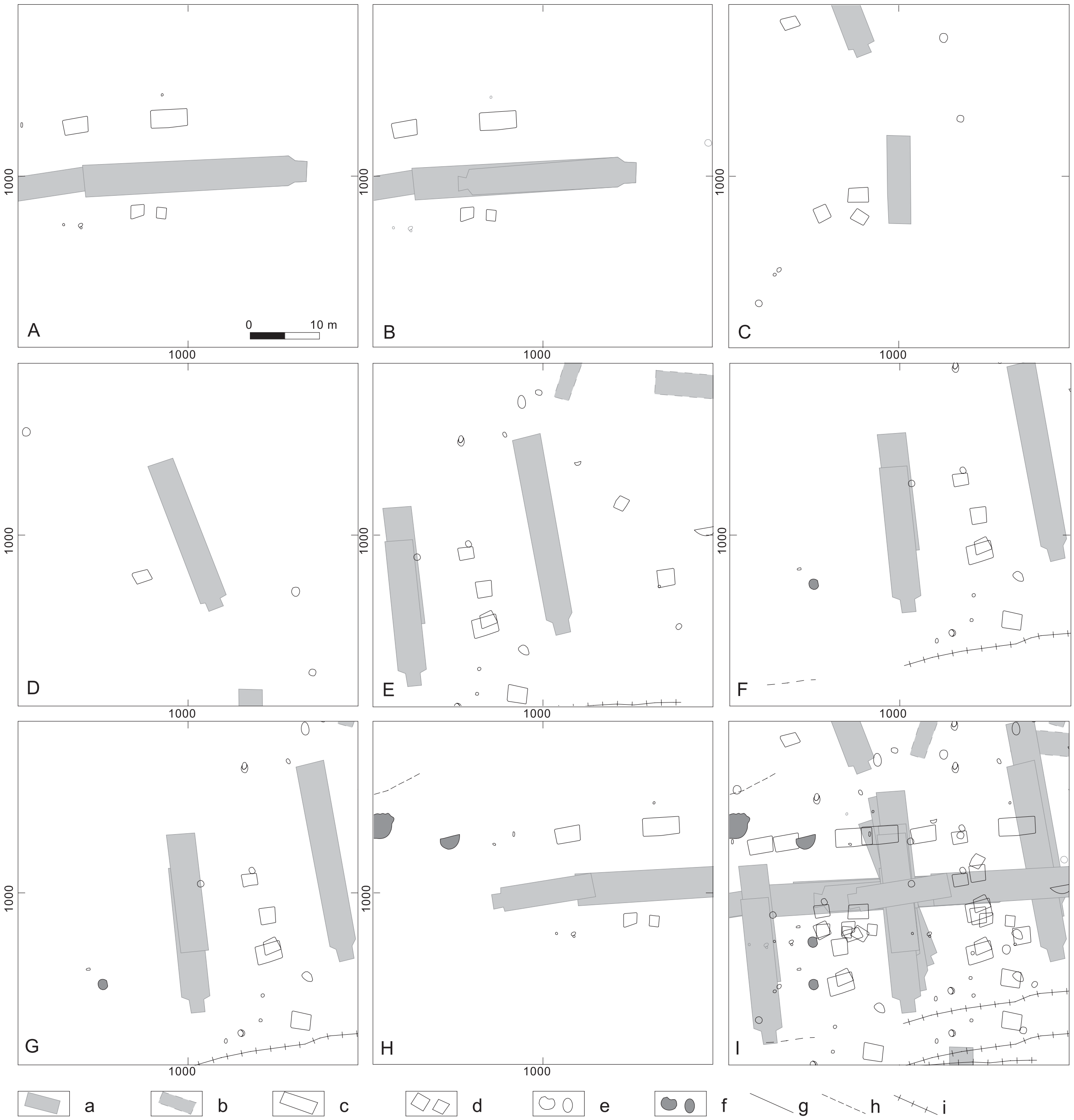

Fig. 6.54 VASO plot towards magnetic north for Tiel - Medel 8 MBA house-sites 1a (A), 1b (B), 2 (C), 3 (D), 5 (E), 6 (F), 7 (G), 8 (H) and the VASO plot for all elements (I).

a: houses, b: late bronze age structure, c: barn/shed-type outbuildings, d: granary-type outbuildings, e: pits, f: wells. g: type-1a fences, h: type-2 fences, i: other types of fences.

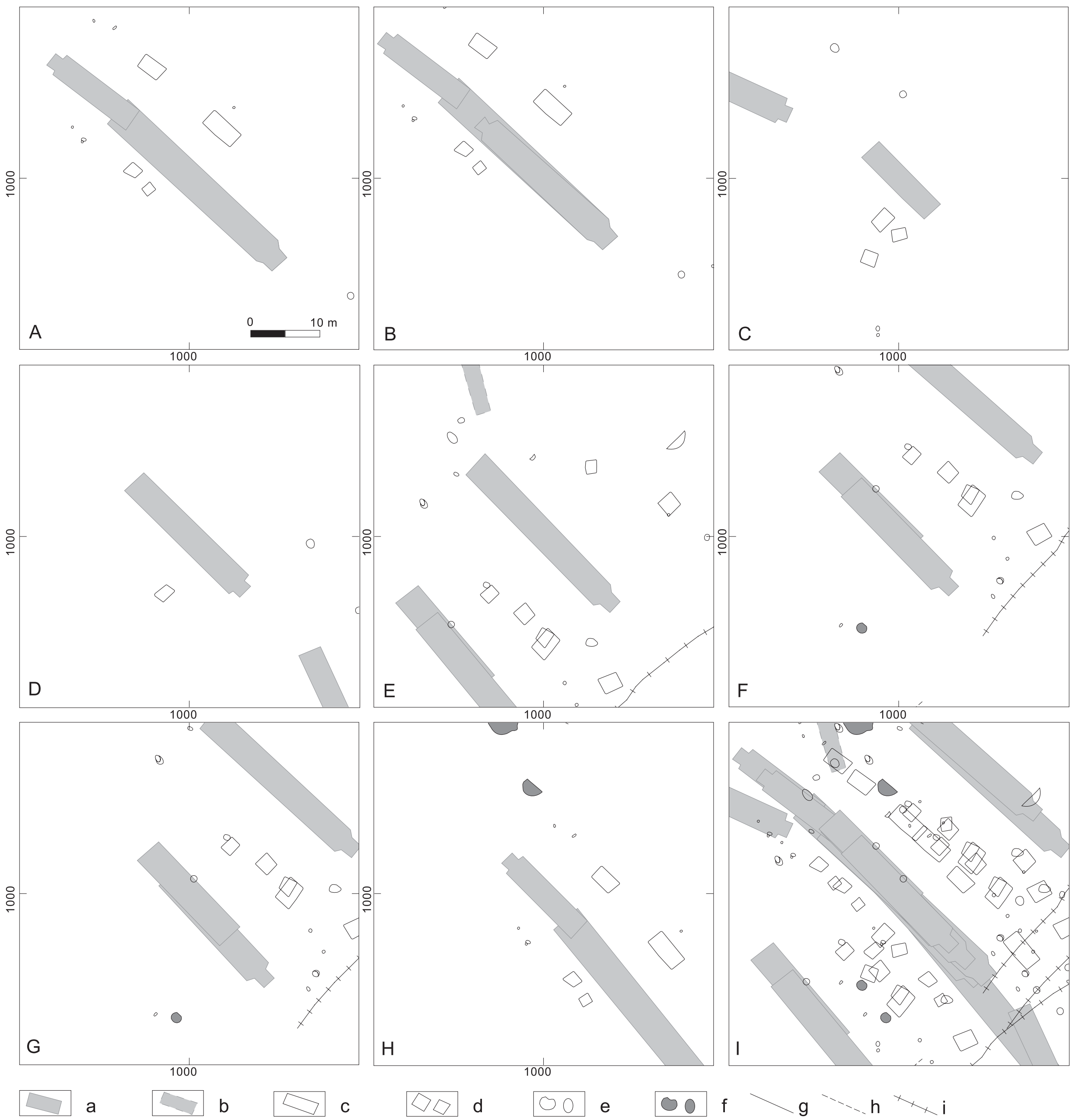

Fig. 6.55 Rotated VASO plot for Tiel - Medel 8 MBA house-sites 1a (A), 1b (B), 2 (C), 3 (D), 5 (E), 6 (F), 7 (G), 8 (H) and the VASO plot for all elements (I).

a: houses, b: late bronze age structure, c: barn/shed-type outbuildings, d: granary-type outbuildings, e: pits, f: wells. g: type-1a fences, h: type-2 fences, i: other types of fences.

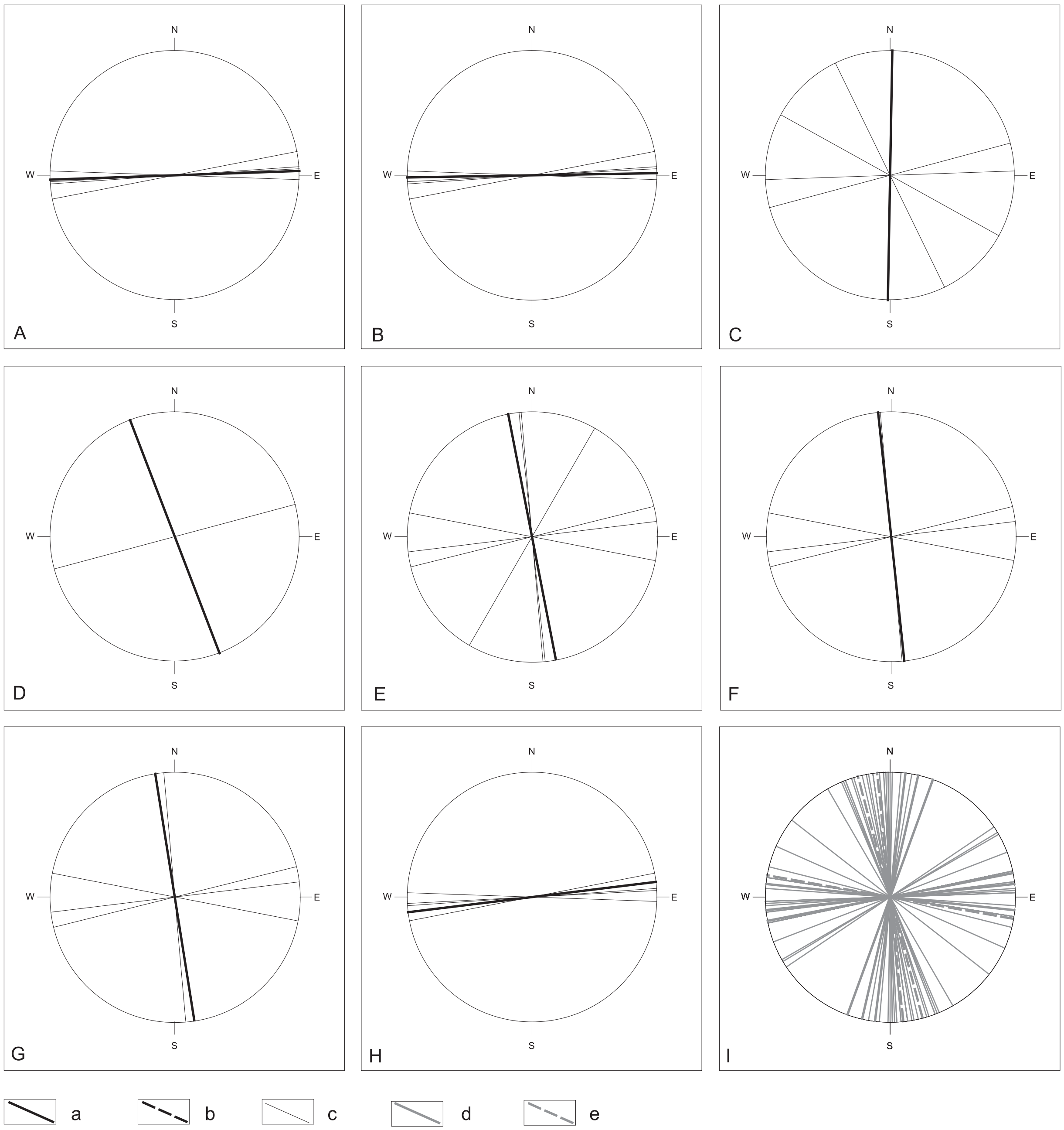

Fig. 6.56 Wind-rose diagrams for Tiel - Medel 8 house-sites 1a (A), 1b (B), 2 (C), 3 (D), 5 (E), 6 (F), 7 (G), 8 (H) and all combined also with LBA or unassigned outbuildings (I).

a: houses, b: barn/shed-type outbuildings, c: granary-type outbuilding, d: LBA or unassigned house, LBA or unassigned barn/shed-type outbuilding, e: LBA or unassigned granary-type outbuilding.

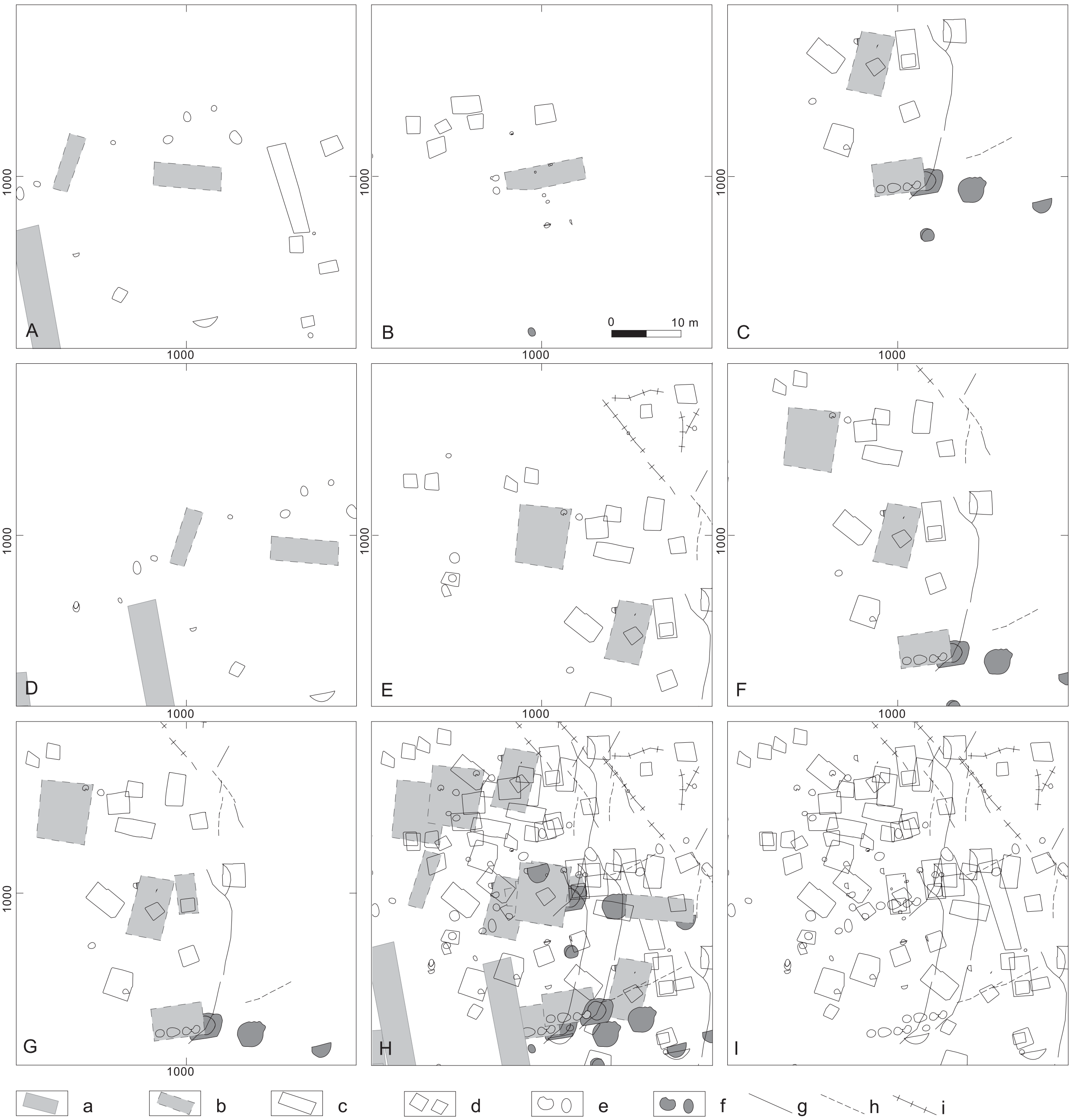

Fig. 6.57 VASO plot towards magnetic north for Tiel - Medel 8 possible Late Bronze Age house-sites 4 (A), 9 (B), 10 (C), 11 (D), 12 (E), 13 (F), 14 (G), the VASO plot for all elements (H) and the VASO plot for all elements minus the houses and wells (I).

a: MBA houses, b: Late Bronze Age possible houses, c: barn/shed-type outbuildings, d: granary-type outbuildings, e: pits, f: wells. g: type-1a fences, h: type-2 fences, i: other types of fences.

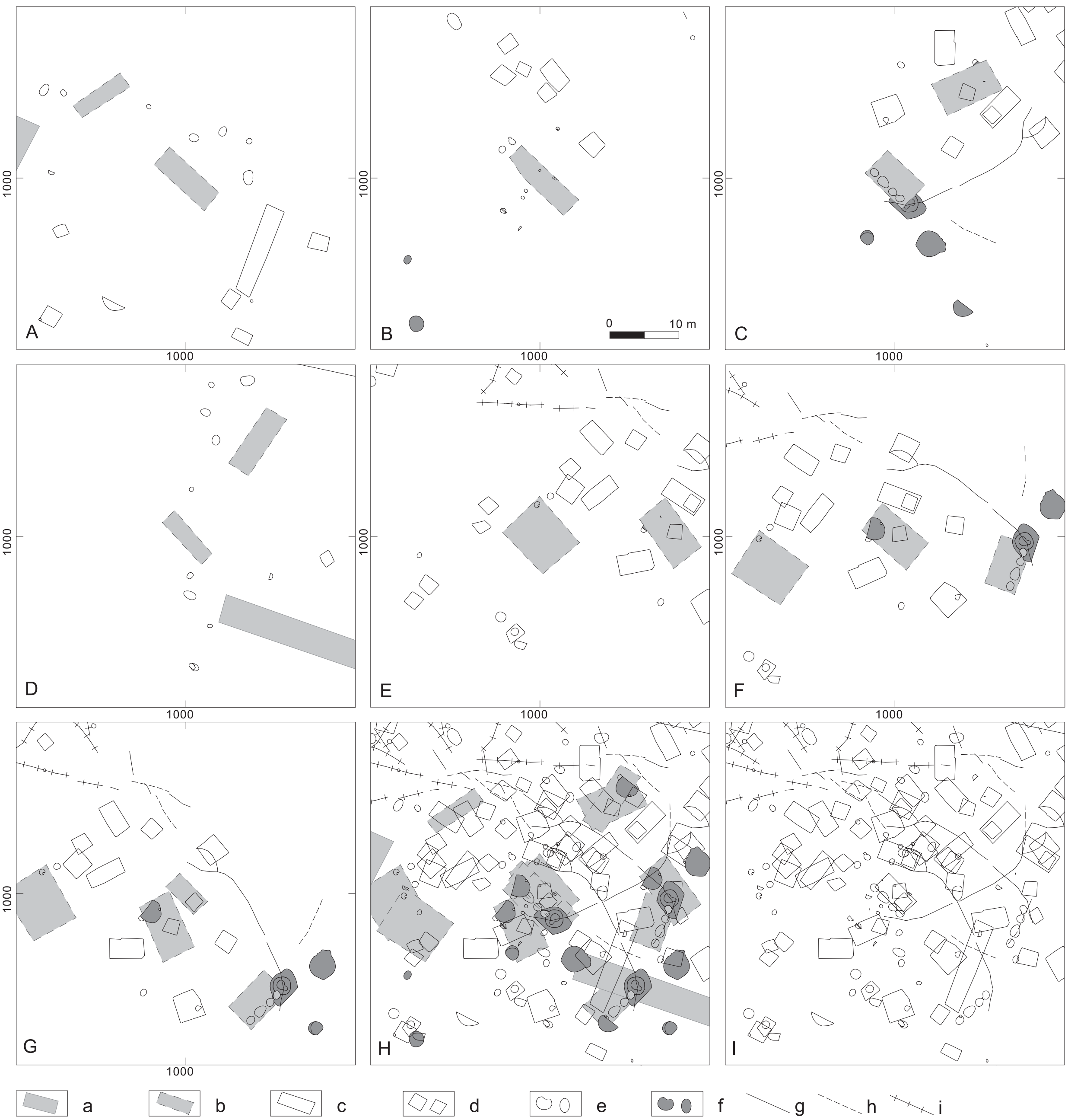

Fig. 6.58 Rotated VASO plot for Tiel - Medel 8 possible Late Bronze Age house-sites 4 (A), 9 (B), 10 (C), 11 (D), 12 (E), 13 (F), 14 (G), the VASO plot for all elements (H) and the VASO plot for all elements minus the houses and wells (I).

a: MBA houses, b: Late Bronze Age possible houses, c: barn/shed-type outbuildings, d: granary-type outbuildings, e: pits, f: wells. g: type-1a fences, h: type-2 fences, i: other types of fences.

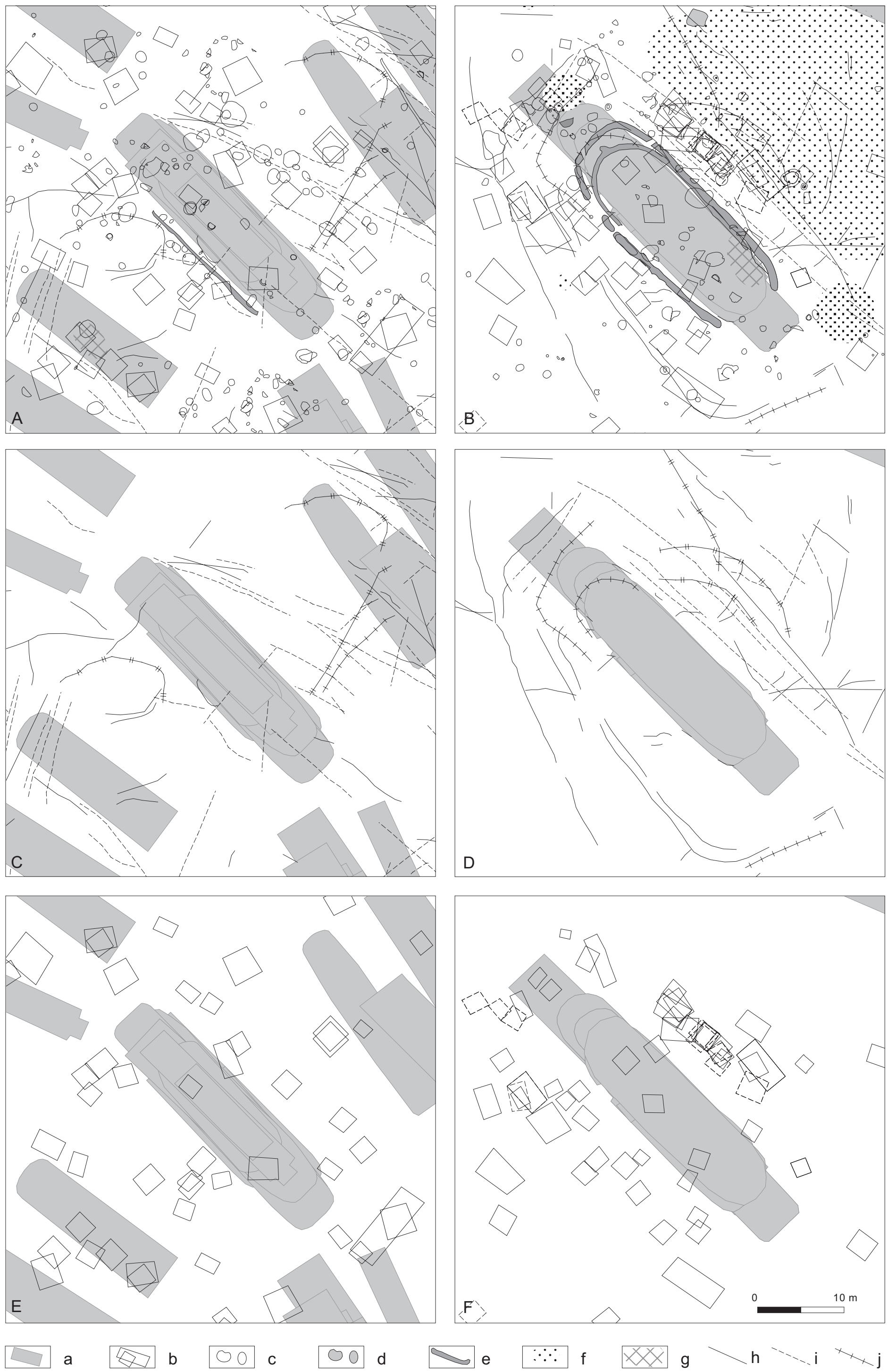

Fig. 6.59 Rotated VASO plot for the ten house-sites with the smallest (A, C, E) and largest (B, D, F) combined first and second inter- house-site distances (according to table 6.1, sum of columns three and four) in order to compare possible isolated versus nucleated house-sites. In A and B all elements are shown, in C and D only the houses and fences and in E and F the houses and outbuildings are shown.

a: houses, b: outbuildings, c: pits, d: wells. e: ditches, f: hoof-imprints, g: ard-marks, h: type-1a fences, i: type-2 fences, j: other types of fences.

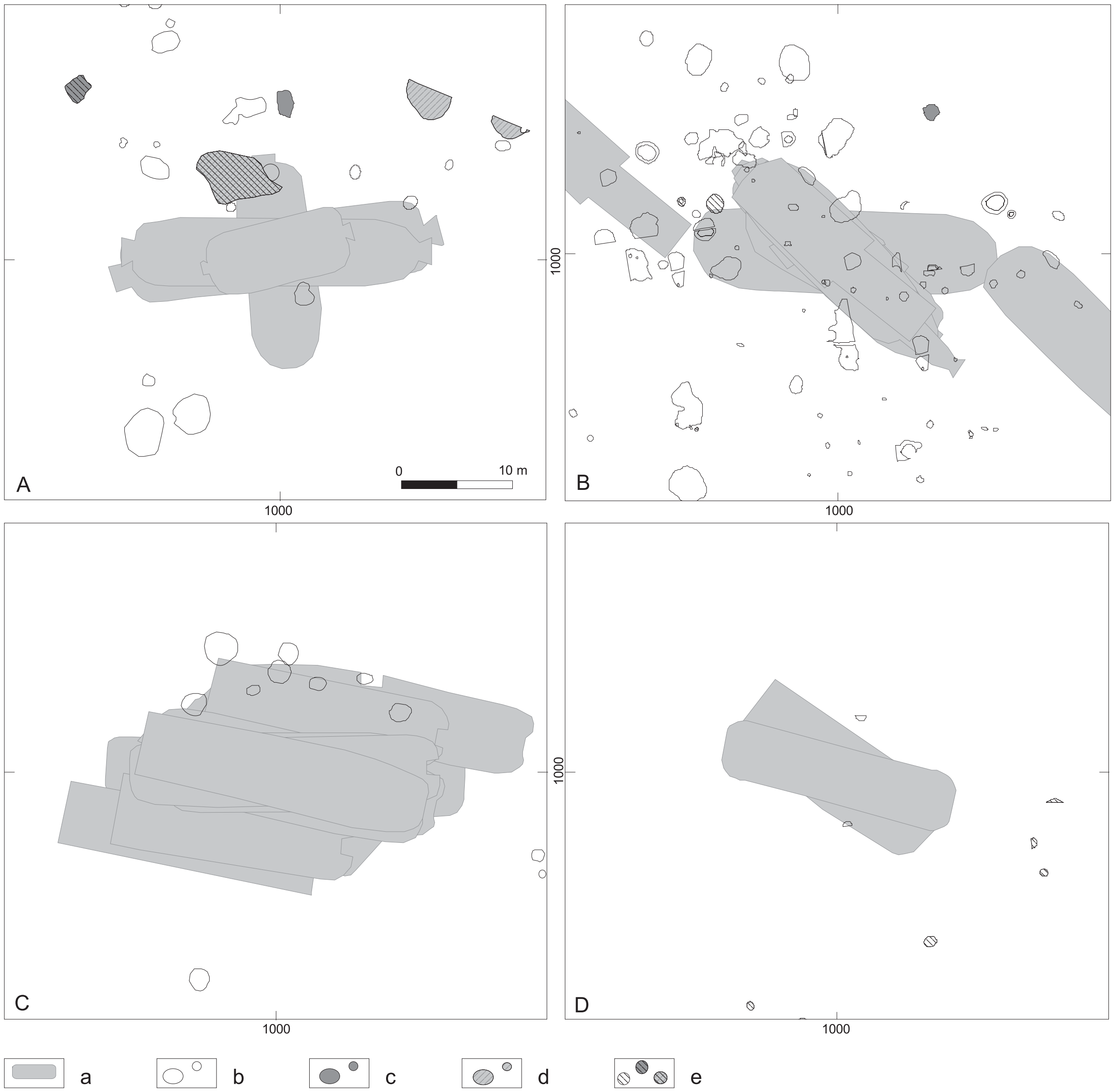

Fig. 6.60 VASO plot towards magnetic north for houses and pits at Zijderveld (A), Eigenblok (B), Wijk bij Duurstede - De Horden (C) and Lienden (D).

a: houses, b: pits, c: wells, d: drinking pools, e: possibly used (secondarily) as refuse pit.

7 Bronze Age settlement dynamics in the Dutch river area

7.1 Introduction

This chapter addresses the dynamics of Bronze Age settlements in the Dutch river area. Whereas the preceding chapters have been concerned with the stage (chapters 2-3) and actors (chapters 4-6) of Bronze Age settlement archaeology in the Dutch river area, their specific interplay is the focus of the present chapter. Settlement dynamics in this area involve an entangled set of different but interrelated types of dynamics, such as landscape dynamics, landscape use dynamics and cultural dynamics. As such, it is virtually impossible to discuss separately the dynamics of the physical landscape, cultural dynamics and the way these two together influenced the use of space. Therefore, in this chapter such interrelated dynamics are discussed together on a chronological axis.

For the different periods under study, the settlement dynamics are analyzed. A long-term diachronic approach is used to characterize the nature, duration and locational stability of human activities. In this, answers to various questions are sought: Were settlement sites the dominant site type? Were these sites settled permanently? Did additional types of sites exist and what function and duration of use may be assumed for these? Moreover, specific attention is paid to the relations between settlement dynamics and fluvial dynamics: are settlements situated, for instance, solely on levee- and crevasse splay deposits of inactive fluvial systems? If so, how and why does the human usage differ for active and fluvial systems? Answers to such and similar questions provide insight into (the changes in) the ways in which prehistoric communities dealt with – the dynamics of – their surroundings, and the changes taken place in it. Such information is necessary to characterize the settlement dynamics for the Bronze Age periods proper, but also to outline and investigate its significance as part of wider diachronic variation in later prehistoric settlement dynamics.

Such questions may be answered by a detailed study of the remains preserved for the different periods in combination with analyses of the geogentic contexts of these. Additionally, any discussion of settlement dynamics should take into account the societal processes and developments playing at larger temporal (long-term developments) and spatial (supra-local or regional) scales. Therefore, the discussions presented below on the nature of human activities within the study area for the separate periods, are preceded by brief introductions specifying the established views on the settlement dynamics for the periods in question. Starting from the Neolithic, the settlement dynamics of the prehistoric occupation of the Dutch river area will be traced up to the Early Iron Age.

7.2 The onset: Neolithic to Middle Bronze Age-A occupation in the Dutch river area

7.2.1 Models for (Middle to Late) Neolithic and Early Bronze Age settlement dynamics

Neolithic societies in the Low Countries are traditionally conceived of as being characterized by a more spatially and temporally differentiated settlement dynamics compared to later Bronze Age occupation. During the (middle) Neolithic, a larger number of places in the landscape were presumably used for a wider range of tasks. Moreover, these places are thought to have seen a different nature and duration of use in comparison to more permanently occupied domestic sites. Among such additional sites are included raw material procurement (*i.e.* extraction) sites, hunting camps, fishing sites *et cetera*. For some domestic sites, it may be debated whether they were permanently occupied (*i.e.* year-round) or only during certain seasons, but the task-specific sites supposedly did not support continuous habitation. Rather, such sites may have been part of more short-term (*e.g.* daily, monthly, seasonally or even annual) excursions by certain members of the local communities.[1] While characterized by a subsistence strategy based largely to predominantly on cultivated cereals and livestock and only partly on hunting,[2] these communities are ascribed significant settlement differentiation and mobility.[3] Louwe Kooijmans (1993a, 97) classified such a system of long-term seasonal settlements in different ecozones with optional extraction camps as 'restricted residential mobility'.

1 Louwe Kooijmans 1987, 250-251; 1993a, 88-105; Fokkens 2005a, 362; Bakels & Zeiler 2005, 333.
2 *I.e.* quasi-mixed farming; *sensu* Louwe Kooijmans 1993a, 103; Bakels & Zeiler 2005, 329-333, *cf.* Arnoldussen & Fontijn 2006, 299 fig. 8.
3 *Cf.* Van Gijn & Bakker 2005, 293; 298-299; Raemaekers 2003, 744.

Two visualizations of such systems of settlement dynamics, for two different periods, are depicted in figure 7.1. Despite superficial differences, both models bring across a similar image of more fixed (domestic) sites from which

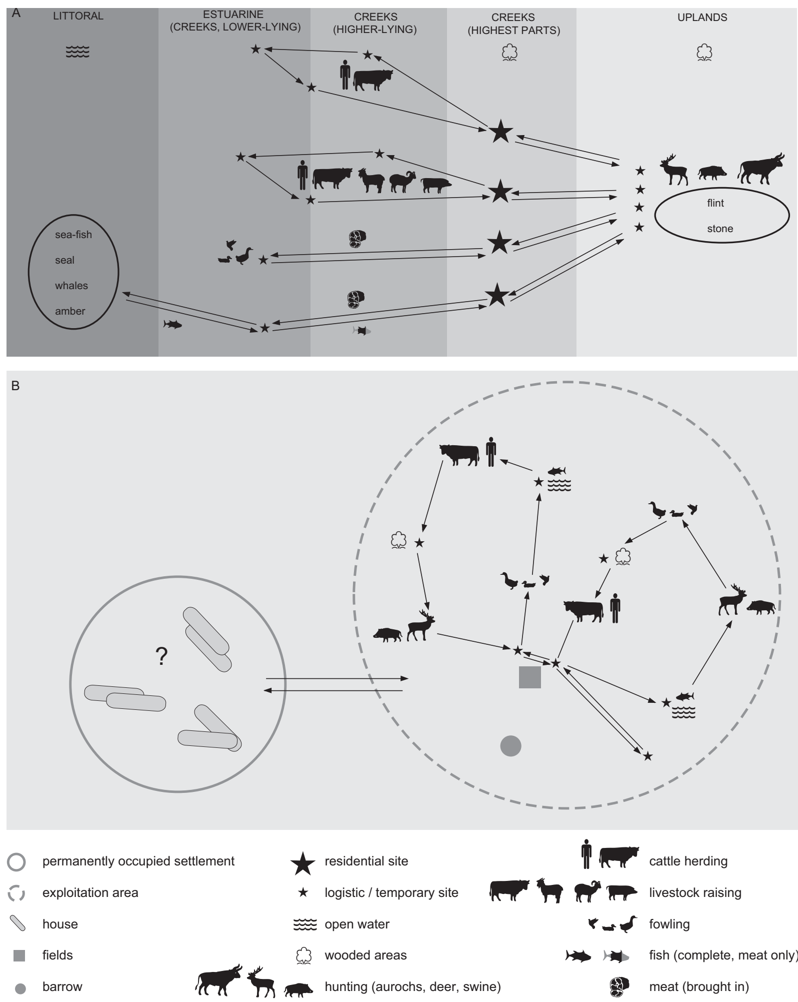

Fig. 7.1 Models showing the dynamics and mobility of Late Neolithic Single Grave culture period (*c.* 3050-2600 cal BC) settlements in the western Netherlands (A: after Hogestijn 2001, 152 fig. 5) and Early Bronze Age (*c.* 2000-1800 cal BC) settlement sites in the Dutch river area (B: after Jongste 2002b, 619 fig. 11.11).

a wider environment was exploited by means of smaller additional sites ('logistic sites', 'extraction sites', 'camps'). Moreover, both representations are unfortunately fairly unspecific as to what the exact relations were between these two main classes of sites. Was there, for instance, a correlation or correspondence between the two classes (*e.g.* were the smaller sites used exclusively by one larger domestic site or were these shared?)? In addition, in both models some elements function whose presence seems more anecdotal and is not explained in relation to the other elements (*e.g.* the meat in fig. 7.1, A, the barrow and fields in fig. 7.1, B). While both models draw attention to the function(s) of such additional sites (the 'why'), they are less informative on the duration ('how long'), the location (the 'where') and the importance (qualitative and quantitative) of such sites within the overall settlement dynamics for these two periods. Essentially, both provide no more and no less than interpretative frameworks within which excavated sites can be meaningfully represented as parts of an overall system of settlement dynamics.

Long-term approaches to settlement dynamics run the risk of oversimplifying and over-contrasting sites from different periods. It appears that in more interpretative accounts of settlement dynamics between the fourth to the first millennium BC, often an implicit evolutionist (almost teleological) progression can be identified. In such narratives, Mesolithic communities are periodically on the move between sites of different functions, while hunting plays an important role. During the (middle?) Neolithic, less diverse locations are part of the settlement system and the periods of use of particular sites differ more distinctly. While some activities, among which hunting and fowling *et cetera*, are still undertaken in different parts of the landscape, a significantly larger part of time is spent at (semi-?)permanent settlements. With the Late Neolithic, hunting was presumably only marginally relevant to subsistence strategies and permanent settlement sites predominate. This then all culminates in the Bronze Age, when permanent settlements are the focal points in the landscape and only very limited time is spent elsewhere. This kind of narrative structure can be modeled along three axes, which are the role of hunting, the degree of difference in site-use duration and the variability in site types (fig. 7.2).

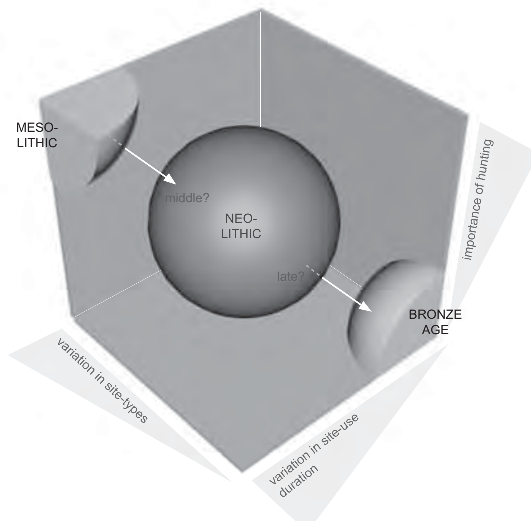

Fig. 7.2 Schematic representation of a common narrative structure used in long-term analyses of settlement dynamics. Site interpretation is in such approaches frequently modelled on the degree of difference in site-use duration (y-axis), the variability in site types (x-axis) and the importance of hunting (z-axis). Evolutionistic interpretations thus assume a progression from the top-left sphere segment (Mesolithic), via the central sphere (Neolithic), to the Bronze Age (bottom-right sphere segment).

The model presented as figure 7.2 may represent a common narrative or interpretative framework, but it should be stressed here that I by no means consider it to be a reliable or data-based reflection of long-term settlement dynamics. Rather, it serves here as an source of inspiration for the compilation of more specific questions that serve to establish the validity of such narratives. Consequently, in order to assess whether and where the sites from the Dutch central river area may be placed and interpreted in such models, we should first turn our attention to the factual indications for settlement dynamics in the excavated remains for the periods under study.

7.2.2 Neolithic sites and site types in the Dutch river area

The Middle Neolithic

Many of the Late Pleistocene and early Holocene aeolian river dunes (dutch: *donken*) in the Dutch river area supported Middle Neolithic occupation.[4] At these locations, presumably more permanent occupation took place and from these, more distant and lower-lying areas were exploited. Examples of such additional sites may be the fowling and fishing

4 *E.g.* De Kok 1965; Louwe Kooijmans 1968; 1974, 125-168; 1993b, 118 fig. 7; 2001a; 2001b, *cf.* Amkreutz *in prep.* There is also considerable evidence for Middle Neolithic(-B); *c.* 3400-2900 cal BC occupation of coastal dunes and barriers (*e.g.* Van Regteren Altena *et al.* 1962a-c; 1964; Glasbergen *et al.* 1967a-b; Verhart 1992; Koot & Van der Have 2001; Louwe Kooijmans & Jongste 2006) and tidal creeks (*e.g.* Louwe Kooijmans 1987; Van Beek 1990; Gehasse 1995; Goossens *in prep.*), but as these sites are situated more distant from the present study area (*cf.* fig. 1.3) they are not dealt with in detail here. See also Diependaele *in prep.*, for a Middle Neolithic to Late Neolithic-A site on crevasse splay deposits of the Oude Rijn fluvial system.

camp at Bergschenhoek (*c.* 3450 cal BC; Louwe Kooijmans 1987, 238-242) or the weirs and fish-traps at Emmeloord (Bulten, Van der Heijden & Hamburg 2002). In addition to the *donken*, levee deposits of fossil rivers were also used for habitation. At Ewijk, levee deposits of a fossil – but possibly re-activated – river course yielded remains datable to the Vlaardingen culture period (*c.* 3400-2600 cal BC).[5] As finds were recovered there from the residual gully fill consisting of humic clay to clayey-peat (Clason 1990, 64 fig. 2) it is improbable that this gully was still active at that time (Berendsen & Stouthamer 2001, 245).[6] Possibly, habitation of unknown permanency and duration was situated on the levees next to it (but these were eroded by later fluvial activity, and it cannot be excluded that the finds in the residual gully were washed from their original location (*cf.* Asmussen & Moree 1987, 55)).

The levees of active river systems in the study area were also used by people in the Middle Neolithic, but no sites have been sufficiently extensively excavated to assess the exact nature and duration of such activities. At Zijderveld, pollen analysis suggests that human activities took place on the levees of the eponymous fluvial system (De Jong 1970-1971, fig. 8).[7] Some flint artefacts and pottery sherds of possible Middle Neolithic age were recovered during the 2005 excavations (Knippenberg & Jongste 2005, 80; 84). As these were found embedded in the levee deposits of the Zijderveld fluvial system and were not associated with a vegetation horizon or evident signs of erosion, the Zijderveld fluvial system was still active then. A radiocarbon date from the residual gully suggests that fluvial activity ceased between *c.* 2870-2480 cal BC (Berendsen & Hoek 2005, 21), confirming a Middle Neolithic Age for these Zijderveld artefacts.

Within the De Bogen macro-region, several find-spots of presumably Middle Neolithic artefacts are known, but their exact dating is often imprecise as they predominantly concern pottery fragments and fragments from polished axes (see Appendix III for details). Moreover, there is usually not enough information on the original context of the finds. Only near the Nieuwe Provinciale Weg at Geldermalsen could it be documented that Vlaardingen-culture period sherds were found in a washed position (Hulst 1973, 28; 1975c, 81). During the Middle Neolithic, several fluvial systems were active in the De Bogen macro-region (Chapter 2; Appendix III). One or several of these created the complex stacked crevasse splay deposits on which the Late Neolithic and Bronze Age occupation took place (*cf.* fig. 2.9). When exactly these crevasse splays were formed is unclear. A combined sample from two residual crevasse gullies at De Bogen sites 28-2 and 28-3 yielded a *terminus ante quem* age of *c.* 3520-3100 cal BC, which indicates a Middle Neolithic age for their formation.[8] As some presumed Middle Neolithic sherds were recovered from De Bogen site 30 (Jongste & Smits 1998, 30-31; Appendix III, table III.5), the crevasse splay deposits of active systems may have been used as well.[9] Unfortunately, the exact stratigraphic context of these sherds is not specified.[10]

Additional support for Middle Neolithic use of crevasse deposits of still active fluvial systems, can be found in the Dodewaard macro-region. Middle Neolithic ceramics and some flint tools were discovered at several sites where test-trenches were dug prior to the Betuweroute railway construction.[11] However, these finds were recovered from a layer that contained mostly Middle Bronze Age ceramics, and they are best interpreted as having been incorporated unintentionally. The same applies to the Middle Neolithic finds uncovered in the main Dodewaard excavation

5 Louwe Kooijmans 1985, 145-146; Janssen 1989; Clason 1990.

6 A sample from the residual gully situated 310 m to the northwest was dated to *c.* 3980-3790 cal BC (GrN-11290: 5105 ± 40 BP; Berendsen & Stouthamer 2001, 151), suggesting the landscape had been fossil for several centuries prior to the Vlaardingen culture period phase of usage (*cf.* Louwe Kooijmans (1985, 50) who argues – for the coastal barriers – that these may have been more favourable locations for Vlaardingen period occupants when a more developed forest was present. Possibly, this may also explain the time difference between the cease of fluvial activity and documented remains at Ewijk).

7 For the Eigenblok excavations as well, pollen data pointed towards Middle Neolithic human activities (Brinkkemper *et al.* 2002, 448-449) whose exact nature, however, could not be determined.

8 AA-37523: 4600 ± 45 BP; Van Zijverden 2002b, 79-80.

9 For example, the 'Buren type' axe found at Noordeloos (to the west of the study area), may have originated from a crevasse splay deposit of the Schoonrewoerd fluvial system (Arnoldussen 2000, 82 fig. 6.5). This find – if not secondarily displaced – renders a Late Neolithic-B start for the Schoonrewoerd system (as proposed by Berendsen & Hoek 2005, 27) improbable.

10 But see Jongste & Smits 1998, 22 fig. 4b. It is suggested that some finds (of unspecified age) were found in the crevasse and floodbasin deposits at levels not associated with vegetation horizons, so possibly during periods of fluvial activity.

11 Bulten 1998a-c; Bulten & Smits 1998; Ten Anscher & Van der Roest 1997; Appendix VI.

(Theunissen & Hulst 1999a, 153-154). Only for site 34 (Dodewaard - Peyenkampse Veldweg; Bulten 1998b) can the nature of the Middle Neolithic occupation in the Dodewaard macro-region be understood more clearly.[12] At this site, at 60 cm below the present-day surface, a finds-layer was discovered that contained Late Neolithic pottery and flint artefacts (Bulten 1998b, 12-19). At 20 cm depth below this layer, another finds-layer and a ditch were uncovered, the latter containing charred emmer wheat, Middle Neolithic pottery and flint flakes. Probably, a Middle Neolithic settlement was present at that location, but most of the surface level of this site is thought to have been eroded by later crevasse formation (*ibid.*; Appendix VI). The ditch was dug into crevasse splay deposits, and a younger layer of crevasse deposits also separated this layer from the upper finds-layer. Most likely, this are two distinct phases of crevasse splay formation by (a precursor to) the Distelkamp-Afferden fluvial system that was active from the Middle Neolithic-B to the Iron Age (Berendsen & Stouthamer 2001, 197; Appendix VI).

For the Middle Neolithic remains uncovered in the Wijk bij Duurstede macro-region (Hessing & Steenbeek 1990, 15; Appendix IV) and near Tiel (Arnoldussen 2000, 35-39; Van Zijverden 2007, 21 fig. 2.7) there is insufficient clarity on their stratigraphic context to use them in discussions of site locations and dynamics.[13]

Middle Neolithic settlement dynamics in the study area: a conclusion

After having presented the available data for this period in the sections above, is it possible to comment upon the settlement dynamics for the Middle Neolithic in the study area? The answer is predominantly negative. While find-spots datable to this period are known in some numbers, the finds were usually no longer in their original stratigraphic context, or no context was published. In any case, the aeolian river dunes west of the study area supported habitation and, where investigated, frequently yielded artefacts in quantities, states and numbers that suggested an interpretation as (semi-?)permanent domestic sites. Yet, it should be stressed that without extensive excavation, it remains unknown if this material resulted from recurrent brief or seasonal use, or from (semi-)permanent occupation.

Clear-cut indicators for permanency of occupation are difficult to establish in the first place (*cf.* Louwe Kooijmans 1993a, 90-95; Raemaekers 1999, 115-125) and possible promising correlates such as seasonally informative bone assemblages, domestic structures or plough marks are generally not encountered in smaller excavations or chance discoveries.[14] Moreover, the Middle Neolithic occupation in the study area has never been the focus of specifically targeted research and finds-layers are generally situated below the reach of modern ploughs, which decreases detectability as chance finds and during survey campaigns. Therefore, the data that *is* available, is a dangerous underestimate of the real numbers, types, extents and densities of sites once present. In short, no evident 'camps', 'extraction sites' or '(semi-)permanent settlement sites' can be outlined in the study area at present.[15]

Nonetheless, the available – albeit anecdotal – evidence indicates that levee deposits of active (Zijderveld),[16] as well as inactive systems (Ewijk; inactive for several centuries) were utilized by Middle Neolithic communities. The diverse nature of the remains at Ewijk may indicate a domestic function for the (assumed) eroded site nearby.

12 For the full overview see Appendix VI, esp. fig. VI.4.

13 For the area around Tiel, the lack of direct dates framing the phase(s) of activity of the Zoelen fluvial system especially hampers the interpretation. Overlapping with the suspected location of the Zoelen channel-bed deposits, Vlaardingen-culture period and Single Grave Culture period finds are known. It is unclear whether the Zoelen system was still active at that time. Some Early Bronze Age finds are also known from similar locations, but it is not clear whether they are situated at the same stratigraphic level. It is clear, however, that the Zoelen system was reactivated prior to the Middle Bronze Age-B occupation, as new levee- and crevasse deposits formed that underlie the Middle Bronze Age and younger occupation (Van Zijverden 2007, esp. fig. 2.7).

14 Possibly also graves may be added to this list (but see Louwe Kooijmans 1993a, 92).

15 But see Louwe Kooijmans 1987, 250-251 (Bergschenhoek, *c.* 4200 cal BC); 1987, 243-250 (Hekelingen III, *c.* 3000-2600 cal BC); 1993a, 94 (and references therein); 2005, 264 (Hazendonk, *c.* 3850-3600 cal BC); Verhart & Louwe Kooijmans 1989, 104-107 (Gassel, Middle Neolithic); Hogestijn, Bulten & Koudijs 1994, 28 (Slootdorp - Kreukelhof, *c.* 3400-2900 cal BC); Hogestijn 1994, 147 (Mienakker, *c.* 2860-2570 cal BC) for Middle- to Late Neolithic examples of such sites outside the present study area.

16 The stratigraphy caused by ongoing sedimentation at Hekelingen III during the Vlaardingen period (Louwe Kooijmans 1974, 244; Louwe Kooijmans & Van de Velde 1980, 10-11) also indicates human activities on active fluvial systems.

The Zijderveld remains are too few to postulate a similar function for.[17] Possibly, active levees were either used less frequently, or in a different manner compared to levees of fossil systems (*cf.* sections 2.7.1-2.7.2). Crevasse splay deposits were in any case also used during the Middle Neolithic period. The discovered ditch fragment at Dodewaard - site 34 presents tangible evidence thereof. For the other Middle Neolithic artefacts from the Dodewaard macro-region, it is plausible (but not definitively proven) that they were situated on crevasse splays deposited by fluvial systems that were active during the Middle Neolithic. The artefacts datable to this period from within the De Bogen excavations were all found in secondary contexts, which means that it remains unclear whether they were associated with active or passive crevasse splays. Consequently, to study if – and how – Middle Neolithic activities differed on crevasses splays of active and passive fluvial systems may be an important future research question. At present, there is unfortunately inadequate data to shed more light on site types and settlement dynamics for the Middle Neolithic period in the study area.

What is nonetheless clear, is that the Dutch central river area formed the north(eastern) most boundary between the Vlaardingen group sites in the south and the northwest group of the Funnel Beaker culture to the north during the Middle Neolithic (fig. 7.3).[18] The river area possibly provided a natural boundary zone against which pottery traditions can be outlined. The typical funnel-beaker decorated ceramics are scarce to absent south of the central river area, and the Vlaardingen pottery tradition with s-shaped pot profiles and rim-perforations is only very infrequently encountered to the north of it.[19] Nonetheless, there is sound evidence for contacts between these two areas. For example, axes of distinct Funnel Beaker (rectangular cross-sections) or Vlaardingen-style (*Buren*) are found in the opposite areas. [20] An additional argument may be the fact that ceramic types like baking plates and collared flasks are present in both areas as well (Van Gijn & Bakker 2005, esp. 303). Possibly, the large tidal estuary that penetrated up to the higher (boulder-clay) areas in the north-west of the Netherlands formed a key area of contact and interaction.[21] For instance, from the present-day province of Noord-Holland – which was then part of the large tidal zone – Funnel Beaker period sites (Hogestijn 1992; 2001; Drenth & Hogestijn 2001) as well as Vlaardingen group sites (Van Heeringen & Theunissen 2001b, 227-236) are found as little as 17 km apart.[22]

The reasonably easily recognizable Funnel Beaker style decorated pots are almost unknown from the central river area proper. The so far single exception are the sherds from two or three (locally made?; Bakker 1982, 90-91) pots decorated in Funnel-Beaker style from the Hazendonk (Louwe Kooijmans 1976a, 285 fig. 23) but Funnel Beaker sherds are also known in some numbers from the ice-pushed hills of the province of Utrecht that directly border the central river area in the east (*e.g.* van Tent 1979, 117). These relatively sharply contrasted distributions (Bakker 1982, 90) suggest that communities present in the river area conceived their region – in addition to as a region imbued

17 At Zoelen - Kerkenakkers significant amounts of pottery, stone and bone were recovered, which may suggest a domestic use of the site (Arnoldussen 2000, 39; Archis 22375). At Echteld - Scheele Hoek (Arnoldussen, *loc. cit.*; Archis 40498), Middle Neolithic finds originated from a large feature. While the quantity and diversity of artefacts, as well as the presence of features may indicate more permanently used sites, they are not discussed here in detail as the fluvial system on which these sites are situated (the Zoelen fluvial system) is ill-dated (see note 13). Consequently, it is not known whether, or how long, this fluvial system was inactive prior to the Middle Neolithic activities.

18 The remains classified as the Stein group are presumable the southern Netherlands, upland, counterpart to the Vlaardingen group sites known predominantly from the Holocene wetland areas (Van Gijn & Bakker 2005, 281-282; Schreurs 2005, esp. 318-319). Presumably, the Stein group continued up to the Late Neolithic-B without showing much Beaker (*e.g.* Funnel Beaker, All Over Ornamented, Single Grave period) influence (Schreurs 2005, 319; Van Hoof & Van Wijk 2005, 190).

19 For claimed Vlaardingen-style ceramics in the north-east see Bakker 1982, 90; Heidinga 1984, 6; Scholte Lubberink & Lohof 1997. For the previously claimed TRB ceramics from Herpen (Ball & Jansen 2002, 26-28, see Waterbolk 2003, 215 on the origin of the TRB axe), Drunen (Van der Lee 1976, 84) and Roggel/Neer (Archis 27298), a Late Bronze Age date cannot be excluded. Note that the coastal dunes are also part of areas where Vlaardingen-style ceramics were currrent.

20 See for instance the *Buren* type axes found at Denekamp (Bakker & Van der Waals 1973), Darp and Zwigelle (Archis 239807; 239935), the possible Vlaardingen (or TRB?) chisel of Slootdorp - Dolfijntocht (Archis 18506) or the TRB axe from Zandwerven (Bakker 1982, 94) and knob-butted axes from Leenderheide, Neeritter, Ittervoort and Bladel (Bakker 1982, 102).

21 The recent finds of Funnel Beaker Culture sherds at the sites of Hazerswoude - Turbinepark N11 (Diependaele *in prep.*; pers. comm., Feb. 2008) and Hellevoetsluis (Goossens *in prep.*; Van Hoof, pers. comm., March 2008) support the idea that the coastal estuaries and adjacent part of the river area may have been a key area of contacts.

22 The identification of ceramics from P14 as Vlaardingen (Bakker & Hogestijn 1987, 54) is no longer seen as tenable (Gehasse 1995, 219).

with other local characteristics – as a boundary zone where differences were perhaps stressed rather than bridged (*cf.* Cohen 1985, 110).

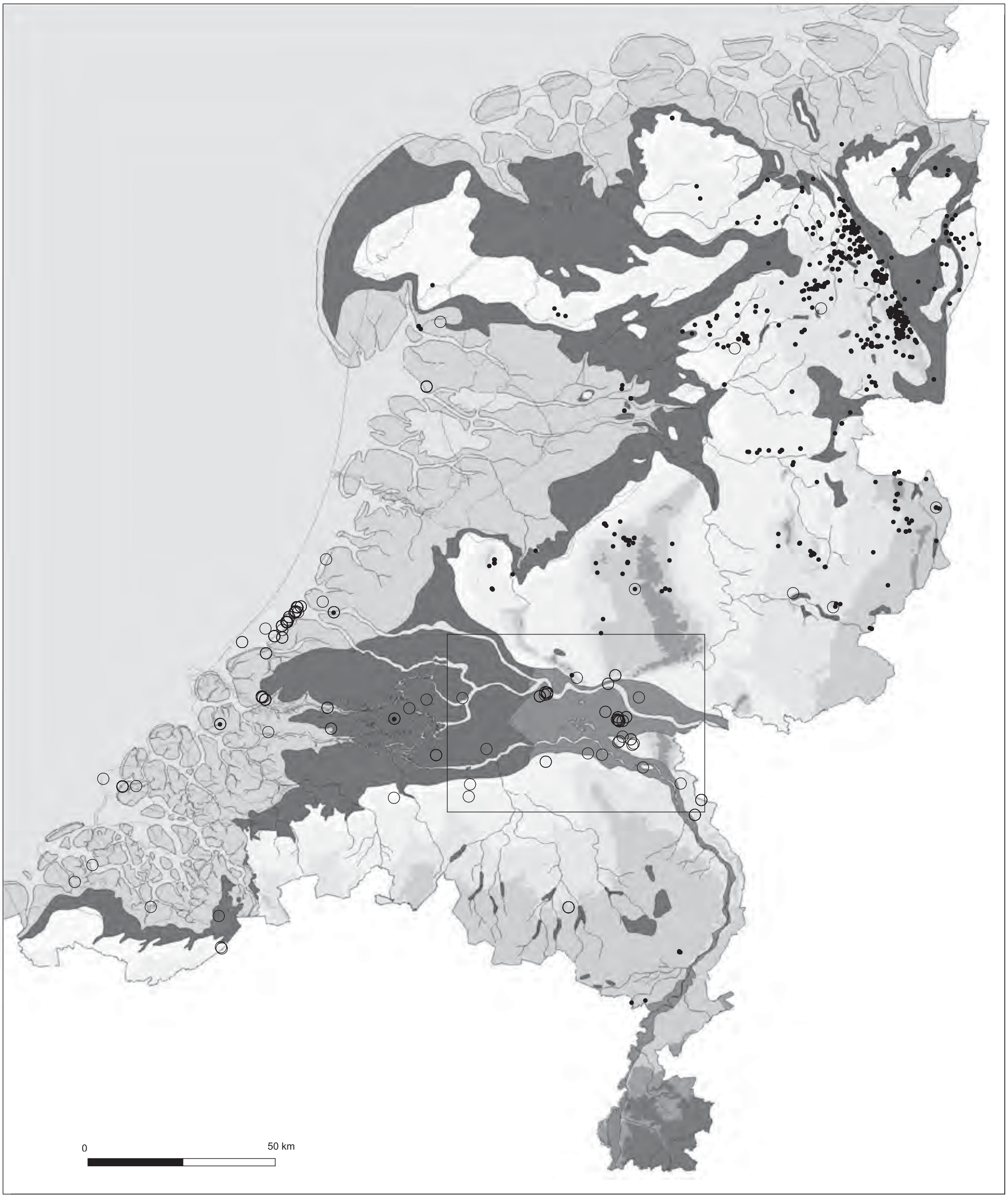

Fig. 7.3 Funnel Beaker culture sites (filled small circles, *c.* 3400-2900 cal BC) and Vlaardingen group (outlined larger circles, *c.* 3600-2500 cal BC) sites (from Dutch national Archaeological inventory Archis, maintained by the RACM, formerly ROB) plotted on a palaeogeographic map for the Netherlands around 5100 BP (from Vos 2005, map 4). The study area is indicated as the outlined frame.

The Late Neolithic

Around the end of the 4th and start of the 3rd millennium BC, the subsistence strategy of Neolithic communities shifted notably towards a strategy wherein mammal hunting no longer seems to play a dominant role. From the start of the Single Grave Culture period (*c.* 3000/2900-2500 cal BC), the dominance of hunted mammals in bone assemblages drops in nearly all sites to less than 10-20%.[23] In the (near-)coastal sites, fowling, fishing and the collecting of shellfish nonetheless continued to be of importance (Lauwerier 2001). As with the preceding Middle Neolithic period, a differentiation between presumably (yet not proven) permanently settled sites and smaller, more transient, logistic sites is envisioned (*e.g.* fig. 7.1, A; Hogestijn 2001, 153).[24]

The presence of fields, documented archaeologically by plough-marks or pollen evidence, has been forwarded by Louwe Kooijmans (1993a, 92) as reflecting the permanency of domestic sites. Therefore, much weight has been put on the role of the ard – and its archaeological correlate: the ard-mark – in the transition from the Middle- to the Late Neolithic.[25] While there is evidence that ard-based agriculture was practised during the Funnel Beaker Period,[26] it may have been more common or even the customary in the Single Grave Culture period, when such traces are more frequently encountered.[27] It is plausible that the increased labor investments in the fields – as reflected by ard-agriculture (Fokkens 1986) – helped to create bonds between households and specific places in the landscape that were claimed, effectuated or celebrated by the use of barrow burials (Van der Beek 2004, 158). This change towards a dominant agricultural strategy based on ard-agriculture may also have rendered redundant or inappropriate the hunting that previously formed part of the Middle Neolithic subsistence strategies.[28]

Regardless of when exactly ard-agriculture gained momentum, a whole new burial custom (barrows erected over individual graves) and new styles of material culture were *en vogue* at the start of the Late Neolithic. In settlements, moundless graves and in barrow interments, ceramics decorated in Northwest European Single Grave Culture styles are encountered.[29] In addition, flint daggers and perforated stone axes are found that display styles shared within wider northwest-European networks.[30] The distribution of these new styles cuts across some of the former Vlaardingen/Funnel Beaker boundary zones. Single Grave pottery is thought to be current in all areas above the present-day river Rhine in the Low Countries, as well in the main Meuse and Rhine river valleys (*e.g.* Fokkens 2005a, 359-360 fig. 16.2).[31] Only during the later All Over Ornamented (*i.e.* All Over Corded, *c.* 2600-2500 cal BC) [32] and Bell Beaker (*c.* 2500-2000 cal BC) periods, is the entire Dutch central river area thought to have been part of this more northernly distribution pattern.[33]

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23 *E.g.* Gehasse 1995, 226 table 9.12; Lauwerier 2001, 206-207; Arnoldussen & Fontijn 2006, 299 fig. 8.

24 *Cf.* Woltering 1985a, 214; 1987, 295-297; Gehasse 1995, 228; Fokkens 1998a, 107.

25 *E.g.* Sherratt 1981, esp. 286; Fokkens 1986, Tegtmeier 1993, Drenth & Lanting 1997.

26 *E.g.* at Emmerhout; Drenth & Lanting 1997, 57-59, possibly also at Groningen; Kortekaas 1987, *cf.* Drenth 2005, 335.

27 See examples in Drenth & Lanting 1997; Pronk 1999; Van Heeringen & Theunissen 2001a, 132.

28 It should be stressed here that there is nonetheless much evidence that at Single Grave Period sites situated in the near-coastal areas of rich bio(tope)-diversity, hunting, fishing and fowling was practised (Zeiler 1997). The difference with preceding periods lies in the fact that despite this more 'broad-spectrum' exploitation, domesticated species almost invariably dominate the bone assemblages (Lauwerier 2001, 206-207; Gehasse 2001, 173 table 5; De Vries 2001, 324; Arnoldussen & Fontijn 2006, 299 fig. 8).

29 *E.g.* Floore 1991; Roorda 2001; Sier 2001, Drenth 2005, 336-349, *cf.* Drenth & Bakker 2006, 5-7

30 Drenth & Lanting 1991; Buchvaldek & Strahm 1992; Suter 2002; Furholt 2003; Van der Beek 2004, 178-180; Drenth & Bakker 2006, 5.

31 Although the site of Voorschoten was situated south of the Rhine inlet (Glasbergen *et al* 1967a-b), it is perhaps best regarded as a continuation in southern direction of the Single Grave Culture period presence on the coastal barriers more to the north (*e.g.* Ten Anscher 1990, 49; Bitter 1993, 306; Woltering 1985b, 327).

32 Lanting & Van der Plicht 2002, 79-83; Van der Beek 2004, 159.

33 Fokkens 2005, 360 fig. 16.2; Drenth 2005, 335; Schreurs 2005, 319. See also Lanting & Van der Plicht (2002, 33) on possible Single Grave Culture period fragments of (type A battle-)axes and pots at Vlaardingen (Van Beek 1990, esp. 173; 203; plates S & W). The cord-decorated beaker sherd (PFB?) from Linden - Kraaienberg (Louwe Kooijmans & Verhart 1990, 62 fig. 13) from a pit with Stein-type ceramics (*cf.* Schreur 2005, 318) is a well-known possible finds-association between these two ceramic traditions. Additionally, Lanting and Van der Plicht (2002, 32; 66) dismiss the often claimed Funnel Beaker-Protruding Foot Beaker association of the late Funnel Beaker Culture period cremation grave of Emmen - Angelslo (Bakker & Van der Waals 1973, 25 fig. 9). They object that bioturbation may have caused the incorporation of the Single Grave Culture period sherd into this feature, despite opposition to this in Bakker and Van der Waals (1973, 25). As such, it may still be a case of association, but it needs to be considered with due caution.

Essentially, the ideas on what settlement dynamics were like during the Late Neolithic, do not differ essentially from those applied to the Middle Neolithic, save for a generally reduced importance of hunting. Does this mean that sites of comparable types may be expected in comparable locations? Furthermore, it may be worthwhile investigating whether the established views on the central river area as an area initially devoid of new (Single Grave period) ceramic styles, but with All Over Corded and Bell Beaker ceramics, holds true and can shed any light on the (demise of the) central river area as a possible boundary zone.

Late Neolithic sites in the study area

There are no find-spots known for the start of the Late Neolithic (*i.e.* Late Neolithic-A; 2900-2500 cal BC) from the Zijderveld macro-region. In the first place, this should be attributed to low research intensity, but this still leaves unexplained why in the various Zijderveld excavations (see section 4.2) no undisputable Late Neolithic remains have been found. A plausible explanation may be that the sedimentation of the Schoonrewoerd fluvial system, situated only 500 m to the southeast, rendered habitation unfavorable until the cessation of sedimentation by the Schoonrewoerd fluvial system prior to or around *c.* 2460-2140 cal BC.[34] After the cessation of sediment deposition, the accumulation of Zijderveld- and Schoonrewoerd levee- and crevasse deposits was in theory available for use, but no remains have been documented for the Bell Beaker phase within the Zijderveld excavations. Possibly, sedimentation by the Schoonrewoerd system covered the preferred (more sandy to silty) locations beyond what acceptable for either living or agriculture. Alternatively, the slightly higher Schoonrewoerd levee- and crevasse deposits may simply have been preferred. Some support for the latter option can be found downstream of the Zijderveld macro-region, where several sites on the Schoonrewoerd deposits that have been test-trenched or excavated, yielded remains datable to the Late Neolithic. These sites yielded a few possible All Over Ornamented (Single Grave Culture period) and Maritime Bell Beaker sherds, but most beaker sherds could be interpreted as originating from Bell Beakers.[35] This suggests a rapid usage of the Schoonrewoerd levee deposits after the cease of fluvial activity.

At both the Enspijk (section 4.3.3) and Eigenblok (section 4.3.4) excavations, sherds datable to the Late Neolithic were found. The single groove-decorated sherd from Enspijk can not be dated more precisely than ‘Late Neolithic, possibly Bell Beaker’ (Ter Wal 2005b, 27; 29 fig. 16.2). While this fragment does prove that the period of fluvial activity suggested for the Hooiblok/Enspijk fluvial system(s) on which the site is located may be wrong (*c.* 2500-2200 BP; Berendsen & Stouthamer 2001, 199; 208), it only provides a *terminus ante quem* for the actual age of this branch of the Hooiblok-Enspijk system.[36] It is possible that the Enspijk fluvial system linked up downstream to the Eigenblok fluvial system (Van Zijverden 2004b; Appendix II, fig. II.2). For this system, cessation of sedimentation prior to or around *c.* 3340-2930 cal BC is likely.[37] On the levee and crevasse splay deposits of the Eigenblok fluvial system, a vegetation horizon formed (Van Zijverden 2002a, 60 fig. 2.7). No direct or indirect dates are available that can more precisely date the formation of this vegetation horizon. A date from the residual crevasse gully that later eroded parts of this finds-layer only indicates that this occurred well before *c.* 1920-1680 cal BC.[38] The few (n = 24) possible Bell Beaker sherds recognized at the Eigenblok excavations cannot be dated more precisely and were all found in secondary context (*i.e.* the upper, Bronze Age, occupation layer; Bloo & Schouten 2002, 265). It is probable that at both Enspijk and Eigenblok, Late Neolithic activities (of indeterminate nature) took place only centuries after cessation of the underlying fluvial system.

From the greater diversity and quantity of Late Neolithic artefacts from the various De Bogen excavations (section 4.4.3; Appendix III) it is clear that Late Neolithic occupation must have differed in nature here compared

34 See Appendix I and Van Zijverden 2003a for a detailed discussion on the proposed end-dates for the Schoonrewoerd fluvial system.

35 Louwe Kooijmans 1974, fig. 18 and his appendix III; Wassink 1981, 59 (although for a few cord-decorated sherds an interpretation as AOC-pots cannot be excluded; *e.g.* Wassink 1981, photo 15, top right); Deunhouwer 1986, 101; Thanos 1995, 58 table 8.2. At Molenaarsgraaf, Bell Beaker pottery is the oldest pottery recovered (Louwe Kooijmans 1974, 209-210), although some smaller fragments may be parts of AOO beakers (*op. cit.*, 287).

36 Moreover, the exact context (feature, finds-layer, levee deposits?) of the sherd was not published.

37 GrN-24265: 4450 ± 40 BP; Berendsen & Stouthamer 2001, 199.

38 AA-37254: 3475 ± 45; Jongste 2002a, 36. Another indirect indication is provided by the charcoal from a pit situated within the ring-ditch at Eigenblok site 5 dated to *c.* 2300-1750 cal BC (GrN-24100: 3660 ± 80 BP; Jongste 2002a, 35).

to that at Eigenblok and Enspijk. At the De Bogen sites, many sherds and lithic remains were dated to the Late Neolithic.[39] These finds were generally embedded in a vegetation horizon that had formed in a layer of (Middle Neolithic; *supra*) crevasse deposits that overlaid older levee- and crevasse splay deposits (Van Zijverden 2002b, 78; 2004b). The oldest Late Neolithic remains from the De Bogen macro-region may be the possible All Over Corded sherds from De Bogen site 30 (Jongste & Smits 1998, 28; 31), similar sherds found with Vlaardingen period sherds at Geldermalsen - Nieuwe Provinciale Weg (Hulst 1973, 28; 1975c, 81)[40] and a possible type P2 battle-axe (Addink-Samplonius 1968, 233) and a possible Protruding Foot Beaker sherd (De Jager 1996, 13) from Meteren - Kalenberg.[41] These finds indicate that Single Grave Culture period activities may be expected, but cannot yet be isolated and understood in detail.[42]

It is not until the All Over Ornamented (*c.* 2600-2500 cal BC) and Bell Beaker period (*c.* 2500-2000 cal BC) phases that human activities have left clearer traces. Comparable to the situation at the Eigenblok macro-region, a time lag of several centuries may have lapsed between the cessation of fluvial activity and more intensive human activities in the De Bogen macro-region. Alas, the exact nature and duration of these latter activities escape us. The presence of the claimed Late Neolithic structures at De Bogen site 29, 30 and 45 (Hielkema, Brokke & Meijlink 2002) has been refuted in this study (section 4.4.3; Appendix III), which means that finds and features cannot easily be studied in meaningful interrelation. Moreover, no areas or stratigraphically separated levels were found where Late Neolithic remains could have been studied in isolation from younger period occupation traces. Consequently, the various fragmentary – yet vivid – relicts such as artefacts and some remarkable features (*cf.* Chapter 4, fig. 4.21, C) cannot be characterized more precisely than as 'human activities'. They may very well represent habitation, but the duration and nature thereof remains unknown.

For the Wijk bij Duurstede macro-region, only few indications for Late Neolithic use are known. While it is plausible that deposits of the Werkhoven fluvial system were suitable for human use after the avulsion into the Houten fluvial system around *c.* 2460-2040 cal BC (Berendsen & Stouthamer 2001, 209), few tangible remains thereof have been uncovered. Weak indications are provided by the radiocarbon dates for a vegetation horizon (Steenbeek 1990, 67; Appendix IV), features observed in trench sections below the level of the Bronze Age occupation (Appendix IV), recovered flint artefacts (Letterlé 1985, 335) and Late Neolithic features and pottery described in passing remarks (Hessing & Steenbeek 1990, 16; Hessing 1994, 226).

At Lienden, a few late Bell Beaker sherds were recovered from a vegetation horizon that formed in the lowermost crevasse deposits of the adjacent Westerveld fluvial system (Siemons & Sier 1999b, 23-25). Unfortunately, this fluvial system is not dated directly, and the Bell Beaker sherds form only a *terminus ante quem* date. It seems however probable that the Westerveld fluvial system remained active during the Late Neolithic, as a second phase of crevasse formation underlies later Bronze Age occupation (Van Dinter 2002, 50; Appendix V).[43] At present, the data from Lienden cannot be used to determine whether the Bell Beaker activities (which may have included the digging of postholes; Siemons & Sier 1999b, 19) took place shortly after the start of sedimentation by the Westerveld fluvial system or not.

From the data obtained in the Dodewaard macro-region, it is clear that crevasse splay deposits in the vicinity of active fluvial systems were (intensively?) used during the Late Neolithic (Appendix VI). There, on several

39 On the ceramics see Ufkes 2001; Ufkes & Bloo 2002, on the lithic remains see Niekus, Van Gijn & Lammers 2001; Niekus & Huisman 2001; Niekus *et al.* 2002; Van Gijn *et al.* 2002.

40 A sherd with three rows of spatula impressions in herringbone pattern was found as well, which could be part of a Single Grave Culture period Protruding Foot Beaker (type 1d) or an All Over Ornamented beaker (type 2IIc; for types see Van der Beek & Fokkens 2001, 302 fig 1).

41 For the typochronological dating of battle-axes see Butler & Fokkens 2005, 394-395; Drenth 2005, 349.

42 A dated sample of charcoal from a house typologically dated to the Middle Bronze Age (house 30DH) yielding an age of *c.* 3330-2890 cal BC (AA-37516: 4390 ± 55 BP; Meijlink 2002a, 47) provides a weak *terminus ante quem* for the creation of the underlying crevasse splay and may simultaneously provide a weak indication of human activities during the first (Single Grave Culture-period) part of the Late Neolithic.

43 Berendsen & Stouthamer (2001, 207; 243) assume that the Homoet-Kamp fluvial system formed the upstream connection to the Westerveld system situated 9 km to the west. For the former, a residual gully date of *c.* 1740-1420 cal BC has been obtained (*op. cit.*, 170), which confirms the continued activity from the Late Neolithic into the Bronze Age for the Westerveld fluvial system.

crevasse splay deposits – for which it was not clear from which fluvial system(s) they originated[44] – Late Neolithic ceramics, stone tools and some possibly associated features have been discovered.[45] All sites are situated within 900 m from an active fluvial system (Appendix VI, fig. VI.4). Generally, the remains recognized concern Bell Beaker ceramics, which are mostly found mixed with younger (Bronze Age) period features and finds.[46] Only at two sites in this macro-region that were test-trenched prior to the Betuweroute railway construction, did Late Neolithic finds and features occur without later activities at the site.[47] At Dodewaard - site 24 a possible hearth and a posthole were found, but the surface area of the site may have been disturbed by later fluvial erosion (Bulten & Smits 1998a, 12-13). This site appears to be situated at the transition of more sandy-clayey crevasse deposits towards more silty-clayey floodbasin deposits. Some archaeological remains were found incorporated in the floodbasin deposits, which again suggests fluvial erosion (Van Zijverden in Bulten & Smits 1998a, 21-27). At Dodewaard - site 23, a thin finds-layer was uncovered at the (vertical) transition between crevasse-splay and (covering) floodbasin deposits (Jongste 1998, 8-16). Underneath this finds-layer, that contained most Bell beaker and Potbeaker sherds (Jongste 1998, 39), two postholes and a pit were uncovered. This site too may have been affected by fluvial erosion, as possible washed-in finds were noted and the remaining thickness of the finds-layer (*c.* 15 cm) was limited (Jongste 1998, 10-12). The absence of well-developed vegetation horizons, combined with the indications for fluvial erosion and the knowledge that several large fluvial systems were active in the Dodewaard macro-region during the Late Neolithic, supports the proposed view of Bell Beaker period activities taking place on crevasse-splay deposits, and possibly on floodbasin deposits overlying them, that were (incidentally or periodically) affected by active fluvial systems.[48] Again, the nature of these activities remains unclear.

Late Neolithic sites in the study area: special activity sites or settlement sites?

There is a stark contrast between the number of Late Neolithic find-spots known from the study area and the amount of information on settlement dynamics obtainable from them. Generally, the find-spots consist of typologically better datable stone artefacts (*i.e.* (battle)axes, plano-convex knives, flint daggers), ornaments (v-perforated buttons) or pottery displaying beaker types of decoration) that were found amidst debris from other – usually Middle Bronze Age – periods. The number of sites where Late Neolithic finds and/or features could be studied in relative isolation is very limited. While at some sites features stratigraphically pre-date the Bronze Age, there is generally no indication of their exact age. Consequently, only very few features can be dated to the Late Neolithic based on incorporated finds or radiocarbon dated samples, and structures such as outbuildings and houses have not been identified with certainty yet. How does this compare to the regions directly outside the study area?

For the area outside the study area, a comparable image can be drawn. While many find-spots are known from various geogentic regions and barrows datable to the Late Neolithic are known in some numbers, settlement sites are less apparent.[49] Whereas some Single Grave culture period settlement sites in West-Friesland have seen more extensive research,[50] excavated settlement sites from this period in other regions and Bell Beaker period settlement sites in general are few in number. This is not to say that no Bell Beaker settlement sites have been excavated at all, but that the number of sites where the Bell Beaker-period habitation seems to have been the only or dominant occupation phase, is low. For instance, the several more extensively researched Bell Beaker period sites found on

44 Some *terminus ante quem* indication for the start of crevasse formation may be offered by the radiocarbon dated fragment of charcoal at site 24 (Valburg - Vergulde Bodem; Asmussen 1994, 46-49; Bulten & Smits 1998a) which yielded a date of *c.* 3090-2890 cal BC (UtC-3108: 4360 ± 40 BP; Asmussen 1994, 47).

45 Appendix VI, fig. VI.5; Ten Anscher & Van der Roest 1997; Bulten 1998b-c; Theunissen & Hulst 1999a, 140; 150; Schutte 2003.

46 No older beaker styles can be identified with certainty; Appendix VI and references therein.

47 Dodewaard - site 23; Jongste 1998 and site 24; Bulten & Smits 1998a.

48 A similar conclusion (Late Neolithic activities on active fluvial systems) may also hold true for sites such as Maurik - Meerboomweg and Kerk-Avezaath - Burensedijk (Arnoldussen 2000, 37-38 inventory nos. 17 & 70), which both yielded cord-decorated (Single Grave Culture or All Over Corded period?) ceramics and are both likely to be associated with the crevasse- or levee deposits of the Zoelen channel for which a start of sedimentation around *c.* 3100-2900 cal BC is probable (UtC-6846: 4376 ± 37 BP; Berendsen & Stouthamer 2001, 248).

49 Drenth & Hogestijn 1999; Drenth 2005; Drenth & Lohof 2005.

50 *E.g.* Van der Waals 1989a; Hogestijn, Bulten & Koudijs 1994; Van Ginkel & Hogestijn 1997; Van Heeringen & Theunissen 2001a-c; Drenth 2005, 353.

the Schoonrewoerd levee- deposits that have been published by Louwe Kooijmans (1974), have all yielded remains from younger periods. This complicates the interpretation of settlement nature and settlement dynamics for the Bell Beaker period, as the sites represent a palimpsest of features and finds caused by later activities (often at the same stratigraphic level). For example, at Ottoland - Kromme Elleboog, Bell Beaker, Barbed Wire-stamp decorated and Hilversum-style decorated sherds were found (Wassink 1981, 59). For the possible house plan (Chapter 5, fig. 5.4, no 2) and tentative four-post outbuilding from this site (Wassink 1981, fig. 56; 59), an Early Bronze Age date cannot be excluded as pits 'associated with' the houses yielded both Bell Beaker and Barbed Wire-stamp decorated fragments (*op. cit.*, 19).

At the nearby site Ottoland - Oosteind, a post-alignment of which one feature yielded a potbeaker sherd, may represent yet another Late Neolithic or Early Bronze Age house plan.[51] For this site as well, occupation remains from the Early-, Middle and Late Bronze Age are likely to occur interspersed (Deunhouwer 1986, 101-150). At Molenaarsgraaf, two house plans were reconstructed, for which a Late Neolithic to Early Bronze Age date may be assumed based on the indirectly associated ceramics from the site.[52] As it has been argued above that sedimentation by the Schoonrewoerd fluvial system on whose levee deposits these three sites are situated is likely to have ceased around 2400-2100 cal BC (*supra*), their presence suggests that inactive river courses may have been utilized almost instantly there. This was, however, not always the case.

The available data and dates for Late Neolithic activities on the levee- and crevasse deposits in the Eigenblok macro-region and the crevasse deposits in the De Bogen region indicate that between cessation of fluvial activity and the first human activities, a time lag of two to five centuries may have occurred (*supra*). Alternatively, the data obtained in the Dodewaard macro-region indicate that crevasse-splay deposits were used for human activities at a time when the fluvial systems responsible for their formation (and/or other fluvial systems within a kilometer distance), were still active.

Having outlined that active, recently inactive and long fossil systems could equally well harbour Late Neolithic activities, the nature and duration of these activities has yet to be determined. The diversity and quantity of the finds and features uncovered at Ottoland, Molenaarsgraaf and Valburg (for references see above) suggests a use as a settlement site, although houses have not (yet) been discovered or could not be dated to the Late Neolithic with certainty.

For Valburg - De Vergulde Bodem zuid, the small spatial extent (*c.* 60 by 40 m) and limited numbers of features and finds recovered were used to propose a function as a special activity site (Bulten & Smits 1998a, 16). Considering the small area uncovered in the test-trenches and the possibility of later fluvial erosion, the number of recovered artefacts is perhaps not that low.[53] This assemblage may very well reflect the (partially eroded) debris of a settlement, and the proposed interpretation as an animal butchering and animal product processing-site seems rather far-fetched.[54] The small (?) size suggested by the coring campaign (Asmussen 1994, 46 fig. 12) may be much more related to the morphology of the underlying deposits combined with differential taphonomic processes (*i.e.* fluvial erosion) than related to past human behavior. Consequently, this small size should not be used as an argument supporting claims of it being a special activity site.

The nearby site Valburg - Zettensche Veld Oost (situated *c.* 100 m more westerly) is comparable in geological terms, taphonomy and nature of the archaeological remains discovered. For this site, by contrast, an interpretation as a settlement site was forwarded (Jongste 1998, 16). This more plausible interpretation also applies to Valburg - De

51 Chapter 5, fig. 5.4, no 7; Deunhouwer 1986, 36 & fig. 12.

52 Louwe Kooijmans 1974, 169-339; 1993, fig. 6.10, nos. 3-4; section 5.2.1, fig. 5.2, A-B.

53 In total, 698 sherds (*c.* 1 kg), 94 flint objects (*c.* 360 g), 61 stones (*c.* 1 kg) and 287 bone fragments (*c.* 450 g) were recovered for the Late Neolithic phase from *c.* 168 m^2 (Bulten & Smits 1998a, esp. 8; 12-13).

54 While this interpretation is not supported by the remains uncovered, one might wonder whether the presence of many sherds of (often large) ceramics vessels (Bulten & Smits 1998a, 13 fig. 6), polished axe-flakes and a flint arrowhead (*ibid.*, 13-14) do not even argue *against* a dominant or exclusive function of this site as a special (animal processing) activity site.

Vergulde Bodem zuid, and possibly also to other sites in the Dodewaard macro-region.[55] The above observations suggest that the 'special activity sites' assumed for the Bell Beaker phase of the Late Neolithic (*supra*; Louwe Kooijmans 1993a, 94; 99) are not easily identifiable or even archaeological constructs, instead of well-documented phenomena for this period.[56] Moreover, it is unclear whether the scarcity of clear-cut special activity sites, besides known (near-) coastal Single Grave Culture period examples, should be explained in terms of chronology (*i.e.* they are predominantly a Late Neolithic-A feature), geography (*i.e.* they are predominantly a (near-)coastal feature), or both.

Late Neolithic sites in the river area: the distribution of Single Grave Culture period finds

At first glance, it seems that typical Single Grave Culture ceramics (Protruding Foot Beakers), are absent from the study area, confirming the view that it was not until the All Over Ornamented phase (*c.* 2600-2500 cal BC) that the river area was added to the former Single Grave Culture distribution areas. It should, however, be kept in mind that the fragmentation of pots into the small sherds generally recovered from settlement sites may have decreased recognition.[57] The fact that larger pot profiles – which show the undecorated lower bellies typical for Protruding Foot Beaker – are necessary to distinguish between All Over Ornamented and Protruding Foot Beakers, implies that Protruding Foot Beakers are presently underrepresented. Moreover, pots from the All Over Ornamented phase share decorative techniques, motifs and decoration locations with the Protruding Foot Beaker vessels, which means that for cord- or herringbone pattern decorated fragments a decisive interpretation can only be made if the lower pot section is preserved.[58]

Several find-spots of Protruding Foot Beaker sherds or stone implements attributed to the Single Grave culture period are known from the regions south of the present-day river Rhine. While digging a drainage ditch at Almkerk, sherds from All Over Ornamented beakers were found (Louwe Kooijmans 1968, 124; 1974, 345, possibly also Protruding Foot Beaker sherds). At Wijchen - De Homberg, several sherds decorated with cord impressions and spatula impressions in herringbone pattern were uncovered (Jansen & Tuyn 1978, 244 fig. 8). During fieldwalking at Siebengewald,[59] sherds decorated with herringbone patterns were found and at Swalmen - Bosheide, two Protruding Foot Beakers were found during barrow excavations (fig. 7.4, C; Lanting & Van der Waals 1974; 1976, 7 fig. 3).

55 See Appendix VI, fig. VI.5. Site Valburg - Zettensche Plas (22; Jongste & Ten Anscher 1998) may represent the periphery of a settlement site (datable to the Middle Bronze Age-A/B?), as here many (washed?) finds but no postholes or pits were uncovered (*contra* Jongste & Ten Anscher 1998, 17). At the neighbouring site Valburg - Zettense Veld west (21; Ten Anscher & Van der Roest 1998), a similar situation occurred. There, Bell Beaker and Barbed Wire-stamp decorated sherds were found together with flint, stone and bone fragments and despite several arguments to the contrary (*ibid.*, 18), interpreted as special activity sites dated to both periods (*loc. cit.*). The authors may have put too much weight on their interpretation of the spatial distribution (Arnoldussen 2000, 90) and the interpretation of neighbouring sites which are all based on test-trenches of limited size and wide inter-trench distances (see Appendix VI, section II).

56 The references stated by Louwe Kooijmans (1993a, 94) for examples of Late Beaker special activity sites must be viewed critically. First, Woltering (1985a, 214) states that sites existed that were discontinuously occupied, but does not refer to a more specialized functional nature for these. Second, while the distribution of Bell Beaker ceramics at Vlaardingen is spatially confined (Van Beek 1990, 173-174 fig. 95), they originated from a layer also containing Vlaardingen-period ceramics, flint and stone fragments and (burnt) bone (Van Beek 1990, 173-183). This cluster is at one point interpreted by Van Beek as a possible house-site (1990, fig. 95), and at another as reflecting more short-lived activities (*op. cit.*, 250). Only for the smaller (spatially distinct) concentrations that formed the late Vlaardingen to Beaker period use-phase of Hekelingen III (Louwe Kooijmans & Van de Velde 1980, 10-12), can a distorting role of methodology and taphonomy be dismissed to explain the limited spatial extent and numbers of features.

57 For instance, the cord-decorated fragments recovered at Ottoland - Kromme Elleboog, De Bogen site 30, Maurik - Meerboomweg or Kerk-Avezaath - Burensedijk, or the sherds with herringbone pattern from Geldermalsen - Nieuwe Provinciale Weg, Meteren - Kalenberg, Molenaarsgraaf and Hekelingen III may have been part of All Over Ornamented or Protruding Foot Beakers (Ottoland - Kromme Elleboog: Wassink 1981, photo 15; De Bogen site 30: Jongste & Smits 1998, 31; Maurik - Meerboomweg and Kerk-Avezaath - Burensedijk: Arnoldussen 2000, 37-38; Geldermalsen - Nieuwe Provinciale Weg: Hulst 1973, 28; 1975c, 81; Meteren - Kalenberg: De Jager 1996, 13; Molenaarsgraaf: Louwe Kooijmans 1974, 287; Hekelingen III: Louwe Kooijmans & Van de Velde 1980, 13).

58 Which also affects the interpretation of the claimed AOC sherds from Geldermalsen - Middengebied (Hulst 1994, 72), Maurik - Hornixveldweg (Arnoldussens 2000, 40), Broekhuizen (Archis 15591) and Linnen (Archis 4285). For an introduction to the pottery see Drenth 2005; Drenth & Hogestijn 2006.

59 Verscharen 1988; Stoepker 1989, 174; Archis 17482.

Additionally, stray finds such as fragments of daggers made from *Grand Pressigny* flint are known from the southern Netherlands.[60] Such daggers date to *c.* 2650-2400 cal BC and are frequently found in graves in association with (late?) Protruding Foot Beakers and All Over Ornamented vessels.[61] At Sevenum - Reindonk, half a type P1 battle axe was found as a stray find (Bloemers 1973). Another battle axe (type Glob F3) was recovered at Beesel - Turfheide (Willems 1983, 205-206).[62] Both are presumably relatively late Single Grave Culture period axes (Drenth 2005, 349).

To sum it up, the distribution of clear-cut Protruding Foot Beaker ceramics is at present predominantly confined to the coastal barriers and the Pleistocene areas north and north-east of the present-day river Rhine. Nonetheless, a few find-spots of Protruding Foot Beaker ceramics are known in the south (*e.g.* Swalmen and Wijchen). It is frequently difficult to distinguish between Protruding Foot- and All Over Ornamented Beakers for smaller sherds.[63] Near the end of the Protruding Foot beaker phase and start of the All Over Ornamented phase of the Late Neolithic-A, contacts seem to more often – at least archaeologically – span the river area, as (late) Single Grave Culture period axes and flint (*Grand Pressigny*) daggers are known in some numbers from the sandy areas to the north as well as to the south of the Rhine river. All Over Ornamented Beakers may have had their widest distribution during this period (*c.* 2650-2400 cal BC).

Late Neolithic settlement dynamics in the study area: a conclusion

For the Late Neolithic periods, a paradoxical situation exists. While ceramics and stone artefacts are known from most macro-regions – and sometimes in considerable quantities – the contextual information available for them is very limited. No extensively excavated settlement sites are known within the study area where Late Neolithic features and finds could be studied in relative isolation. At nearly all sites, Late Neolithic remains are found either void of context or mixed with younger period settlement site debris. Pottery fragments from the first part of the Late Neolithic (Protruding Foot Beaker- and All Over Ornamented phase) are respectively absent to scarce. Yet, the typical Bell Beaker pottery seems

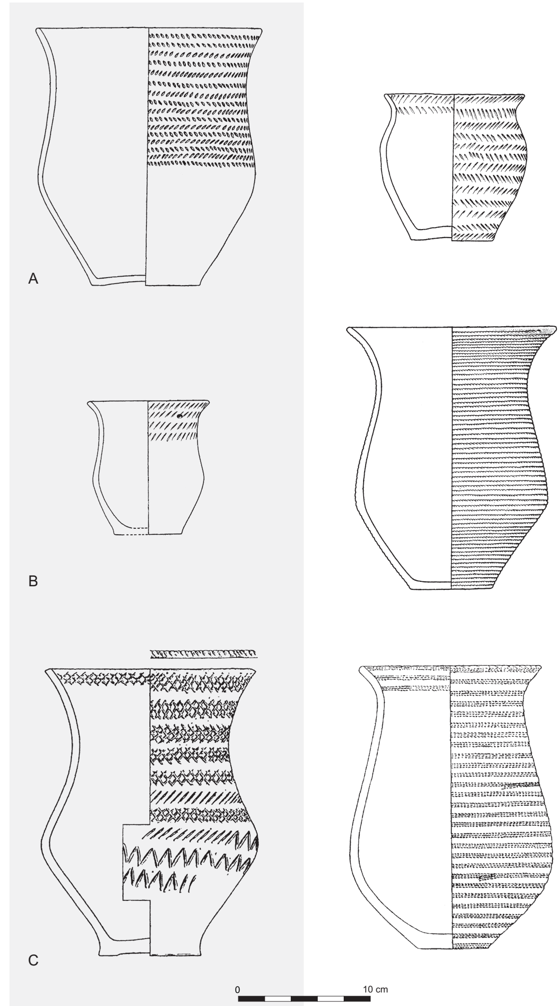

Fig. 7.4 Examples of Protruding Foot Beakers (left) and All Over Ornamented Beaker pots (right) from Soesterberg - Tumulus 3 (A; after Lanting & Van der Waals 1976, 18 fig. 8), Emst-Hanendorp - Tumulus 2 (B; after Lanting & Van der Waals 1976, 19 fig. 10) and Swalmen – Bosheide Tumulus 6 (C; after Lanting & Van der Waals 1974, fig. 12). See Drenth 2005, esp. 337 fig. 3, for an overview of the Single Grave Culture period pottery traditions.

60 *E.g.* Kaatsheuvel - Bernsehoef (Van der Lee 1970, 20), Boekel - Molenwijk (Hulst 1965c, 43), Groesbeek - Klein America (Archis 7536), Kesseleijk (Franssen 1982), Beek en Donk (Polman 1993, 14), Meerlo (Brounen 1998), Venray - Overbroek (Archis 29639), Zundert (Dijkstra & Peeters 1983), Heeze - Leenderheide (Archis 30534), Kessel (Wouters 1981), Bergeijk (Beex 1957; Kakebeeke 1971), Loon op Zand (Van der Beek 1993, 54), Rijsbergen (Beex 1959, 17) or Heythuysen (Roymans 2004; Archis 406791).

61 Lanting & Van der Waals 1976, 14 table II; Drenth 1990; 2005, 338; 349.

62 A type R/P1 battle axe was found at Echt - Slufferd, but this has not been published yet (Archis 4344*, cf.* Archis 15642).

63 Note that all examples (A-C) in fig. 7.4 were found in graves, indicating the undoubtable association of PFB and AOO decorative traditions, which is claimed to be rare according to Van der Beek (2004, 164). It does also underline the risk that sherds interpreted as All Over Ornamented beakers may in fact be (contemporaneous to) partly earlier Protruding Foot Beakers.

to occur more widespread. Considering the low overall numbers, and low quality of presently known Beaker period sites, this differential occurrence is hard to interpret. Several explanations of equal, and indeterminate, validity may be forwarded.

First, the limited geographic distribution and confined spatial extent of the excavations executed in the study area simply missed settlement site locations for these periods.[64] Such an explanation would imply that settlement site locations may have differed for the start and final phase of the Late Neolithic, as remains from the latter part *are* known in some numbers. Second, the observations for the Lienden and Dodewaard macro-regions suggest that crevasse-splay deposits next to active fluvial systems were used during the Bell Beaker period. If during the first part of the Late Neolithic-A similar locations were chosen, these sites were prone to more fluvial erosion and/or sediment covering, which could decrease their archaeological visibility. It would however seem probable that the Bell Beaker period sites were affected equally, which appears not to be the case. Finally, the role of fluvial dynamics must be considered. At first glance, a reasonably similar situation seems to exist for the Late Neolithic-A and Late Neolithic-B, if judged by the number of fluvial systems emerging, active and becoming inactive (*cf.* fig. 2.13; Berendsen & Stouthamer 2001). Few fluvial systems, however, become inactive directly prior to the Late Neolithic-A,[65] and the ones that do so have seen little archaeological research.[66] In addition, for some of the more extensive fluvial systems that became inactive, nearby systems remained active or became active relatively soon thereafter.[67] This may have limited human usage of these fossil systems.

The interpretation of the settlement dynamics for this period is hampered by the scarcity of well-preserved and single-phased sites. While fossil levee and crevasse splay deposits and crevasses of – or next to – active systems were used, the nature and duration of such usage remains unknown. The diversity and sometimes quantity of the artefacts recovered do however hint at domestic use of some of such sites. Remarkably, other site types like smaller extraction-, processing- or hunting camps are commonly assumed for these periods, but have not yet been discovered for this region and period under study. One might speculate whether the assumped presence of such sites does not in the first place derive from preconceived notions of what ‘proper’ Late Neolithic life-styles and settlement dynamics should be like (*cf.* fig. 7.2). In any case, following an inductive approach there is little evidence to indicate the presence of such site types in the study area.

7.2.3 Early Bronze Age sites and site types in the Dutch river area

7.2.3.1 The Early Bronze Age

The start of the Early Bronze Age is traditionally related to the introduction of two new categories of artefacts: the name-giving bronzes and pottery decorated with ‘Barbed Wire’-stamp impressions.[68] This introduction need not have suddenly or dramatically changed the nature and dynamics of settlement sites, and the implications of these technological changes in the domain of settlements is best not overstated (Fokkens 2001, 255). Fokkens has stressed

64 Additionally, pottery datable to *c.* 2900-2500 cal BC from the river area may be hard to identify if it was characterized by decorative traditions not akin to those elsewhere or traditions that differed little from preceding and ensuing periods. There is presently no evidence, however, to suggest that this was the case.

65 *E.g.* Andel/Molenveld/Zaltbommel-Nederhemert or Blokland-Snelrewaard; Berendsen & Stouthamer 2001, 193; 246. See also Chapter 2, fig. 2.16.

66 The period of activity of the Blokland-Snelrewaard fluvial system is well-bracketed by radiocarbon dates to *c.* 3340/2920 cal BC for the start and *c.* 2880/2490 cal BC for the cessation of fluvial activity (Berendsen & Stouthamer 2001, 193). Later fluvial activity has presumably not eroded much of this system’s deposits, suggesting that preservation conditions may be good. Specific archaeological research of this system may yield high-quality information on Single Grave Culture period activities on active fluvial systems and usage of fossil systems for later periods. The Schaik system (see note below), may offer a similar potential for the study of Bell Beaker period sites.

67 For instance, the usability of the Schaik fluvial system (fossil around *c.* 2930-2630 cal BC; Berendsen & Stouthamer 2001, 233), may have been affected by the continued sedimentation of the nearby Schoonrewoerd system (*ibid.*, 233-234). A similar situation may have occurred in the south of the central river area, when the Andel/Molenveld/Zaltbommel-Nederhemert system may have been quickly brought under influence of sedimentation by the nearby Biesheuvel-Hamer/Hedel-Wordragen fluvial system, which became active around *c.* 2630-2460 cal BC (*op. cit.*, 204).

68 Anonymous 1967, 9; Lanting & Mook 1977, 6; 97; Fokkens 2001; Fontijn 2003, 56-57.

the fact that in pottery traditions, burial customs and presumably settlement data a continuity between the Late Neolithic and the Early Bronze Age can be outlined (Fokkens 2001, 258, following Lanting 1973). This could indicate that settlement dynamics also changed little between these two periods and I have already argued earlier (*cf.* fig. 7.1) that some models proposed for Early Bronze Age settlement dynamics differ only marginally from those used for the preceding (Late) Neolithic phases.

In Chapter 5 (section 5.2.1) I have shown that Early Bronze Age houses in the Low Countries exemplify a building tradition that may prove hard to distill from more dense post-concentrations, suggesting that these are frequently likely to remain undetected. Indeed, only very few Early Bronze Age houses are known, despite the fact that the distinctive Barbed Wire-stamp decorated pottery is frequently found during excavations of later-period settlement sites.[69] This problem of recognizing Early Bronze Age houses also affects additional interpretations of the nature and dynamics of the settlement sites for this period. For instance, granary-type outbuildings do not seem to have been a common element of settlement sites until the Middle Bronze Age-B (Chapter 5, section 5.4).[70] While fence lines and palisades may date to the Early Bronze Age, they do not appear to define or delimit Early Bronze Age house-sites or settlement sites (Chapter 5, section 5.5).[71] Essentially, while Early Bronze Age houses can be outlined in a few specific cases, the evidence from those sites (*i.e.* direct observations) and from other sites with 'stray' Early Bronze Age remains (*i.e.* indirect argumentation) indicates that during the Early Bronze Age, little structuring of the house-environment can be identified.[72] During the Early Bronze Age, house-site structuring did evidently not matter in the same way, was not standardized, or depended on principles with poor archaeological visibility.

While it is tempting to link this interpretation of the nature of Early Bronze Age settlement sites to that of the preceding Late Neolithic period, similarities remain to be proven. The fact that for both periods the structure of settlement sites is unclear, and that houses can only be outlined with great uncertainty, does not prove that the nature of settlement sites or settlement dynamics were comparable. A similarly incomprehensible outcome may very well hide distinctly different genetic processes. Therefore, the Early Bronze Age find-spots in the study area will be discussed to see whether, and how, they differ from those of the preceding Late Neolithic period.

7.2.3.2 Early Bronze Age sites in the study area

At Culemborg - Lanxmeer in the Zijderveld macro-region, some Barbed Wire-stamp decorated sherds and a charcoal sample radiocarbon dated to the Early Bronze Age were recovered from a feature interpreted as a hearth (Huis in 't Veld 2004, 13; 27).[73] This site is situated at the location of the large crevasse splay between the (active) Hennisdijk and (fossil) Schoonrewoerd fluvial systems (Appendix I, fig. I.7). Although it cannot be determined whether the Schoonrewoerd or the Hennisdijk system deposited these crevasse sediments, the latter was in any case active and situated only 700 m east of the site. Floodbasin deposits of the Hennisdijk fluvial system appear to cover the early Bronze Age remains (Huis in 't Veld 2004, 29). That the levee deposits of the Schoonrewoerd system were in use by this time is indicated by the Barbed Wire-stamp decorated sherds found in secondary context at Culemborg - Den Heuvel (Arnoldussen & Van Zijverden 2004, 66).

Downstream of the Zijderveld macro-region, several other sites located on top of the Schoonrewoerd levees have yielded (Bell Beaker and)Barbed Wire-stamp decorated sherds.[74] At Molenaarsgraaf and Ottoland - Kromme Elleboog, Bell Beaker and Barbed Wire-stamp decorated sherds were equally well-represented (Thanos 1995, 58-

69 Modderman 1955c; Lanting 1969; 1973. The available radiocarbon dates suggest that pottery decorated with 'Barbed Wire'-stamps was current between *c.* 2060-1630 cal BC, although this date range is in need of more high-quality dates. See for direct dates: Gehasse 1995, 113-114; Lanting & Van der Plicht 2003, 175 and for other dated samples with reasonable – albeit indirect – association: Huis in 't Veld 2004, 11; Deiters 2004, 502; Van Heeringen, Van der Velde & Van Amen 1998, 38-43; Waterbolk 1960, 74; Lanting & Mook 1977, 97; Butler, Lanting & Van der Waals 1972, 230; Lanting 1973, 245.

70 See for some claims Chapter 5, note 253 and references therein and Appendix II, figs. II.5 and II.7.

71 See for instance the claimed Early Bronze Age fence-line at Noordwijk (Van Heeringen, Van der Velde & Van Amen 1998, 15 fig. 5; Van der Velde 2008) and the palisades at De Bogen sites 29 and 30 (Hielkema, Brokke & Meijlink 2002, 157; 185).

72 Particularly if compared to that of the Middle Bronze Age-B (Chapter 6; Arnoldussen & Fontijn 2006, 299-301).

73 Charcoal (unspecified wood species) dated to *c.* 2020 - 1760 cal BC (GrA-27104: 3555 ± 40 BP; Huis in 't Veld 2004, 11).

74 Louwe Kooijmans 1974, esp. fig. 18; Wassink 1981; Deunhouwer 1986.

59 table 8.3).[75] This may indicate that these sites were used with comparable intensity (nature, duration) during both periods. Thus, from the fact that the features cannot be disentangled and separated into distinct Late Neolithic and Early Bronze Age phases of use, important observation can still be made. First, it indicates that during both periods, identical locations were used. Second, it is clear that these were places that were not affected by direct fluvial sedimentation because of (1) their remote location from active fluvial systems and/or (2) by their relatively high topographic positions. Otherwise, sedimentation would or could have created separate stratigraphic levels. Third, the seemingly uniform appearance of the finds-distributions and feature configurations also conveys the impression that general settlement site use and the use of post-built structures did not differ categorically between the two periods. While preservation conditions allowed for distinctly different post-configurations – representing structures from different periods – to be preserved, this was hardly the case. This is not to say that *no* variation can be outlined. Quite the contrary may have been the case, as is also suggested by the different aspect of the tentative houses claimed for Molenaarsgraaf (Chapter 5, fig. 5.2, A-B), Ottoland - Kromme Elleboog (Chapter 5, fig. 5.4, no 2) and Ottoland - Oosteind (Chapter 5, fig. 5.4, no 7) that all cannot be dated more precisely than 'Late Neolithic or Early Bronze Age'. It is exactly this *variation* that seems to typify settlement site elements for these periods. Perhaps the bandwidth of allowed variation was comparable for the Early Bronze Age and Late Neolithic settlement site elements, rather than that specific structures were of comparable (super)structure. Without significantly large excavated areas of limited time-depth, such argumentation is however difficult to uphold or falsify and has little to offer to the interpretations of the frequently isolated finds from the several macro-regions in the study area.

Few Early Bronze Age finds are known from the Eigenblok macro-region, despite the extent of the excavations at Enspijk - A2 (*c.* 0.5 ha; Ter Wal 2005b, 11) and Rumpt - Eigenblok (*c.* 1.7 ha; Jongste 2002a, 24). At Enspijk, a single sherd pierced underneath the rim (presumably datable to the Early Bronze Age) was found in the trench with the later Middle Bronze Age(-B) house plans, but its exact context has not been published (Ter Wal 2005b, 28). As such, it can only be used as an Early Bronze Age *terminus ante quem* for the Hooiblok/Enspijk fluvial system on whose levee deposits this site was situated. In the Eigenblok excavations, Early Bronze Age sherds have been uncovered on the crevasse splays, as well as on the levee deposits (Jongste 2002a, 37-38). The number of sherds unambiguously datable to the Early Bronze Age is low and the few and probably unintentional incorporation of these fragments into features does not allow to isolate features or structures presumably datable to this period.[76] However, it is possible that intensity of pre-Middle Bronze Age-B activities at Eigenblok is underrepresented. This may have two complementary causes. First, a phase of crevasse activity prior to *c.* 1920-1680 cal BC has eroded much of the pre-existing landscape, possibly removing finds and destroying more shallow features.[77] Second, the location and extents of the excavations at Eigenblok sites 1 to 4 was steered by the location of the Middle Bronze Age-B vegetation horizon and finds-layer (Jongste 2002, 20-23) and was not specifically targeted towards investigating older occupation traces. Consequently, it is possible that pre-Middle Bronze Age sites (of unknown types) were present on the crevasse- and levee deposits of the Eigenblok fluvial system, that have essentially not been investigated.[78]

Within the De Bogen macro-region, there is considerable evidence of Early Bronze Age use of the stacked crevasse splays uncovered in the various excavations (Chapter 4, section 4.4; Appendix III). Beyond the De Bogen excavations, the number of Early Bronze Age find-spots is low. Only at the excavation known as 'Lage Blok', at *c.*

75 For the group of potbeakers and other decorated beaker period pots, it frequently cannot be determined whether they date to the Late Neolithic and/or the Early Bronze Age, as several decorative techniques and motifs (*e.g.* grooves, v-shaped paired fingertip impressions) were current in both periods. A detailed combined technological-, typological- and radiocarbon supported analysis is much needed for these periods and these ceramic groups in particular.

76 The total number is 11 to 13 fragments; Jongste 2002a, 37-38; Bloo & Schouten 2002, 265-266.

77 Based on a residual channel date for this crevasse phase (AA-37254: 3475 ± 45 BP; Jongste 2002a, 35; Van Zijverden 2002a, 70).

78 As the later crevasse formation extended up to the highest parts of the Eigenblok fluvial system's levee deposits (Van Zijverden 2002a, 60 fig. 2.7a), the low numbers of Early Bronze Age artefacts and features recovered from them may not be used to indicate that the nature of the Early- and later Middle Bronze Age activities differed categorically. Had no crevasse erosion taken place at these highest parts of the landscape, the presence or absence of earlier (Neolithic, Early Bronze Age) traces may – if ever present – have been discussed with more certainty.

1.2 km to the east of the De Bogen excavations, were a few Barbed Wire-stamp decorated sherds recovered (Ufkes 2002b, 70; Milojkovic & Smits 2002). The contexts of these sherds are not specifically discussed, but they most probably originated from a level below that of the Middle Iron Age settlement site which was the focus of this excavation (Van Zijverden 2002c, 40-41). No direct dates are available for the fluvial system on whose levees these Bronze Age activities took place,[79] but based on a comparison of the stratigraphy and sand-depth to the nearby De Bogen excavations, a cessation of fluvial activity of this system prior to the Late Neolithic may be assumed (Van Zijverden 2002c, 39; 2004b). This suggests that activities here took place on the levee deposits of an inactive fluvial system.

For the Early Bronze Age remains uncovered within the various De Bogen excavations, it has proven very difficult to outline specific structures or activity areas (Meijlink 2002b, 770). Even for the sites where Early Bronze Age ceramics occurred relatively abundantly,[80] no evident Early Bronze Age clusters or structures could be isolated. Moreover, it has been argued that the houses claimed to date to the Early Bronze Age, show too much inconsistency in post placement and depth within and between structures for these to be credible.[81] Nonetheless, the diversity and quantity of the indicators of Early Bronze Age use of the stacked crevasse splay landscape is striking. Several Early Bronze Age radiocarbon dates for pits, wells and sherds indicate that these were all current phenomena. Essentially, the available evidence suggests the presence of domestic activities and thus of a settlement site, for which we unfortunately fail to credibly reconstruct post-built structures. Due to the palimpsest nature of the site, no detailed information on the duration and permanence of use can be given (Meijlink 2002a; Appendix III). Presumably, De Bogen site 31 represents a part of the crevasse splay landscape where remains from this period were more prominently present in the past, or where they have been better preserved (*i.e.* adequate preservation and less affected by later erosional activities; Schoneveld & Gehasse 2001). Here too, the diversity, content and quantity of the remains recovered point more towards a (brief?) use as a settlement site, than towards a 'special activity site' as was assumed at the start of the excavations.[82] Additionally, the interpretation of this site as being used only briefly and exclusively during the Early Bronze Age is challenged in this study, as indications for later Middle Bronze Age use are present as well.[83]

In the Wijk bij Duurstede macro-region as well, indications for Early Bronze Age presence are only found within the large scale excavations (Chapter 4, section 4.5). Besides stray finds of Barbed Wire-stamp decorated sherds at Wijk bij Duurstede - De Geer (J. van Doesburg, pers. comm., Aug. 2006), somewhat more information is available for the data from the Wijk bij Duurstede - De Horden excavations. There, a phase of reduced sedimentation between *c.* 2000 and 1700 cal BC led to the formation of a vegetation horizon. This vegetation horizon formed in the floodbasin deposits of the Houten fluvial system, that covered older deposits of the Werkhoven fluvial system.[84] The few (n = 2) Barbed Wire-stamp decorated sherds and a single presumed Early Bronze Age flint arrowhead are presumably associated with this vegetation horizon.[85] As the Bronze Age levels were not specifically targeted at that time of the excavations (Appendix IV), no interpretation of the contexts of these remains can be made. Nonetheless, they do indicate that human activities took place within several hundred meters of active systems.

At Lienden, some Early Bronze Age activities took place on the crevasse splay deposits of the Westerveld fluvial system, which remained active throughout this period. The extent of a vegetation horizon dated 'pre-Middle Bronze Age-B' by stratigraphy could be mapped and showed different densities or archaeological materials (fig. 7.5, d-e; Van Dinter 2002). Presumably, the 20 Barbed Wire-stamp decorated sherds recovered were predominantly associated with this vegetation horizon.[86]

Regrettably it was decided that the remains from the lowermost level would remain undisturbed by the railway construction, despite advice to the contrary (Kranendonk & De Voogd 2002, 18) and the subsequent

79 *I.e.* an unnamed precursor of the Meteren fluvial system; Van Zijverden 20-02c; Appendix III.
80 Ufkes & Bloo 2002; Appendix III, table III.5.
81 Chapter 4, section 4.4.3; Appendix III, esp. figs. III.13; III.14.
82 Schoneveld 2001, 189, *contra* Jongste & Smits 1998, 40; Ter Wal 2001, 32.
83 See section 4.4.3 and Appendix III for details, *contra* Schoneveld & Gehasse 2001, 21.
84 Hessing & Steenbeek 1990, 16; Van Zijverden 2004a; Appendix IV.
85 Letterlé 1985, 335, fig. 4; 341 fig. 9; Hessing & Steenbeek 1990, 16.
86 Siemons & Sier 1999b, 80; Sier & Drenth 1999, 14-17; Ufkes 2002a, 99; Appendix V.

excavations at Lienden focused solely on the upper (Middle Bronze Age) occupation levels. Consequently, a rare opportunity to investigate (Late Neolithic to) Early Bronze Age remains in relative isolation may have been missed. Moreover, the few remains that were recovered and documented now cannot be used in discussions on the settlement nature and dynamics for this period.

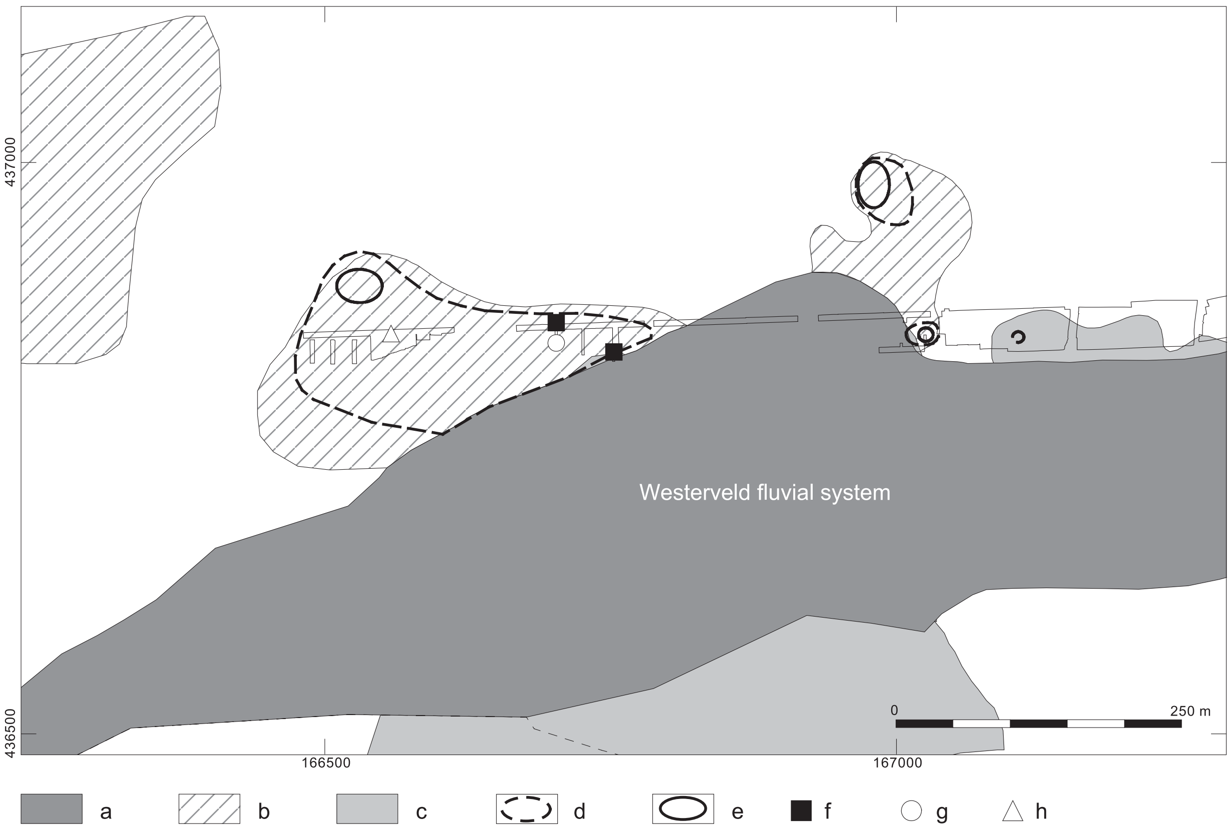

Fig. 7.5 Distribution of the finds-layers dated by stratigraphy to the (Late Neolithic and?) Early Bronze Age at Lienden, in relation to the fluvial landscape and excavation trenches.

a: active fluvial system, b: crevasses of active fluvial systems, c: fossil fluvial systems, d: periphery of finds-distribution as suggested by corings, e: core area of finds-distribution as suggested by corings, f: 'Barbed Wire'-stamp decorated sherds from excavations, g: features, dated by stratigraphy to the Late Neolithic or Early Bronze Age, h: possible Early Bronze Age flint arrowhead.

For the Early Bronze Age remains found in the Dodewaard macro-region, the interpretation does not differ fundamentally from that offered for the Late Neolithic remains. For this period as well, several find-spots of Barbed Wire-stamp decorated pottery are known from the crevasse splay complex wedged between the both active Distelkamp-Afferden and Herveld fluvial systems (*cf.* fig. 4.38, e-f; Appendix VI, fig. VI.7).[87] The numbers of sherds however are low and they were found mixed with older and younger period remains.[88] The absence of clear-cut Early Bronze Age finds from the main Dodewaard excavation is confusing. While palaeogeographical analyses indicate that conditions at this time were favourable, not a single Barbed Wire-stamp decorated sherd was recovered

87 Ten Anscher & Van der Roest 1997, 14-16; Bulten 1998c, 19; Peters 1999, 17; 19; Appendix VI. Possibly, the Late Neolithic and Early Bronze Age remains at Valburg - Zetten-West were washed from their original location (Peters 1999, 19-20), confirming continued fluvial activity in the Dodewaard macro-region.

88 A total of 11 Early Bronze Age sherds at site 21 and one at site 18; Ten Anscher & Van der Roest 1997, 14-16; Bulten 1998c, 19.

from the *c.* 0.4 ha area excavated.[89] Possibly, this is just a matter of chance, as the detailed spatial and chronological distributions of the Dodewaard crevasse splays are not yet fully understood. It may just be that at the location of the most extensively investigated site, a somewhat younger layer of crevasse deposits destroyed or covered earlier traces. Like at Lienden, for this site too it is a pity that no more extensive excavations were planned prior to the Betuweroute railway constructions, as now the pre-Middle Bronze Age-B relicts remain very difficult to interpret.

7.2.3.3 Conclusion: Early Bronze Age sites in the study area

While all of the macro-regions have yielded finds datable to the Early Bronze Age, in none of them were such remains uncovered in certain association with other artefacts and features. The finds were either recovered outside their original context – mixed with finds from other periods – or could not be related directly to specific (clusters of) features or structures. This means that these finds do not greatly improve our understanding of the settlement dynamics for this period. Assessments of the permanency or duration of (settlement) site use rely to a considerable degree on structures being recognizable and more importantly, on cases where material assemblages can be studied for functional clues and seasonal indicators. None of the sites presently investigated in the study area meet these requirements.[90] As such, discussions of the nature and dynamics of Early Bronze Age settlement systems are rendered impossible.

Nonetheless, the current evidence confirms the relative ubiquitous presence of people in a broad spectrum of locations with different fluvial dynamics.[91] The evidence from Wijk bij Duurstede indicates that former levees quite close (< 1 km) to active fluvial systems were used, as were the crevasse splays of active systems (*e.g.* Culemborg - Lanxmeer, Lienden and Dodewaard). In addition, crevasses (*e.g.* Eigenblok sites 1 and 2) and levees (*e.g.* Enspijk, Eigenblok 5 and 6, Culemborg - Den Heuvel, Lage Blok) of (long) fossil systems were used. This 'usage' may very well be (permanent?) settlement, but only for the De Bogen excavations does the diversity and quantity of remains uncovered for the Early Bronze Age presumably support this interpretation. It has been argued, however, that (a) the Early Bronze settlement site elements were not categorically different from those of later Bronze Age periods – otherwise, they would have stood out – but that (b) the variation in construction and placement of such settlement sites elements was so considerable as to render them archaeologically invisible with the present state of knowledge. At Dodewaard, and particularly at Lienden, where locations with Early Bronze Age traces could have been isolated by specifically targeted research, a significant research potential has been left unexplored as no specific research (*i.e.* large scale excavation) aimed at this period was undertaken.

7.2.4 Middle Bronze Age-A sites in the study area

7.2.4.1 Quiet before the storm? Low-visibility settlement archeology

Even more than for the preceding periods, the Middle Bronze Age-A presents a somewhat paradoxical situation. The Middle Bronze Age-A spans a *c.* 300 year period between the end of the Early Bronze Age and the start of the Middle Bronze Age-B at 1500 cal BC during which our knowledge on settlements is extremely limited. While the characteristic pottery decorated in 'Hilversum'-style (see Chapter 5, table 5.1) is known in some numbers from various regions of the Low Countries (see fig. 5.6), no clear-cut settlements can be outlined. Typically, Hilversum-style decorated sherds are found in very small numbers within larger ceramic assemblages datable to the Middle Bronze Age-B or (Middle) Bronze Age in general. Had it not been for a few sites such as Den Haag - Bronovo (Waasdorp 1991; Bulten *in prep.*), Vogelenzang (Ten Anscher 1990) or Barendrecht (Moree *et al.* 2002, Moree *in prep.*) where Hilversum-style decorated pottery occurs abundantly, the hypothesis may have been forwarded that this pottery represented a special purpose ware complementary to the normal (less lavishly decorated) vessels.[92]

89 Steenbeek 1990, 190-193; Van Zijverden 2003b; Appendix VI, fig. VI.6. For the excavation results see section 4.7 and Theunissen & Hulst 1999a.

90 But see Brinkkemper & Van Wijngaarden-Bakker 2005, 492-493 on an Early Bronze Age fishing camp at P14.

91 Note that Early Bronze Age activities on *donken* and activities on levees and crevasse deposits that only recently became inactive, remain to be discovered (*cf.* fig. 7.10).

92 But see table 8.1 on possibly more frequent use of Hilversum pottery in settlement site depositions.

It remains however difficult to explain why Hilversum-style decorated vessels are not known in greater quantities beyond the coastal areas.

The most plausible explanation is that pottery decorated in Hilversum-style was part of an interaction sphere whose centre of gravity may not have been land-based, but marine. Around the time of our Middle Bronze Age-A, intensive cross-channel contacts can be outlined. Such contacts may be reflected by the continental presence of circular enclosures (*e.g.* Bostyn, Blancquaert & Lanchon 2000), British and Irish Bronzes (*e.g.* Butler 1963; 1989; Fontijn *in press*), ornaments such as grooved biconical faience beads (*e.g.* Shepherd & Barclay 2004; Haverman & Sheridan 2006) and the shared presence of pottery decorated in Hilversum-tradition (cord-decorated, horseshoe handles) and possibly the (Late Bronze Age?) round houses.[93] Recently, Needham coined the term 'maritory' to describe this marine territory of (cross-) coastal interaction (Needham 2006, 88; O'Connor 2007, 7). The coastal (and riverine!) distribution of the pottery decorated in Hilversum tradition is striking (Chapter 5, fig. 5.6), although some find-spots are also found more inland to the south of the Rhine.[94]

While the similarities between some English, French and Dutch vessels presumably datable to the Middle Bronze Age-A period is conspicuous, the fact that different interpretative schemes are used across the channel somewhat complicates comparisons. Vessels from the United Kingdom are primarily classified by pot morphology, and additionally by decoration (*e.g.* Gibson 2002; Needham 2005), while continental pottery is classified primarily by the type (technology and iconography) of decoration (*cf.* Chapter 5, table 5.1). Consequently, there is little information on the chronological relevance of pot-morphology for the continental 'Hilversum-style' pots,[95] while conversely vessels from the United Kingdom that would be classified in a continental framework as 'Hilversum-style' ceramics, appear under 'bi-conical urns', 'Trevisker ware', 'Collared urns' and '(enlarged) Food Vessels'.[96] It may be rewarding to investigate whether the (more confined) date-ranges for the European decorative techniques bear relevance to the dating of similar insular examples.[97] In any case, there is considerable evidence to suggest that in both areas pot-morphology and decorative traditions were ultimately based on those of the preceding (late Neolithic to) Early Bronze Age periods.[98] Yet, the distribution of 'Hilversum-style' ceramics appears much more confined compared to that of the Barbed Wire-stamp decorated pottery. In the Netherlands, for instance, it is absent from the north-western sandy soils, while Barbed Wire-stamp decorated ceramics are known from that region.

If the interpretation holds true that Hilversum-style ceramics were part of a North Sea/channel coast maritory, the difference in ceramics assemblage composition (dominant in coastal settings, minority in inland areas) may be better understood. The larger density of find-spots of Hilversum-style decorated vessels along the Oise, Schelde and Rhine tributaries (*cf.* Chapter 5, fig. 5.6) suggests that rivers played some part in the distribution. This still, however, leaves the problem unaddressed in what ways the ceramic distribution did spread inland. A key problem is that it is entirely unclear 'what' exactly was distributed. Possibly, only the pottery form and decoration were shared, implying local production and emulation, but also pots themselves may have traveled. Future trace-element and diatom analyses may shed light on this matter. Alternatively, it may have been its contents (possibly of coastal origin?, *e.g.* salt, salted foodstuffs, metal scrap or ores?) that were sought for in more inland and upstream areas. It seems probable, however, that a much more encompassing package of cultural elements were shared, instead of just the beakers. Needham's (2006) discussion of the distribution of different artefact types such as ornaments

93 On roundhouses see Desfossés, Martial & Vallin 2000 and references therein; Pope 2003; Jahier 2005; Mare 2005, *cf.* section 5.8.

94 Additionally, it may be interesting to study the evolution of the 'Culture du Rhone' pottery traditions (*e.g.* Roudil 1972; Guilaine 1972; several contributions in Mordant & Gaiffe 1996; Lemercier 2002; Lemercier & Gilabert *in press*) in relation to those of the north-west coastal maritory. There as well (starting from a local Barbed Wire-stamp decorated tradition) several elements typical for 'Hilversum-style' pots are found such as cross-hatched motifs (done in cordons), cordons linked to knobbed handles – like horseshoe handles mimicking handles attached to an organic encasing netting ? – while cord-decoration is absent to very infrequent there.

95 NL: *Hilversum* (Glasbergen 1969), D: *Hilversum* (Hoffman 2004, 70-80), F: *Urnes à décor plastique* (Blanchet 1984).

96 *E.g.* Gibson 2002, 21 fig. 7; 26 fig. 9; 54 fig. 25; 97 fig. 46; 100 fig. 48; 102 fig. 49, *cf.* Theunissen 1999, 206; Fokkens 2005c. In French terminology, some Hilversum-style decorated pots are classified as '*céramique à anses en fer à cheval*' or '*céramique à decor à la cordelette*' (Warmenbol 1996, 643) or simply as '*vases biconiques*' (Roussot-Larroque 1996, 518).

97 This is a task, however, that lies beyond the scope of the present study.

98 This is exemplified by hybrid types such as the Barbed Wire-stamp decorated Hilversum-style vessels from Wijchen (Glasbergen 1954, 125 fig. 63.4-5), Vorstenbosch (Modderman 1959a) and the pot from Rhenen-Remmerden, which is decorated in Early Bronze Age tradition yet has Middle Bronze Age morphological traits (Jongste 2001, 12 fig. 14).

and drinking cups shows how varied and far-reaching such interaction could be. While such far-reaching contacts or influences can be identified in some cases for this period, it is also evident that regional variation in the dominance (*i.e.* relative frequency of occurrence) of Hilversum-style decorated pottery can be outlined between the coastal and inland/upstream sites. Whereas some coastal sites (*e.g.* Den Haag - Bronovo, Vogelenzang, Barendrecht (*supra*)) have yielded significant amounts of Hilversum-style decorated pottery,[99] the scarcity of this pottery in inland settings indicates that these were not produced and/or used there in similar quantities.

The fact that sherds decorated in Hilversum-style generally form only a minority within ceramic assemblages of (more extensively investigated) sites, renders it difficult to indicate possible Middle Bronze Age-A settlement sites supplementary to the coastal sites already referred to. Moreover, the excavations of these coastal sites are of limited size and discontinuous surface area, which has complicated the identification of settlement site elements for this period (Chapter 5, section 5.2.2). Essentially, studying settlement sites for the Middle Bronze Age-A is looking for a needle in a haystack: only a limited set of bronze and ceramic artefacts can be reliably dated to this period, and the excavated presumed settlement sites have thus far yielded no reconstructed buildings or features that can be reliably used to outline occupation traces from this period at other sites. Moreover, I feel that archaeologists should perhaps not focus on 'trying to locate' Middle Bronze Age-A settlement sites beyond the coastal areas, but should accept that they may be different beyond the coast, and instead investigate *why certain elements* from the cultural set shared within the maritory were (literally and/or figuratively) taken up by (specific) non-coastal communities.

7.2.4.2 Middle Bronze Age-A settlement sites in the study area?

In short, there are no sites known from the study area where artefacts or features were recovered in isolation or in such diversity and/or quantities that they could sustain an interpretation as representing a possible Middle Bronze Age-A settlement site. Even at Meteren - De Bogen, with several house-sites claimed to date to the Middle Bronze Age-A (Meijlink 2002b, 774-779; 2007), critical (re)analyses of the structures, radiocarbon dates and pottery (Chapter 4, section 4.4.3; Appendix III) have shown that the structures forwarded cannot be proved to date to the Middle Bronze Age-A and that in general, only very few sherds date unambiguously to the Middle Bronze Age-A.[100] Nonetheless, the presence of these ceramics and several samples radiocarbon dated to the Middle Bronze Age-A indicate that some activities took place – possibly indicating a settlement site – but that these activities cannot be analyzed in relation to settlement dynamics or discussions of occupational duration or permanence.

At Zijderveld, only a single post was radiocarbon dated to the Middle Bronze Age-A, but as no ceramics were found, later re-use of older wood cannot be excluded (Theunissen & Hulst 1999b, 158). I have already argued above (section 7.2.3.2) that several of the features at the lowest stratigraphic levels at Eigenblok 5 and 6 predate the Middle Bronze Age-B, but cannot be dated directly. Therefore, the few clear Hilversum-style sherds (n = 8-9; Jongste 2002a, 37-38), a possibly 16th century BC dagger (Hielkema 2001, 337) and a single post radiocarbon dated to the Middle Bronze Age-A (possibly of a structure; section 5.2.2; fig. 5.5, no 4) are the few direct indications of use of the Eigenblok levee and crevasse deposits during this period. For the three to four Hilversum-style decorated vessels at Wijk bij Duurstede - De Horden, no detailed context has been published (Letterlé 1985, 341 fig. 8; 9.2-3). At Lienden, no clear-cut Hilversum-style ceramics were recovered.[101] Within the Dodewaard macro-region, use of the crevasse splays is likely to have continued, although only very few sherds decorated in Hilversum tradition were recovered from the different sites subjected to test-trenching.[102]

7.2.4.3 Absent or masked? Middle Bronze Age-A settlements?

The Middle Bronze Age-A remains from the study area tie-in well with the pattern established for the other geogentic regions beyond the coastal zone (section 7.2.4.1). A limited number of find-spots are known, that moreover generally yield only small amounts of diagnostic pottery. The Middle Bronze Age-A may be the period poorest in type-fossils

99 Bloo *in prep.*; Bulten, Boonstra & Bloo 2008, *cf.* Île Tatihou; Marcigny & Ghesquière 2003, esp. 75-97.

100 The ceramics concern 24 sherds at site 28-1 and 16 from all other De Bogen sites; Appendix III, table III.5.

101 But see Sier & Drenth 1999, 17; Ufkes 2002a, 95-96.

102 A total of five to six sherds; Jongste 1997, 13; Bulten 1998c, 19; Jongste & Ten Anscher 1998; 14-15; Peters 1999, 17; Appendix VI.

for the various periods under investigation in this study. Only diagnostic pottery fragments, some bronze types and radiocarbon dates may indicate human presence at the different sites. It should be noted that in nearly all cases, continued use from the preceding Early Bronze Age onward is a possibility.[103] In absence of better recognizable artefact types and domestic structures, the issue whether the few remains recovered at the different excavations reflect settlement sites will remain unresolved. In this study, I have used the somewhat larger set of indications (*i.e.* several radiocarbon dates and relatively more sherds) to postulate that the De Bogen palimpsests may mask a use-phase as a settlement site during the Middle Bronze Age-A.

The remains recovered at other sites may reflect more transient uses of these locations. Alternatively, it may have been the case that towards the Middle Bronze Age-B, the percentage of decoration on and between vessels drops, and that fewer other typologically datable finds (*e.g.* bronzes) were current. If the hypothesis is correct that Hilversum-style pots were (1) perhaps not produced at all, or (2) not at all sites, or (3) not in comparable quantities in the study area, the intensity and nature of human presence during this period is prone to be downplayed unacceptably. In other words: accepting the low-diagnostic character of material culture and settlement site elements for this period, even year-round long-term habitation will still escape our view if masked by traces of similar (and similarly non-diagnostic) use-phases.

As I see no urgent reasons to assume that the population densities or subsistence base differed significantly for the Late Neolithic-B to Middle Bronze Age-A communities, the remains from these periods may (but need not) reflect similar usage of the landscape. Again, we cannot but argue from the negative evidence: as no clear-cut structures, finds-concentrations or feature types can be recognized that are distinguishable from earlier (Late Neolithic) or younger (Middle Bronze Age-B) use-phases, the usage need not have differed categorically. Yet, in all fairness, the extreme paucity of numbers of datable pottery fragments is in stark contrast to the abundance of ceramics recovered from well-preserved Middle Bronze Age-B house-sites (*cf.* Chapter 6, fig. 6.36). Acknowledging the small size of the various excavations, the impression remains that even if pottery decorated in Hilversum tradition was only incidentally present (*i.e.* made or imported) at Middle Bronze Age-A settlements, the few numbers recovered at present from the various sites seem to indicate anecdotal rather than long-term permanent domestic use. Two lines of interpretation – presently of equal validity – remain: (1) usage (*i.e.* settlement structure and duration) was indeed more short-term, or (2) many remains of the Middle Bronze Age-A are presently (through their nature; *e.g.* simple postholes, undecorated pottery of generic Bronze Age fabric) erroneously dated to other periods. Only when (a) a site is excavated beyond the coastal setting for which an exclusively Middle Bronze Age-A period of use may be argued for, can (b) the search for additional diagnostic elements be continued and (c) can the relation between non-diagnostic and diagnostic elements (pottery?) be established and used to better interpret the presently known data for this period.

7.3 Middle Bronze Age-B settlements: between wandering single farms and fixed settlements?

7.3.1 Middle Bronze Age-B models of settlement dynamics and site types

As the Middle Bronze Age-B occupation traces form the main data set and research topic of this study, a brief recapitulation of the ideas on settlement dynamics suffices here. I have argued in Chapter 3 (section 3.3) that for the Middle Bronze Age(-B), house-sites are seen as units that were periodically – generally assumed to be after a single human generation – relocated. In this model of 'wandering farmsteads', only few (diffusely distributed) houses are seen as functioning contemporaneously within a settlement territory, each of them relocating to new grounds after a given time-period. This model predicts that Middle Bronze Age-B house-sites will mostly show only a single house-phase. This model also suggests that clustering of houses will be rare and that the structuring of the direct vicinity of the house may be steered by properties (*e.g.* orientation) of the defining house rather than by other (spatially more extensive) elements of the cultural landscape such as other house-sites or land parcelling features. The validity of such hypotheses will be evaluated below. Yet first, some attention is paid to Bronze Age site typology. Are house-

103 Only at Dodewaard - site 20 (Dodewaard - Valburg/Hiensche Veld; Jongste 1997), no Early Bronze Age sherds were recovered and at site 22 (Valburg - Zettensche plas; Jongste & Ten Anscher 1998) only tentative Early Bronze Age sherds were recognized (Appendix V).

sites (or ‘farmsteads’) the only or dominant site type for this period, or should additional site types be incorporated into accounts of Middle Bronze Age-B settlement dynamics?

As its name suggests, the ‘wandering farmsteads’ model indicates that a new spatial level – the house-environment – is seen as the dominant element in analyses of settlement dynamics. This presents a break from the models compiled for the preceding periods, where ‘hunting-‘, ‘logistic-’ or ‘raw material-procurement’-camps are seen as integral parts of the settlement dynamics (fig. 7.1). It is questionable whether this is a proper approach. I have argued above that for the earlier periods (*e.g.* Late Neolithic-B to Middle Bronze Age-A), such non-domestic sites may be present but cannot be identified with certainty. Moreover, I have suggested that perhaps assumptions by archaeologists on what the settlement dynamics for these periods *should* look like, have overly emphasized the importance of such sites (section 7.2). Conversely, it may be that our *notions* of the subsistence strategies of Middle Bronze Age-B communities precludes the presence of such site types (*e.g.* Louwe Kooijmans 1993a, 101; 104), while in reality they may have been present in numbers and importance comparable to that of preceding periods. I have argued that various tasks may have been undertaken away from settlement sites that required brief to longer ventures into other parts of the landscape, for example to undertake activities such as fishing, metalworking, pottery production, raw material procurement and maintaining social contacts. Presumably, site types intrinsically different from settlements are associated with such activities, but we have failed to recognize and investigate these yet. Essentially, the types, numbers and importance of sites other than domestic sites need not have differed categorically between the Late Neolithic and the Middle Bronze Age-B, but as they are difficult to outline archaeologically, they are prone to inappropriate conceptual contrasting (fig. 7.6).

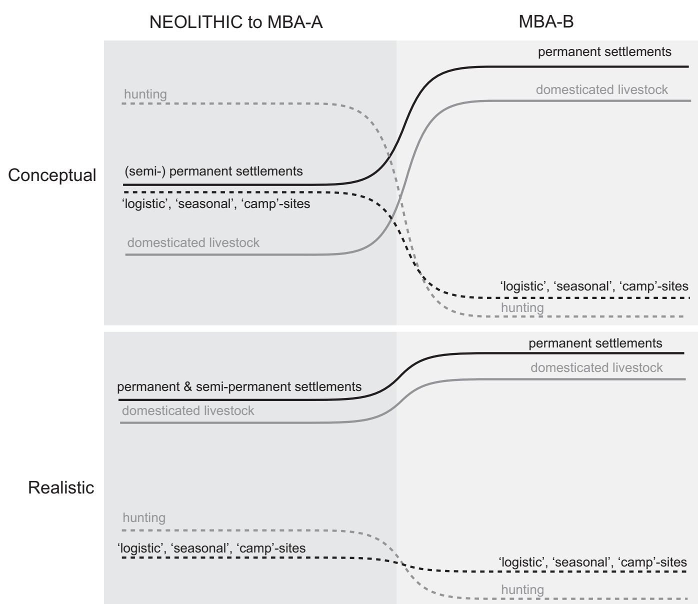

Fig. 7.6 Schematic example of the ways in which Neolithic to Middle Bronze Age-A settlement systems are frequently contrasted to those of the Middle Bronze Age-B. The top part shows an interpretative framework in which changes in settlement dynamics (*e.g.* the permanancy of occupation or the presence of non-domestis sites like hunting camps) and subsistence base (*e.g.* the importance of hunting or domesticated livestock) are strongly contrasted between the Middle Bronze Age-B and the earlier periods. The bottom part shows an interpretation of such changes that is considerd more realistic by the present author.

For example, the importance of activities like hunting, fishing and fowling – and the ‘logistic’, ‘processing’ or ‘seasonal’ sites on which such activities were carried out – is often considered to have decreased significantly with the start of the Middle Bronze Age-B (*cf.* fig. 7.6). However, it can be argued that hunting already decreased in importance much earlier,[104] and that the presence of site(-type)s complementary to domestic sites may have been

104 *Cf.* Clason 1999; Arnoldussen & Fontijn 2006, 399 fig 8 and references therein; *supra*.

relatively similar for the Middle Bronze Age-B and the directly preceding periods (*infra*). Similarly, the contrast often claimed between the Neolithic and the Middle Bronze Age-B periods in the permanency of occupation (*i.e.* the 'Neolithic' being characterized by more impermanent and semi-permanent occupation), may prove less dramatic if the evidence for permanent settlement from the Middle Neolithic onward is reconsidered (*e.g.* Amkreutz *in prep.*, chapter 8). The differences between such assumed (presumably somewhat exaggerated) changes in subsistence strategies and settlement dynamics, and more realistic scenarios, are visualized in the top and bottom part of figure 7.6 respectively. This figure is therefore not intended as an explanatory or descriptive model, but serves merely to outline in what ways the Neolithic to Middle Bronze Age-A settlement dynamics and subsistence base are frequently, yet often unsubstantiated, contrasted to the Middle Bronze Age-B.

While it can be assumed that site types such as food-procurement and processing sites (*e.g.* fishing, fowling, incidental hunting?) as well as raw material procurement sites (*e.g.* stone, coppice, thatch, wood, clay) must have been present during the Middle Bronze Age-B like in earlier periods, only very few are known.[105] During the palaeogeographical mapping around the Eigenblok excavations, a possible 'special purpose camp' location was postulated based on its small spatial extent and geographic location at the transition from the crevasse splay to the floodbasin (Van Zijverden 2002a, 63). As this site was not disturbed by railway construction, it has not been excavated and this interpretation must remain tentative. Another example may be the Middle Bronze Age-B phase of Oldeboorn, which was presumably a pike-catching and processing site also used previously during the Bell Beaker phase (Fokkens 1998a, 111, *cf.* IJzereef 1981, 117-126). While the small numbers of such sites known may be used to question the validity of the assertion that they existed in some numbers for this period, one should keep in mind that traditionally (and still; *e.g.* Jongste 2002a, 20-21; Hielkema 2003) excavations are focused on house-sites. These site types are both more easily detectable and have the 'virtue' of offering most archaeology-per-euro.[106] Therefore, such sites are – through their better detectability – overrepresented (Louwe Kooijmans 1993a, 94) and moreover favoured in decision phases of heritage management for their archaeological richness. Consequently, specific research of 'special purpose sites', for both the (Early and Middle) Bronze Age and the preceding Late Neolithic, is much needed.

The better visibility of houses for the Middle Bronze Age-B (Chapter 5, section 5.2.3) has the positive consequence that for this period, the distribution and possible interrelations with other settlement site elements can be studied in more detail. In Chapter 6, I have focused predominantly on the information available on the nature (*i.e.* the constituent elements and their (spatial) interrelations) of the Middle Bronze Age-B house-sites, and in this section I will focus on the available information on settlement dynamics.

I have argued in Chapter 3 (section 3.4.2) that the use-life of individual Middle Bronze Age-B houses is likely to have exceeded 50 years. This weakens explanations of domestic mobility that assume a close link between household life cycles and those of houses (section 3.4.3), but does not argue against a system of settlement dynamics with periodical relocations. Therefore, in order to asses the validity of the wandering farmsteads model, an analysis of the diachronic dynamics of Middle Bronze Age-B house-site uses is in place. First, the Middle Bronze Age-B house-sites from the study area are discussed. Thereafter, the results are compared to other regions within The Netherlands.

7.3.2 Middle Bronze Age-B house-sites in diachronic perspective

The data set of Middle Bronze Age-B house-sites in the study area comprises *c.* 36-45 house-sites which supported a total of 42 to 50 houses. If the house-sites of Tiel - Medel 1 and 8 are added, 42-52 house-sites with 51-59 Middle Bronze Age-B houses have been uncovered.[107] This large number of house(-site)s allows analyses of the nature of, and differences between, house-site use histories.

105 *Cf.* Tesch 1993, 14 and Gröhn 2004, 69 on Swedish Bronze Age special activity sites.

106 *Cf.* section 2.7; 2.7.3; fig 6.36. Virtue is placed here in brackets as this has a tendency to backfire: locations with many finds recovered can, and frequently do, represent palimpsest sites used during multiple periods, which limits understanding of the individual constituent phases.

107 The house-sites from Tiel - Medel are set apart here because they were discovered during the writing of this thesis and have consequently not been integrated into this study in the same way as the other Middle Bronze Age settlement sites (Chapter 1, note 27; Hielkema 2003; Van Hoof & Jongste 2007).

For the phase preceding the Middle Bronze Age-B occupation of these house-sites, there is much variation in the types of uses (table 7.1). First, at some sites (*c.* 15-25 %), such as at parts of Zijderveld, Tiel - Medel 8 and Wijk bij Duurstede - De Horden,[108] the Middle Bronze Age house-sites were constructed in areas where the absence of other features suggests that they had not been used previously as settlements.[109] Second, at other sites – such as at parts of De Bogen and Eigenblok excavations – house-sites were constructed in areas of low to high feature densities (Chapter 4, sections 4.3.4; 4.4.3). For these locations, no evident structures could be recognized within the feature concentrations, but judging by the finds recovered and/or radiocarbon dates obtained, it is probable that some of these activities predated the Middle Bronze Age-B (*c.* 25 %).[110] Third, structures (houses or outbuildings) overlapped with the house plans at *c.* 27 % of the house-sites.[111] Based on the typology of the structures that overlapped the house plans, it is often clear for the houses – and assumed for the granary-type outbuildings– that they date either to another use-phase in the Middle Bronze Age, or that they post-date the Middle Bronze Age occupation phase(s). Additionally, a few house-sites were constructed next to older barrows (*c.* 8-10 %) or older palisades (*c.* 5 %).[112]

nature of prior activities	feature density	nos. of house-sites	interpretation
unclear (undated features)	very high	1	possibly on former domestic site
unclear (undated features)	moderate	3	possibly on former domestic site
LNEO to MBA-A features	high	7	possibly on former domestic site
LNEO to MBA-A features	moderate	3	possibly on former domestic site
LNEO to MBA-A features	low	2	possibly on former domestic site
unclear to ‘none’	moderate	5	on former ‘empty’ area
‘none’	low	7	on former ‘empty’ area
palisade	moderate	3	near older palisade
barrow	high	1 (2?)	near older barrow
barrow	moderate	2	near older barrow
barrow	low	1	near older barrow
outbuilding or house	high	3	on BA or later settlement site
outbuilding or house	moderate	4	on BA or later settlement site
outbuilding or house	low	6	on BA or later settlement site

Table 7.1 Indications for the previous uses of Middle Bronze Age-B house-sites in the Dutch river area.

The presence of older occupation traces can be interpreted either as chance palimpsest situations, aided by the fact that that no changes or sedimentation in the micro-topographic landscape occurred that could stratigraphically separate these use-phases. For instance, at Eigenblok, fluvial activity had long ceased and only gradual ‘drowning’ (see section 2.3.5) of the landscape by the combined processes of shrinkage, compaction and ongoing sedimentation by other rivers took place between the Middle Neolithic and the Early Iron Age (fig. 4.10; Van Zijverden 2004b). If local communities from the Late Neolithic and the Middle Bronze Age-B all similarly preferred the highest parts of the micro-topographic landscape for post-built structures, it is no wonder they are found interspersed with each of them (Jongste 2002a, 37-38; Appendix II). While the (limited) availability of proper plots and similar settlement location preferences may indeed have *bounded* the locations of Middle Bronze Age-B house-sites, the above argumentation overlooks the possibilities for (individual) choices of location that certainly did exist. The results from the De Bogen excavations are a case in point. Within an undulating, yet essentially similar micro-topographic landscape, distinctively different locations were settled in the Middle Bronze Age-B. Some Middle Bronze Age-B house-sites (such as those at De Bogen sites 28-1, 28-4 and possibly 30) were constructed in areas that were intensively to moderately used (*i.e.* the usage reflected by feature densities and finds-distributions) during the preceding periods, while at the ‘same’ time some house-sites were constructed in previously unbuilt areas (*e.g.* De

108 For Zijderveld see Chapter 4, section 4.2, fig. 4.3, for Tiel - Medel 8 see fig 6.12; 6.54; Van Hoof & Jongste 2007 and for Wijk bij Duurstede - De Horden see Chapter 4, section 4.5.3.
109 Calculated by the ratio of ‘none’ and (‘none’ + unclear to ‘none’) respectively against the total observed cases (n = 48-49) in table 7.1.
110 Calculated by the ratio of ‘Late Neolithic to Middle Bronze Age-A features’ listings against the total observed cases (table 7.1).
111 Calculated by the ratio of ‘outbuilding or house’ listings against the total observed cases (table 7.1).
112 House-sites near (presumable) barrows: Eigenblok sites 5 and 6 (section 4.3.4), De Bogen house-sites 45BH/HH (section 4.4.3) and Wijk bij Duurstede - De Horden 9 (section 4.5.3).

Bogen house-sites 45AH, 45CH, 30 AH and 30GH; fig. 4.16; Appendix III). This means that the options were open to settle either on previously used locations or on pristine plots, and that both were used.

While there may be a practical side to settling as yet unbuilt areas (*e.g.* no debris, no post-stumps to remove, less animal infestations?), it should not be overlooked that opposite views may have been as valid. Previously settled areas may have communicated the potential for successful living in these areas, regardless of whether such previous occupation was seen as the work of mythically or appropriated ancestral occupants, or genealogically traceable forbears. For example, in ethnographic studies, there are various examples of communities more positively appreciating places in the landscape that had proven their value by 'ancestral' activities. Two quotes from Rival's (2002) study of the Amazonian forest dwelling *Huaorani* illustrate this well:

> *'They explored the forest systematically, looking for useful plants and, more important, for evidence of previous occupation, such as potsherds, stone axes, and plant species all taken to be unmistakable signs of previous human occupation. During evening conversations, after having share a copious meal cooked from forest food, they would exchange news about resource-maturing states and locations (...).'* (Rival 2002, 70),

> *'Meanwhile, men were felling trees (...) to make house poles. Women traditionally contribute vine ropes to attach the house poles that men erect, as well as mö leaves to make the water-tight inner roof that lines the external palm roof woven by men. Back from the gathering expeditions, we would work together at leveling the ground underneath the great roof, digging out all root remains and pulling out stones and debris. Each unearthed bits of clay pot or broken stone axe was discovered with great pleasure and excitement, and preciously kept by the women. They were the material signs that* mono memeiri *(literally 'our grandfathers') had once lived there.'* (Rival 2002, 94).

A similar observation has also been published for the occupants of the Solomon Islands, where 'Knowledge of past settlements is not simply a part of memory, to be recalled when asked for by an outsider: it is of major importance in a number of aspects in everyday life (…).' (Miller 1980, 453, *cf.* 456; Joyce 2000, 196).

Presumably, during the Bronze Age (older) barrows formed rich sources of (claimed) ancestral legitimacy, societal well-being and fertility, which may explain why Middle Bronze Age-B house-sites were occasionally erected next to them.[113] A deliberate and recurrent intertwining of funerary and domestic functions has also been noted for the barrow location at De Bogen site 45 (section 4.4.3). There, on a location already in use in the Late Neolithic, a Middle Bronze Age-B house overlapped with a presumably older funerary monument, and may itself have been cross-cut by yet another funerary phase (figs. 4.15; 4.21; Hielkema, Brokke & Meijlink 2002, 197-236). The fact that for the unique post-built (mortuary) structure 45HH dimensioning common to Middle Bronze Age-B houses was used, may be just another reflection of such deliberate entwining of domestic and (ancestral) funerary domains (section 8.2.3.3; Bourgeois & Fontijn 2008; Meijlink 2008). The possibility that not only barrows, but also other vestiges of past habitation (*e.g.* features, debris, pits and palisades) may have carried connotations of ancestral approval and success – which in turn may have been quite important factors in deciding settlement site locations – cannot be proven in archaeological contexts but should at least be kept open.[114]

From such a perspective it can be argued that while an overlap between older occupation traces and Middle Bronze Age-B house-sites may have been a consequence of chance or necessity, this may also have been intentionally favoured. The overbuilding of houses on Middle Bronze Age-B house-sites (*cf.* fig. 3.3, e), which occurred at Enspijk (fig. 4.5, A; Ter Wal 2005b) and Tiel - Medel 8 (fig. 6.12, A; Van Hoof & Jongste 2007) may similarly have been a deliberate choice to reuse a location that had proved its potential by past occupancy, as there was enough space for these houses to be situated elsewhere, had avoidance been preferred.

113 Section 8.2.3.3; Harsema 1982, 156; Fokkens 1999, 32; 2005d, 72; Gerritsen 2003, 237; Kolen 2005, 145; Bourgeois & Arnoldussen 2006; Bourgeois & Fontijn 2008.
114 *Cf.* Jackson 1956, 24; Middleton 1973, 374; Christie 1992, 22; Waterson 2003, 45, Gerritsen 2003, 240.

There are several indications that once a choice for a particular house-site location (and orientation) was made, these locations maintained this function in the long-term. The exact duration of such a 'long term' may be situated somewhere between 50 years and three centuries.[115] To this end, or as a consequence of such presumably long-term usage of house-sites, repairs were commonly undertaken (*c.* 37 % of the houses; table 7.2). Of such repairs, only the re-digging of ditches, replacement of wattle-and-daub walls and replacement of roof-bearing posts are visible archaeologically, altough the re-plastering of walls, floors and hearths and refurbishing of thatch will have occurred more frequently.[116] The fact that some houses may have been extended (*c.* 2-4) can also be interpreted as reflecting an attitude to prolong the use of a given location.[117] While additional domestic space (whether for storage, livestock or people) could have been created by building a bigger (or additional) farmhouse elsewhere, it was decided to prolong the use-life of the existing house instead.

Moreover, when houses had to be replaced completely (regardless of whether this was necessitated by practical (timber decay) or ideological motives), they were often rebuilt on the same spot. While there may be some differences in the dimensioning, ground plan or orientation of the rebuilt houses, they frequently remain so similar as to assume that the occupant groups of both house-phases were related, if not the same.[118] Examples of such nearly identical rebuilt houses were found at four different sites.[119] At one of these, a rather extreme example of such rebuilding of houses was documented. At De Bogen site 30, a farmhouse was rebuilt three times, with only minimal changes in orientation and location for the four house phases (fig. 7.7).

Additionally, I have argued in Chapter 6 (section 6.4.2) that the rebuilding of granary-type outbuildings does not only indicate past intentions to maintain house-site functionality over prolonged time periods, but also that the spatial ordering of elements *within* house-sites was considered important to maintain over time. As (shared) orientation was an important aspect of such ordering (sections 6.4.1-6.4.2) it is probable that the outbuildings which show a different orientation to the houses with which they overlap, date from a different phase of use of the site. Unfortunately, the possibilities to date such overlapping structures are generally limited and such structures can therefore pre-, as well as post-date the occupation phase. Based on indirect typochronological (see section 5.4) and contextual arguments (section 4.5.3), I feel that those overlapping outbuildings that conform in orientation to the houses (*e.g.* fig. 4.5; 4.29), may nonetheless date to the Middle Bronze Age-B. While such outbuildings by definition belong to another (later, yet still Middle Bronze Age-B?) use- or house-phase, their placement may have been a deliberate act intended to create and stress the ties between former (or ancestral) and later occupants. In anthropological studies, there are various examples in which ties between former 'ancestral' houses and branched-off houses are stressed in comparable ways.[120]

From the entries in table 7.1 with 'low feature density', it is clear that in circa one-third of the cases, Middle Bronze Age-B house-sites were not utilized for, or affected by, later habitation. In some cases, such as at Zijderveld, De Bogen and Wijk bij Duurstede, on-going sedimentation may have rendered (the lowermost parts of) the micro-topographic landscape unfavourable for later habitation. A few weak indications for Late Bronze Age use of the Zijderveld, Dodewaard, Eigenblok and the De Bogen micro-regions are known (Appendices I-IV). Early Iron Age structures have been recognized at Eigenblok and Zijderveld.[121] At these sites, features found within the houses and structures overlapping with houses may date to these periods. At Wijk bij Duurstede - De Horden, Early Iron Age

115 Based on documented wood-durability (section 3.4.2) and the date-ranges between the earliest Middle Bronze Age-B occupation and oldest dates for later (*i.e.* end Middle Bronze Age-B/Late Bronze Age or Late Bronze Age/Early Iron Age) structures at Zijderveld, De Bogen and Tiel - Medel 8.

116 See Chapter 3, note 62.

117 *E.g.* De Bogen house 28-1AH (fig. 4.14, B) or Eigenblok house 6.2 (fig. 4.8, 7).

118 See Chapter 3, note 20 for examples.

119 Eigenblok (houses 2.1 and 2.2; fig. 4.8, nos. 2 & 3), Wijk bij Duurstede (house 2, possibly also houses 4-7; fig. 4.23, no 2; fig. 4.27), Dodewaard (houses 1a; 1b; fig. 4.37, B & C) and De Bogen (*e.g.* houses 29B2H and 29B3h; fig. 4.14, H & I).

120 For example, with the eastern Timorese *Mambai*, branched-off houses are empowered by '*buis noran*' or '*fo otan*' rituals (literally; to pluck a leaf or break a branch) wherein stones and some ritual objects are taken from the 'father/mother' house to the new house (Traube 1980, 295). See also Bloch (1995, 77; 82) and Waterson (2003, 45).

121 See Hielkema, Prangsma & Jongste 2002, 108-109; Appendix II; fig. II.19 and Theunissen & Hulst 1999b, 156-177; Appendix I; fig. I.21 respectively.

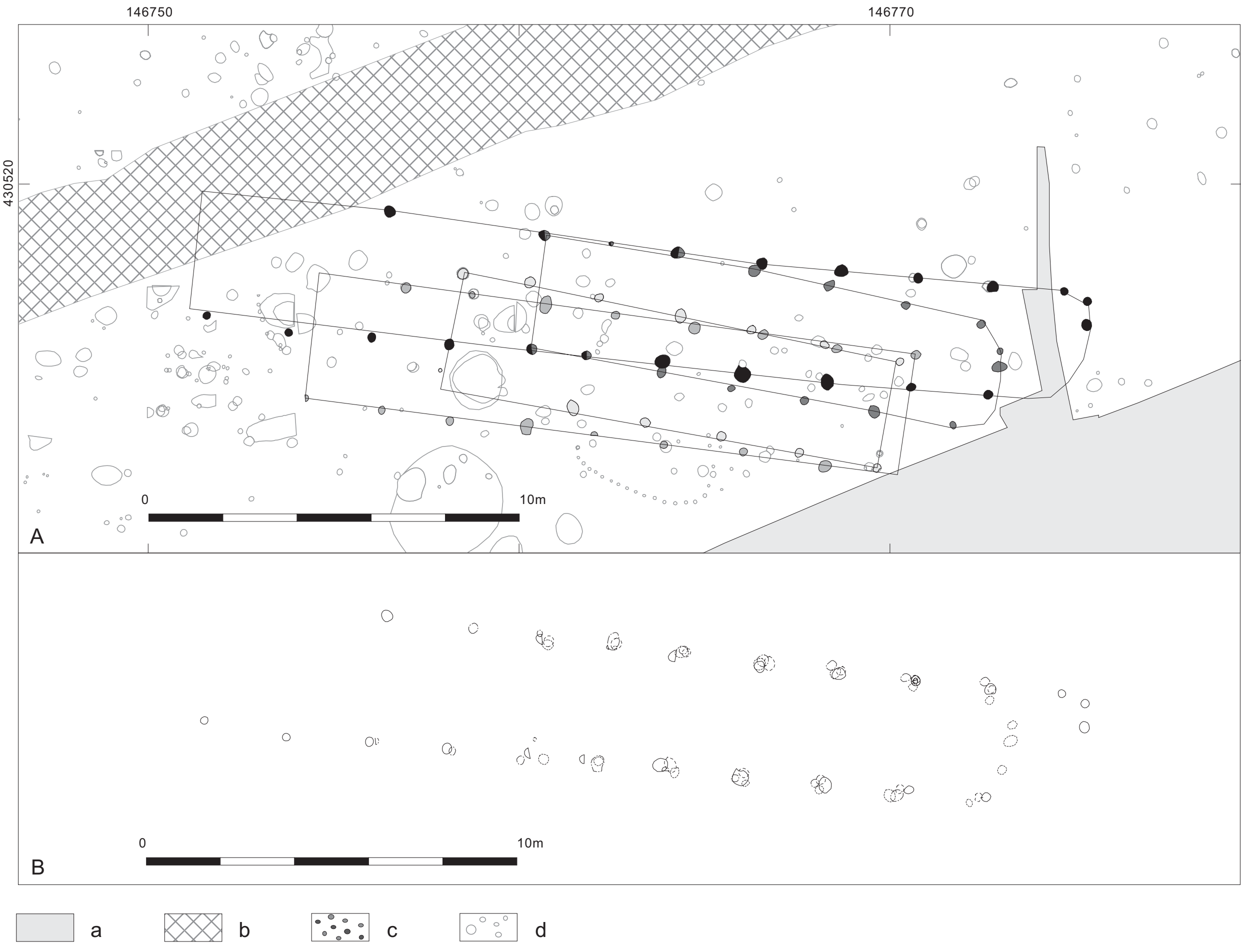

Fig. 7.7 Farmhouse rebuilt three times at De Bogen site 30 (A: after Hielkema, Brokke & Meijlink 2002, 145-154; outlines added for clarity; they have no structural relevance). The four phases are rotated and overlain to show the similarities in roof-bearing structure in B.

a: not excavated, b: recent disturbances, c: features associated with house-phases, d: other features.

occupation took place as well, but this was separated from the Middle Bronze Age-B levels by a layer of sediment.[122] Generally, no typologically datable structures can be reconstructed from the features that overlap with the houses. The type-1a fences that overlap with houses at Dodewaard and Wijk bij Duurstede - De Horden house 3, also occur on Early Iron Age sites, but at Dodewaard no Early Iron Age ceramics were recovered, while at Wijk bij Duurstede the fences were found at a level stratigraphically above that of the house. Other types of later (yet possibly still Middle Bronze Age-B) usage of house-sites may be the construction of ditches, such as the ditches that cut-across De Bogen houses 29B2H/B3H (fig. 4.17) or the ard-marks observed at Eigenblok sites 5 and 6.[123]

While these examples offer some insights into the diversity of later uses of Middle Bronze Age-B house-sites, problems of inadequate dating resolution and representativeness do not allow for discussion of these patterns in more specific terms. In general, it is probable that Middle Bronze Age-B house-sites were erected in three particular types of locations; (1) in areas that showed some traces (finds and features) from preceding periods (*c.* 40 %), or (2) in areas presumably settled earlier during the Middle Bronze Age (*c.* 27 %) or (3) in areas previously left completely or nearly completely unbuilt (*c.* 25 %; table 7.1). The use of a given plot may have altered already during

122 Hessing 1989; Hessing & Steenbeek 1990, 17; Appendix IV.
123 Hielkema, Prangsma & Jongste 2002, 141-142; 156; Appendix II, fig. II.14; II.16.

the Middle Bronze Age-B, and the various post-holes, ard-marks and fences that overlap with Middle Bronze Age-B house(-site)s, may date to a later phase of Middle Bronze Age-B use. For sites that yielded remains datable to younger periods, it is plausible that traces from these periods penetrated down to the Middle Bronze Age-B levels, in locations where insufficient sedimentation occurred to separate these. However, there are indications that prolonged Middle Bronze Age-B occupation need not by definition have lead to a dramatic increase of feature densities on Middle Bronze Age-B house-sites. Particularly house-sites 3 at Zijderveld and 5 at Eigenblok are good examples of house-sites where a long use-life is evidenced by the dates obtained (section 3.4.2), but where feature densities are moderate to low. At Wijk bij Duurstede - De Horden and Tiel-Medel 8 as well, the low feature density of the different house-sites is striking (section 4.5.3; Van Hoof & Jongste 2007). This again supports the notion that once fixed, the built-up environment within (and presumably between, *cf.* section 6.4.3) Middle Bronze Age-B house-sites was not intended to change radically. In different aspects, such as the rebuilding of fences, granaries and complete houses *on their former locations and with identical orientations*, a tradition of 'having everything in its right place' may be reflected that is typical for this period of the Bronze Age (section 8.2.3.6; Arnoldussen & Fontijn 2006; Fontijn 2007).

Theoretically, Middle Bronze Age houses from different phases within this period could have been built to overlap at different angles,[124] but this occurred only rarely in (and beyond) the study-area during the Middle Bronze Age-B (table 7.2). Thus, while for the river area the density of Middle Bronze Age-B house-sites may have been high in suitable parts of the landscape (mean *c.* 55 m apart, *cf.* table 6.3), houses of comparable types did not overlap, but rather conformed in orientation to nearby houses (section 6.4.1, fig. 6.15). This pattern may be explained by two assumptions. The first assumption could be that the house-sites were periodically (*i.e.* after 50-100 years?) relocated and when such relocation occurred, 'new-comers' purposefully avoided the locations of former house-sites yet adopted their orientation. A second scenario is one in which during the Middle Bronze Age-B, new house-sites were erected next to other, *still functioning*, house-sites.[125] With this option, the orientation of the houses was either steered by that of the still present houses, or by the systems of land-parceling within which both older and younger houses were fitted (*cf.* fig. 7.9). To my mind, the second scenario is more appealing, although not much direct evidence can be put forward to support this. It does, however, have important consequences for the nature of Bronze Age settlement sites. Whereas the first option allows for wandering single house-sites (D: *wanderende Einzelhofe*), the second option implies the agglomeration of Middle Bronze Age-B house-sites (or in other words, the existence of hamlets or villages).

It is necessary to discusses whether there are any arguments in support of the presence of multi-house settlement sites. In the cases of Zijderveld and Eigenblok, the available dates for houses allow for contemporaneity, but do not unambiguously dictate it (sections 4.2 and 4.3.5). The fact that the boundaries of the built-up parts of the cultural landscape have not been reached in both excavations, despite trenches distributed across hundreds of meters, suggests that settlement sites in any case may have been rather extensive. A similar impression is obtained for some other sites, such as Bovenkarspel (fig. 7.8, outside the study area) and possibly Wijk bij Duurstede - De Horden, although for the latter the documented size is known to be an under-representation (especially in the western parts; Appendix IV).

For Wijk bij Duurstede - De Horden, I have argued that the ditch to the south of the Middle Bronze Age-B house-sites may have formed a settlement boundary (section 5.6, esp. fig. 5.55), as it partly delineates all Middle Bronze Age-B house-sites. No comparable features are known from other sites, which means that only the numbers of houses, their shared orientation and comparable dates may indicate that several of them were contemporaneous. For example, the four radiocarbon dates for the Middle Bronze Age-B occupation at De Horden (Appendix VI; Hessing 1991) suggest that habitation between 1410 and 1260 cal BC is probable.[126] Assuming a 50 years life-span for individual houses (section 3.4.2), one would expect three rather than 12 house-phases, suggesting that two or three

124 *E.g.* possibly at Hijken (Harsema 1991, 24 fig. 3), or the Middle Bronze Age to Late Bronze Age sites of Elp (fig. 8.3; Waterbolk 1965; 1987) and Angelslo-Emmerhout (Van der Waals & Butler 1976; Kooi 2008).

125 These houses may have been relocated from more distant areas, but more plausibly, were built by the same household (family?) or local community that occupied the former or nearby houses.

126 Based on the calibrated range of these four dates combined; 3069 ± 22 BP (see Appendix VI for details on the individual dates).

farms may have been contemporaneous. Along similar lines, it has been argued for Eigenblok that the six Middle Bronze Age-B houses uncovered there can be framed within a 35 to 205 year period (Jongste 2008, 105). Again using the 50 years life-span, this implies the presence of multiple, contemporary, house-sites. Unfortunately, it is generally unclear exactly how many houses were existing contemporaneously, and possibly not that relevant. What *is* relevant, is that it is very well possible that more than three house-sites functioned simultaneously at short distances, and that when houses were 'added', this was done with respect to prior established bi-axial systems of land-parceling (system of fences) and/or house-orientation. In such a system, individual house-sites may still have shifted locations, have gone into disuse, have changed function or new house-sites may have been added. These processes were, however, all undertaken with respect for, or within pre-existing systems of land-structuring (*cf.* section 8.2.2. Consequently, this is better described as a system of settlement dynamics involving gradual growth and shifts, rather than one of 'wandering farmsteads' (fig. 7.9).

Fig. 7.8 Simplified interpretation of the Bronze Age cultural landscape at Bovenkarspel-Het Valkje (after Buurman 1996a, 16, fig. 5 and IJzereef 1989, 22). Note the extent of the settlement site and the density of houses.

a: not excavated; b: Bronze Age houses; c: Bronze Age ditches; d: pre-Bronze Age barrows.

7.3.3 Middle Bronze Age-B settlement preferences

Cultural factors

In the section above I have argued that settlement location preferences may have been (partly) based on the nature of the pre-existing cultural landscape. Funerary sites such as barrows, but also palisades or domestic refuse that was part of pre-Middle Bronze Age-B occupation periods may have been perceived as reflecting favorable signs for later established Middle Bronze Age-B settlement sites. In addition, I have argued that the built-up part of the cultural landscape may have offered an extensive spatial framework *within which* agglomerations of Middle Bronze Age-B house-sites could evolve. The creation of such agglomerations may have involved shifts of households over considerable distances (*e.g.* unrelated households joining), but I feel that it predominantly reflects small scale expansion and relocation of already present communities or households (fig. 7.9, B). The arguments for this are, however, all indirect:

(1) In the placement and orientation of the houses, conformity to the pre-existing landscape structuring – and thus (broad) contemporaneity – is reflected (section 6.4.1);

(2) the available radiocarbon dates for conforming houses do not argue against contemporaneity (Chapter 4, Appendices I-VI);

(3) in autarkic agraricultural communities, the presence of a neighbour (whether related or not) is an important factor or even prerequisite as households, particularly beginning households, often cannot cope without material help or labour offered by neighbouring households (section 3.4.1).

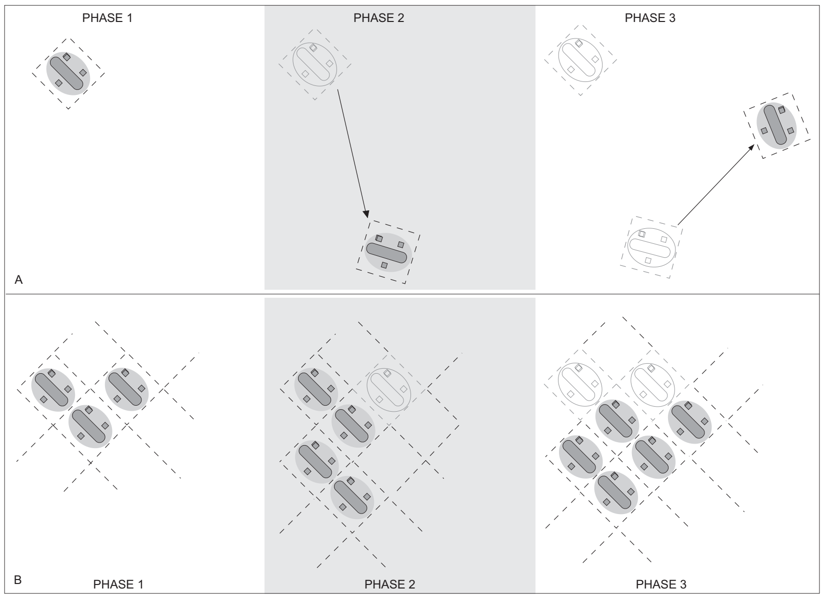

Fig. 7.9 MBA-B house-sites dynamics as represented by the models of 'wandering farmsteads' (top) and 'growth-and-shift' (below).

The role of the physical landscape and its dynamics

The role of cultural factors in determining Middle Bronze Age-B settlement site locations can only be understood as complementary to the determining roles of properties of the physical landscape. Settlement site locations may thus have been decided upon somewhere midway the spectrum between cultural determinism and ecological determinism. These societies were not uniformly cloning culture irrespective of the physical landscape, nor did the properties of the physical landscape determine at which locations what activities needed to take place. However, by both the cultural and physical realms, boundaries were set to human usage of the landscape (Louwe Kooijmans 1993a, 77). For instance, at perfect hunting grounds, such behavior may have been restricted by cultural regulations (*e.g.* taboos), just as settling vast coversand areas could render certain culturally acceptable options (*e.g.* fishing or fowling) improbable. But exactly what choices were made by Middle Bronze Age-B communities in the study area?

It is clear from figure 7.10 that during the Middle Bronze Age-B, an increase occurred in the types of locations of settlement sites. In nearly all types of landscapes, of different fluvial activity and genesis, Middle Bronze Age-B settlement sites can be outlined. Only for the *donken* and on the levee deposits of active systems proper, is evidence limited to absent (fig. 7.10). Despite the fact that problems of definition (section 3.2.1) and recognizability (sections 5.2.1-5.2.2) affect the seemingly dramatic increase in the clarity of the evidence between the Middle Bronze Age-A and the Middle Bronze Age-B, the image of widespread and ubiquitous Middle Bronze Age-B settlement sites remains. Nearly all, rather different (sections 2.7.1-2.7.2) types of fluvial landscapes were chosen for settlement, and no significant difference in the nature of the settlement sites can be outlined between these types (*cf.* Chapter 4; 6).

Interpreting this abundant presence in such a wide variety of landscapes is difficult. Possibly, the system of 'true mixed farming' (*sensu* Louwe Kooijmans 1993a, 104) could be successfully pursued in all these specific environments (*i.e.* an identical subsistence strategy was utilized in varied landscapes), or alternatively; the 'true mixed farming' strategy was sufficiently open to manipulation to allow a wide range of environments to be used (*i.e.* different strategies applied in different environments). Most likely, these two points-of-view are extremes between which the realistic scenarios should be placed. The core of subsistence strategy will have been combined (and interdependent?) livestock rearing and crop-cultivation. Both the composition or relative dominance of livestock versus crops, and

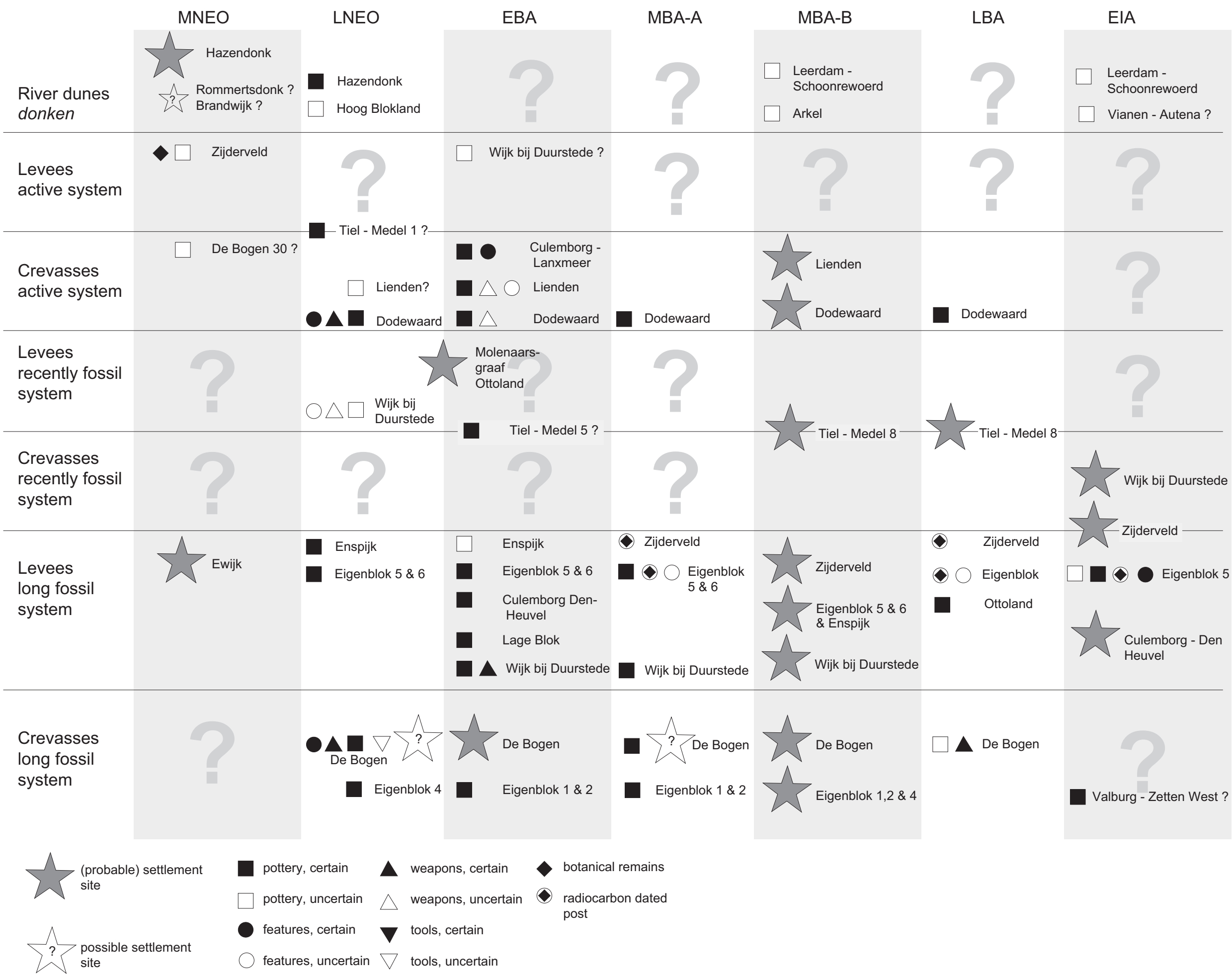

Fig. 7.10 Types of fluvial environments (y-axis) and the documented nature of their usage in different periods (x-axis). For references to the publications of the sites quoted see Chapter 4, Appendices I-VI and Louwe Kooijmans 1974; Verbruggen 1992; Out 2007. Systems classified as 'long fossil' were generally inactive for more than two centuries.

the use of other natural resources exploitable in the vicinity, may have been determined by variations in the physical landscape in the directly accessible surroundings of Middle Bronze Age-B settlement sites. Considering the similar livestock composition spectra and recurrent crop types for sites from different settings (fig. 7.11), such differences are variations on a theme, rather than categorically different strategies.

In Chapter 2, I have argued that crevasse splay deposits and levees of inactive fluvial systems differed in use-potential from crevasse splay deposits and levees of active fluvial systems (sections 2.3; 2.7). Nonetheless, all but the levees of active systems provided suitable settlement locations. With both active and inactive systems, the floodbasins will – if grazed – have provided areas rich in grasses on which cattle could be fed. It remains to be seen whether in the peat-rich areas to the west of the study area, similar possibilities existed. There, rivers were more frequently of the anastomosing type, with small levees and limited lateral movement (sections 2.3.6; 2.7.3). This means that fewer avulsions took place, that the number of overall coeval channel belts may have been lower and that the opportunities for stacked crevasse splay landscapes to form were also smaller. Compared to within the study area, a relatively smaller surface area was available, which was moreover more severely affected by peat-growth and its spatial distribution was more confined to that of the river channels proper. One may also question whether the *donken*, whose surface area was ever decreasing through ongoing sedimentation and/or peat growth, offered a sufficient(ly accessible) area of grazing ground for livestock herding as desired by Middle Bronze Age-B communities.

site	fluvial dynamics	NDB	Bos (n)	(% NDB)	Sus (n)	(% NDB)	Ovic. (n)	(% NDB)	Equus (n)	Canis (n)	Wild (n)	Fish (n)	Birds (n)	Hor. vulg.	Trit. dic.	Trit. aes.	Ave na	ard-marks	references
Lienden	crevasse splay of active fluvial system	3054	2023	66	432	14	556	18	5	1	10	152	3	19	11	0	-	-	Buitenhuis 2002
Dodewaard site 157	crevasse splay of active fluvial system	259	219	85	22	8	17	7	1	0	7	1	1	-	-	-	-	-	Theunissen & Hulst 1999a
Tiel - Medel site 1 and 8	levee and/or crevasses of recently (? *c.* 0.2 kA) fossil system, active system at 1.5-2 km	1054	839	80	95	9	105	10	5	10	4	1	-	- (+)	- (+)	- (+)	-	-	Buitenhuis 2003; De Roller 2003; Cavallo & Van Groenesteijn 2007; Bakels 2007
Wijk bij Duurstede	long (*c.* 0.7 kA) fossil levee deposits, active system at < 500 m	200	161	81	12	6	16	8	9	5	30	-	-	+	+	-	-	-	Letterlé 1985; Hessing 1991
Zijderveld	long (*c.* 1.2 to 0.8 kA) fossil levee deposits, active system at 3.5-7 km	521	488	94	16	3	12	2	2	3	5	0	1	++	+	-	-	-	Theunissen & Hulst 1999b; Bakels 2005; Cavallo 2005
Eigenblok sites 5 to 6	long (*c.* 1.6 kA) fossil levee deposits, possible active system at < 500 m	7150	5669	75	772	14	707	10	2	0	44	7	0	2008	58	0	-	++	Van Dijk 2002; Brinkkemper *et al.* 2002
Enspijk	long (unclear; possibly *c.* 1.6 kA) fossil levee deposits, active system at 6 km	136	95	70	5	4	36	26	0	0	0	0	6	69	8	-	1	-	Schnitger 2005; Hänninen 2005
Eigenblok sites 1 to 4	long (*c.* 1.6 kA) fossil crevasse splay, possible active system < 500 m	321	213	66	57	18	47	15	3	1	0	14	14	152	9	736	-	-	Van Dijk 2002; Brinkkemper *et al.* 2002
De Bogen sites 28 to 31	long (*c.* 1.8 kA) fossil crevasse splay deposits, active system at < 500 m	7633	4446	58	1638	21	1385	18	1	138	47	187	39	745	457	-	-	- / +	Buitenhuis 2001; Stuijts 2001; Van Dijk, Esser & Zeiler 2002; Hänninen & Van Haaster 2002

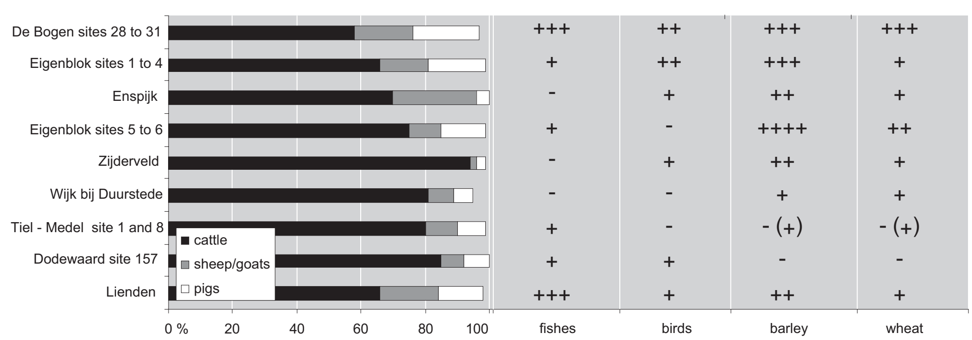

Fig. 7.11 Livestock composition for Middle Bronze Age-B settlement sites in the study area in numbers and as percentages of the fragments identified for the five main domesticated species (NDB; *Bos Taurus*, *Ovis/Capra*, *Sus domesticus*, *Canis familiaris*, *Equus caballus*), the number of fragments for a series of wild species (*Bos primigenius*, *Sus scrofa*, *Ursus arctos*, *Cervus elaphus*, *Capreolus capreolus*, *Alces alces*, *Castor fiber*, *Lutra lutra*, *Martes* sp. and *Putorius putorius*), fishes and birds. Certain numbers of identifications for four main species of cereals (*Hordeum vulgare*, *Triticum dicoccon*, *Triticum aestivum* and *Avena* sp.) and the presence or absence of presumably Middle Bronze Age-B ard-marks is also listed. A simplified interpretation is offered in the lower half of this figure.

Crop-cultivation is also bounded by some properties of the physical landscape. In Chapter 2, I have argued that fluvial sedimentary environments are rich in nutrients, which – in active fluvial settings – are frequently replenished. The lithology of levees (consisting of sandy to silty clay and fine sand; table 2.1) and especially crevasse splay deposits (similar constituents, but much more locally variable; table 2.1) offered a combination of mineral richness and adequate drainage that would have supported different types of, and prolonged (section 3.4.4), crop-cultivation. On active systems, the risk of flooding may have limited the cropping strategies (*e.g.* no winter cereals) and locations of the fields (*e.g.* only the higher locations were used), but the site of Lienden shows that cereals were present (and produced?) in such environments.[127]

River dunes, or *donken*, are characterized by a different lithology (fine to coarse sand, only incidentally loam-rich, which is of a poorer mineral composition (De Mulder *et al.* 2003, 197-202; 346-350)). This also possibly affected the possibilities for (prolonged) crop-cultivation. Moreover, no or only partial replenishing of soil-nutrients by flooding took place at *donken*, while their highest parts were subjected to the leeching-out of minerals and decalcification since their (generally Late Pleistocene to Early Holocene) period of formation. It may be just this combination of a smaller surface area (and fewer possibilities for transport and communication), longer-term soil

127 De Roller, Korf & Mook-Kamps 2002, *cf.* Van Haaster in Bulten 1998c, 50; Hänninen in Sier & Smits 1998, 44.

formation and the absence of nutrient-rich sedimentation, that rendered the river dunes less ideal habitation sites during the Middle Bronze Age-B. As only few river dunes with remains from the Middle Bronze Age-B have been investigated, the distortion caused by research intensity cannot yet be assessed. Presumably, future research may show that some river dunes were indeed settled during the Middle Bronze Age-B. I would suspect these river dunes to be situated close to (inactive) fluvial systems, and possibly in locations were aeolian river dune deposits underlie a thin fluvial cover. This would create a nutrient-rich, subsidence-free and logistically well-conected area comparable to those of the levee and crevasse-splay deposits.[128]

7.3.4 Dynamic landscapes?

Various reasons why the levee- and crevasse-splay deposits in the study area were favoured settlement site locations have been forwarded in the sections above. These arguments all hinge on the interplay between the culturally determined choices for types of land use and the possibilities offered by the physical environment. Levees and crevasse-splay deposits offered (sometimes extensive) areas that could be easily settled, that were nutrient-rich and provided good crop-cultivation and travel possibilities (sections 2.7.1-2.7.2). In the lower-lying parts, where levee and/or crevasse-splay deposits merged into the floodbasins, excellent pastures were present. Most probably, the possibilities thus provided to exploit varied resources at short distances was one of the chief factors drawing Middle Bronze Age-B communities into these landscapes. The erratic occurrence and distribution of crevasse splay formation created a landscape that was compartmentalized on a very local scale. Especially in the study area, Middle Bronze Age-B occupation is perhaps better regarded as being 'webbed' in nature rather than as being bound to the 'threads' of the levee deposits proper.[129] The detailed palaeogeographical coring campaign executed at Eigenblok provides an example of the degree of local variation present in such 'mosaic' landscapes (fig. 7.12; Van Zijverden 2002a; 2004b).

The darker shaded areas in figure 7.12 represent clayey to peaty more lower-lying areas, with open water, reed and alder carr that were suitable for fishing and the collecting of fodder, thatch, wood and wattle. The lighter shades are the fertile more higher, drier and sandy areas suitable for habitation, crop cultivation, exploitation of forest resources *et cetera*. The intermediate areas represent grassland areas interspersed with alder and willow shrubs, which are excellent pastures. As the Eigenblok fluvial system ceased fluvial activity around 3340-2930 cal BC (Berendsen & Stouthamer 2001, 199) the observed Middle Bronze Age-B occupation took place in an already centuries old fluvial landscape, *i.e.* an area of limited fluvial dynamics. Nonetheless, another fluvial system at *c.* 500 m to the south may have been active (Van Zijverden 2002a; 2004b). But to what extent may Middle Bronze Age-B farmers themselves have considered habitation at this site – and the other Middle Bronze Age-B settlement sites in the study area – to have taken place in dynamic landscapes?

In Chapter 2, I have discussed the perceptibility of various fluvial processes in relation to human time-scales in more detail (section 2.4). Consequently, here only the key elements need to be recalled. From a human perspective – which is here for convenience equated with a human generation of *c.* 30 years – the landscape was perhaps not that dynamic to the eyes of its Middle Bronze Age-B occupants. The Bronze Age farming communities were well-acquainted with the annual flooding of the rivers during late autumn and spring (section 2.4.2). Generally, only the lower-lying parts of the landscape were affected and the water level dropped again after several weeks. Only very rarely (*i.e.* once in a generation) did extreme (*e.g.* 150 to 200 % of normal discharge) flooding take place. During such periods of peak-discharge, excess flooding, re-opening of blocked channels and crevasse-inlets and new crevasse-splay formation could take place. As most sites were situated at some distance (*i.e.* several hundreds of meters) from the active channels, these processes are unlikely to have been witnessed by Middle Bronze Age-B occupants in the first place, let alone to have been catastrophic.

128 Note that not all crevasse-splays and not even all levee deposits are subsidence free, as they may not everywhere have scoured into the Pleistocene subsoil (*cf.* fig. 2.9; 2.12; Makaske 1998, Appendix 3).

129 However, it is this image of narrow 'threads' that is best understood (Berendsen & Stouthamer 2001) and has made its way into heritage tools such as the IKAW (Deeben *et al.* 1997; Deeben & Wiemer 1999; Deeben, Hallewas & Maarleveld 2002, esp. 25), although this map – in using paleogeographic base maps compiled for other purposes - grossly underestimates the areas available for human use (*cf.* fig. 2.8 and 7.12, *cf.* section 8.3.2; Verhagen 2007, 129-132).

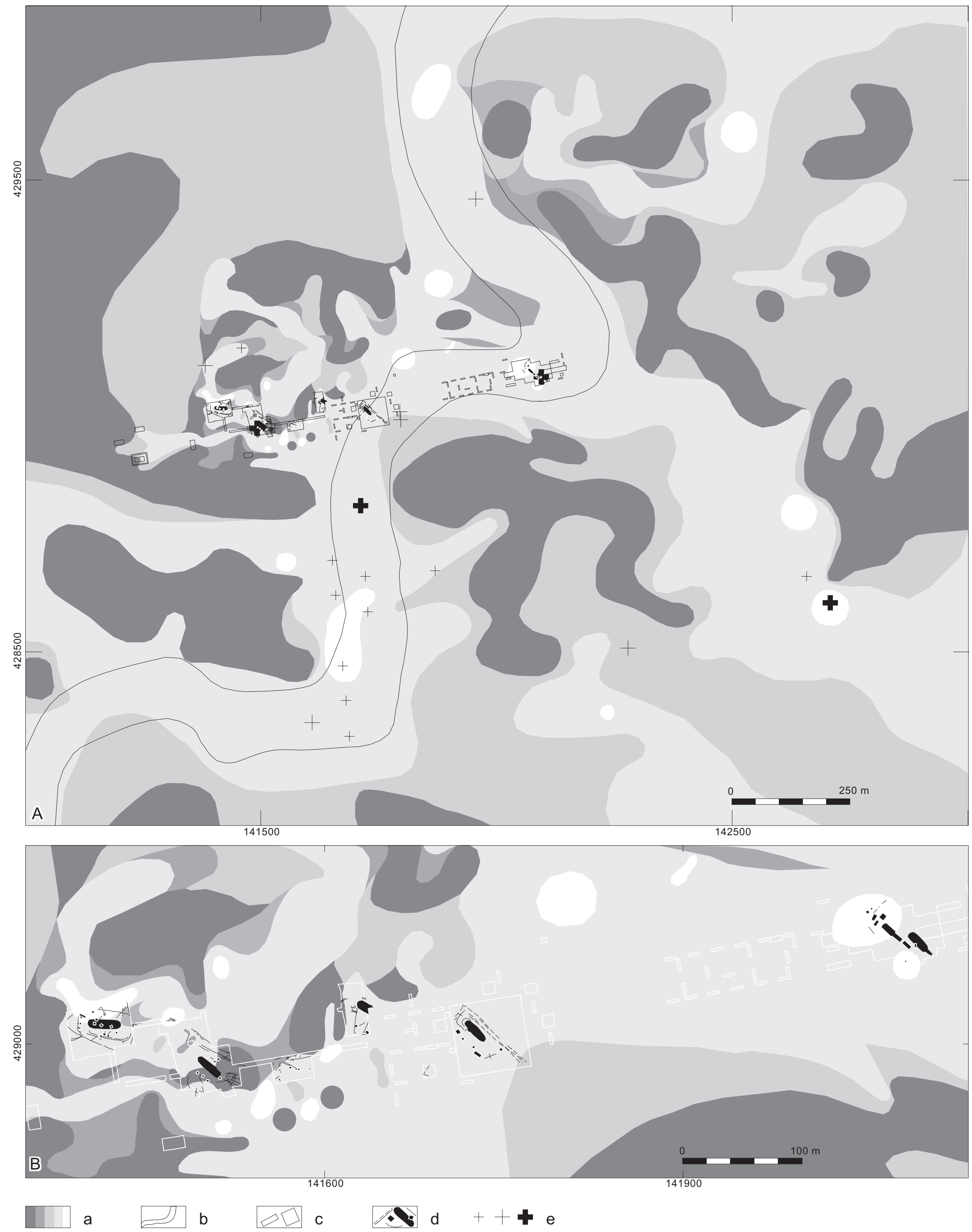

Fig. 7.12 Example of a compartmentalized, 'mosaic' Middle Bronze Age-B landscape and its occupation traces at Eigenblok (after Van Zijverden 2004b). Depicted is a soil-type map showing the more lower lying peaty to clayey wetter zones with some patches of open water (dark) and the higher, drier sandy soils (lighter). A cut-out of A is represented at a more detailed scale in B.

a: soil-types, b: levee deposits of the Eigenblok fluvial system, c: excavation trenches, d: Middle Bronze Age-B occupation traces, e: presumably Middle Bronze Age-B traces documented in coring campaigns (small cross: tentative fields, large cross: possible settlement sites, bold cross: presumable settlement sites).

The sites of Lienden and Dodewaard, by comparison, appear to be ‘inconveniently’ close to active systems. Yet here as well, the frequency and risk of re-working of the fluvial micro-topographic landscape may have been low. At Lienden, the Middle Bronze Age-B occupation was situated on crevasse splays that had formed shortly before (possibly during the Middle Bronze Age-A; Van Dinter 2002, 50, *cf.* fig. 4.32). A residual crevasse gully associated with this phase of crevasse formation appears to have gradually silted-up, with only minor periods of flooding (Van Dinter 2002, 46).[130] This means that Middle Bronze Age-B farmers accepted that parts of the adjacent floodbasin were annually flooded and partly submerged, and that this need not have rendered habitation impossible. At Dodewaard, the fluvial genesis of the micro-region is not yet fully understood (Van Zijverden 2003b; Appendix VI). Based on the studies by Steenbeek (1990) and Van Zijverden (2003b), it is clear that complex sequences of crevasse-splay formation and fluvial erosion took place prior to the Middle Bronze Age-B in the micro-region, but the exact spatial distribution and chronology of these processes is not yet known. During the Middle Bronze Age-B, however, fluvial activity seems to have been limited, as only some floodbasin sedimentation took place (Steenbeek 1990, 174; 185; 193). Considering the fact that the main Dodewaard excavation (Theunissen & Hulst 1999a) is situated at the convex meander peak, it is probable that at the time of occupation, the active course was meandering in the other direction and may have been situated as much as 1.2 km to the south (fig. 4.38; Appendix VI). The preservation of the site itself is proof that no erosive lateral meandering occurred at that part of the micro-region. Near the end of the Middle Bronze Age-B, alder carrs were restored and peaty to strongly humic clay (indicating reduced to absent sedimentation) could be found in the floodbasins near the Dodewaard site (Steenbeek 1990, 194).

In short, there is evidence at the two sites situated near active river courses, that the situation during the Middle Bronze Age-B need not have been much different from those sites situated on the systems that had become inactive centuries prior to Middle Bronze Age-B occupation. The gradual ‘drowning’ of the landscape, through combined subsidence and continued sedimentation at Meteren - De Bogen and Rumpt - Eigenblok would not have been (considered) catastrophic by the Middle Bronze Age-B occupants, as these processes only very slowly decreased the surface area (but see Van Zijverden 2002a, 70; 75) and the presumed main uses of these areas (raw-material procurement, herding, fishing?) were not bound to specific spots.[131] Rather, it seems that habitation was much more hindered – or even rendered impossible – once continued sedimentation occurred within the settlement site area. This may have been caused by new crevasse formation,[132] by reactivation of an older residual gully,[133] or by a combination of these processes.[134] To conclude, while annual and incidental flooding will not have ended Middle Bronze Age-B occupation, prolonged deposition of floodbasin sediments and crevasse-splay formation within the settlement site area or its direct vicinity could have (locally) rendered successful agriculture (temporarily) impossible and this in turn may have caused people to relocate.

7.3.5 Man-landscape interactions

In section 7.3.3 I have argued that subsistence (and social) circumstances during the Middle Bronze Age-B were adequate and/or adaptable enough to settle a wide range of landscapes, of different geological dynamics (*cf.* Arnoldussen & Fokkens 2008). But this should not be taken to signify that Middle Bronze Age-B settlements were structured irrespective of properties of the physical landscape. To the contrary, there are several examples of settlement sites where the distribution and orientation of settlement site elements may have been influenced or even steered by properties of the physical landscape. For example, at Zijderveld the orientation of the houses and many of the fences is identical to that of the Zijderveld fluvial system, and presumably more significantly, its residual gully that was visible as a marshy depression (perhaps seasonally waterlogged) at the time of Middle Bronze Age-B occupation (fig. 7.13).

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130 The later crevasse formation that eroded much of the finds-layer at Lienden is dated to *c.* 1220-790 cal BC, and it is related to the start of sedimentation by the Echteld channel to the south, which reactivated the former Westerveld residual gully (Van Dinter 2002, 50; Berendsen & Stouthamer 2001, 198; Appendix V).
131 Sections 2.3.5; 2.4.3; 4.3.4; 4.4.3; 4.7.3; Appendix II-III; VI.
132 *E.g.* at De Bogen (Van Zijverden 2002b, 87-88; 2004b, Appendix III).
133 *E.g.* at Zijderveld (Knippenberg & Jongste 2005, 25; Van Zijverden 2003a; Appendix I) and Eigenblok (Van Zijverden 2004a; Appendix II).
134 *E.g.* at Wijk bij Duurstede - De Horden (Steenbeek 1990, 92, 188; Appendix IV) and Lienden (Van Dinter 2002, 48; Appendix V).

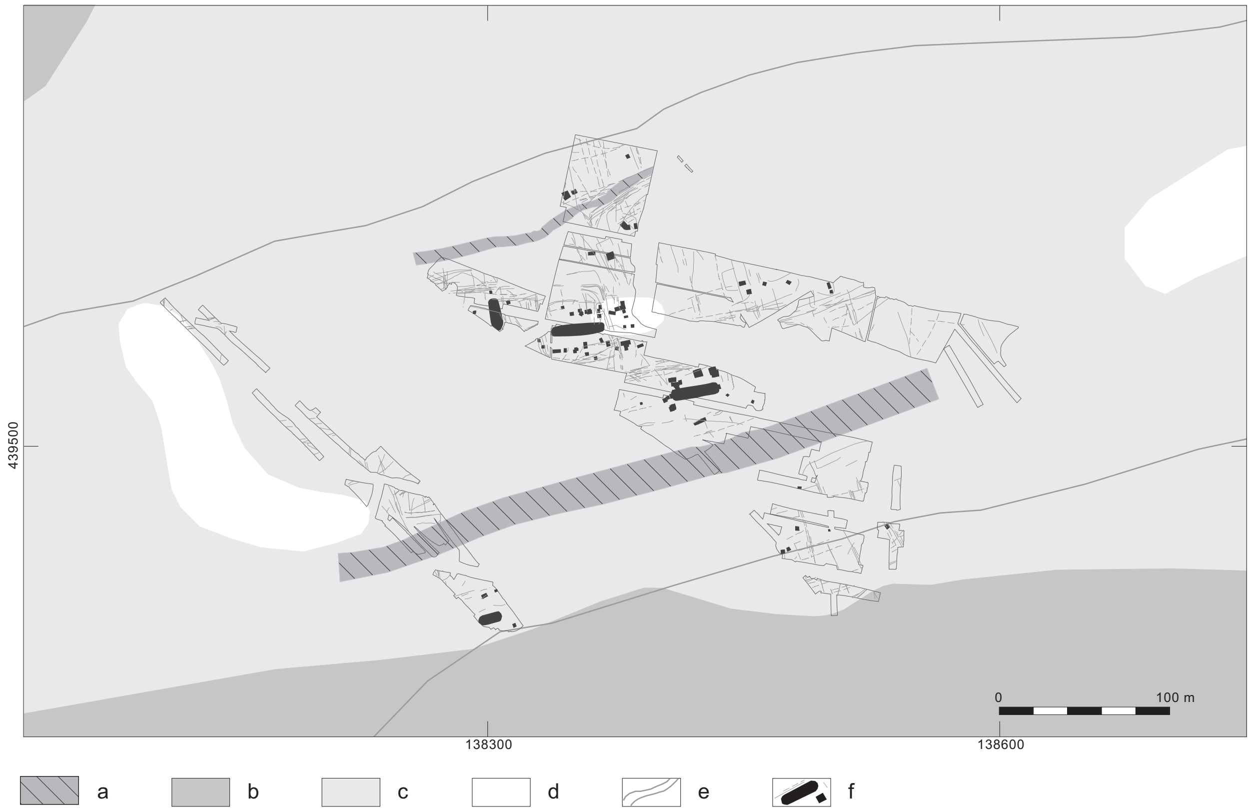

Fig. 7.13 Palaeogeographical map and occupation traces at Zijderveld during the Middle Bronze Age-B (after Van Zijverden 2003a; Knippenberg & Jongste 2005; Van Beurden 2008, *cf.* fig. 4.4).

a: residual crevasse gully (north) and Zijderveld fluvial system residual gully, b: alder carr and wet meadows, c: alluvial hardwood forest; dryer; poplar, ash, alder and garden plots (?), d: highest parts; like c, possibly more oak trees?, e: outline of channel deposits of the Zijderveld fluvial system, f: Middle Bronze Age-B settlement site elements.

As only a small part of the levee deposits of the Zijderveld fluvial system has been excavated, it is not known whether this correspondence between house-orientation and the orientation of the residual gully is also present in other parts. Two kilometers to the west of the excavated area, the fluvial system bends sharply to the north (*cf.* Appendix I, fig. I.5). It would be informative to open up an area there to see whether – if present – Middle Bronze Age-B settlement site elements such as fences and houses followed the (different) orientation of the residual gully there, or alternatively, whether the prese(n)t orientation was continued. There is some evidence that may support the latter scenario.

For example, at Eigenblok, most house-sites conformed to a NW-SE system of orientation that appears to cross-cut height contours and palaeogeographical zones in parts of the micro-topographic landscape (*cf.* fig. 7.12, B; Hielkema, Prangsma & Jongste 2002). While in some parts fence lines may have followed contours of the micro-topographic landscape (corresponding to vegetation zones?), this occurred only incidentally (*contra* Jongste 2002b, 612). Instead, most fences seem to have been part of relatively straight, bi-axial parceling systems that included, yet surpassed, individual house-sites (sections 5.5 and 6.4.3). At Eigenblok house-site 1, an exception to the rule may be present. There, the orientation of the westernmost house and fences deviates from the other four house-sites (fig. 7.12, B). It is not known whether this was done to deliberately create correspondence with landscape geometry or whether other factors caused this.[135] At Meteren - De Bogen, a comparable situation existed. There as well, the local variations in height and morphology of the crevasse splay underlying the Middle Bronze Age-B occupation traces are not reflected by the orientation of the houses. Rather, all houses conform more or less (fig. 6.45) to the dominant

135 One may even question whether this house was contemporaneous to the other houses, as dates are available only for a surrounding fence and two outbuildings (Jongste 2002a, 35; Appendix II).

W-E axis of orientation (fig. 4.18). Here as well, fence systems – although less well preserved – may have been instrumental in carrying a system of orientation across an extensive area (section 6.4.3).

At Enspijk, three houses were uncovered on top of the Enspijk/Hooiblok fluvial system's channel deposits (section 4.3.3; Ter Wal 2005b). The orientation of these houses may be related (similar or perpendicular; fig. 7.14, A) to that of the river course, but as only a narrow strip has been excavated and the morphology of these deposits is not mapped with adequate detail yet (Feiken 2005) this interpretation remains tentative. More evident is the cluster of fence-lines that seems to have been placed in – and along – the residual gully in the south (fig. 7.14, A-B). These fence-lines may have delimited the wetter, lowermost part of the residual channel which was filled with sandy to silty clay (Feiken 2005; Ter Wal 2005b, 16-17; 25).

Fig. 7.14 Overview (A) and detail (B) of the Middle Bronze Age structures at Enspijk – A2 / Op- en Afrit Geldermalsen in relation to the underlying channel bed deposits and residual gully (after Berendsen & Stouthamer 2001 and Feiken 2005, 15 fig. 6).

a: not excavated, b: structures (houses, outbuildings, fences), c: features, mostly fences.

A final example of possible Bronze Age landscape referencing may be the ditch at Wijk bij Duurstede - De Horden. The shape and extent of this *c.* 190 m long possible settlement site boundary ditch may have been inspired by – or may even be mimicking – the trajectory of a swale gully situated 100 to 200 m to the south of it (fig. 5.55). Unfortunately, the dating of this ditch to the Middle Bronze Age-B is insecure (section 5.6; Appendix IV).

In addition to these possible examples of landscape referencing, the distribution of various settlement site elements may have been related to properties of the landscape (see Chapter 4; Chapter 6). For instance, wells are found clustered in locations where good accessible aquifers were presumably found (sections 5.7; 6.4.4). A more general example is the fact that the highest density of features (and in cases of adequate preservation also finds) is generally bound to the highest parts of the micro-topographic landscape, which were preferred house-site locations. The more lower-lying areas generally only supported fences and few structures, some of which may have been granary-type outbuildings. Evidently, relative height (*i.e.* in relation to the mean level of floodbasin sedimentation) affected feature distribution. In a fluvial setting, relative height is connected to lithogenetic facies. The energetic advantage of levee-breeches into the lower-lying floodbasin means that crevasses are by definition mostly lower than levee deposits (section 2.3.3).

Barrows, for example, have thus far only been found on sites situated on levee deposits, rather than on crevasse-splay deposits. First, it should be stressed that the numbers of barrows discovered is very low, which diminishes representativeness.[136] Nonetheless, there is evidence that, outside the river area, barrow mound(period)s were sometimes erected on the highest parts of the micro-topographic landscape and sometimes natural elevations were used (section 5.9, esp. p. 271). If this preference also applied to the river area, it would only be normal for (pre-Middle Bronze Age-B) communities to construct their barrows on the somewhat higher levees.

Ard-marks have thus far also only been found on sites situated on top of levee deposits. Their absence on the smaller, compartmentalized, mosaic crevasse-splay landscape might be explained by assuming that a minimum field size for ard-ploughing to be efficient may not have been met there. However, I would argue that numerous crevasse-splays would have offered adequate space, and that it is predominantly preservation conditions and methodological issues that have rendered such more shallow traces invisible.

There is, however, a serious risk of (mis)interpreting the distribution of Bronze Age settlement sites remains in the river area as being determined, rather than as affected or bound, by landscape characteristics such as lithology, morphology and dynamics. The prehistoric occupants were people who were likely to have stayed two generations (or more) on the same spot or in the same micro-region, and who were intimately familiar with the possibilities and limitations posed by such landscape characteristics. Probably, zones in the landscape that differed in lithology, morphology and dynamics from favoured settlement site locations, were put to optimum use as well (*e.g.* clay extraction, firing activities, food collecting and/or processing *et cetera*). This usage may however differ significantly in nature, and consequently in archaeological visibility, from that of settlements. Despite this, the low representativity of such uses in our perceptions of Middle Bronze Age-B everyday life is partly self-inflicted. By using prospective strategies that have best detection rates for settlement sites (section 2.7), by policy decisions that favour these as well (*supra*; 'maximum archaeology-per-euro') and by the frequently confined scale of excavations, archaeologists actively contribute to an overly home-based view of Middle Bronze Age-B societies. Such imbalances can only be redressed by research projects focused at a (cultural) landscape scale and that allow for more differentiated, dynamic, models of landscape usage.

7.3.6 Middle Bronze Age-B settlement dynamics in supra-regional perspective

Having discussed various aspects of Middle Bronze Age-B settlement dynamics, it is now time to place the observed patterns in supra-regional perspective. Possibly, in other (geogenetic) regions of the Netherlands the Middle Bronze Age-B settlement dynamics were of a different character. If in these areas 'wandering farmsteads' were the norm, one may expect these regions to show less (or no) house-sites with multiple house-phases. In addition, regional differences may become visible from differences in the frequencies with which extensions, rebuilding or overbuilding occurred (*cf.* fig. 3.3). To this end, an inventory of Middle Bronze Age-B houses and house-sites from different geogentic regions has been compiled. As for some areas certain aspects (such as rebuilding, or the percentage of single-phased house-sites) have been published but no full detailed publications are available, the data set varies in size for the different topics. However, as a general indication, a maximum total of 308 to 350 Middle Bronze Age-B house(-site)s was used in the different comparisons (table 7.2).

136 A total of four is known; Meteren - De Bogen site 45 (fig. 4.15; Hielkema, Brokke & Meijlink 2002), Rumpt - Eigenblok site 6 and possibly site 5 (fig. 8.6; Hielkema, Prangsma & Jongste 2002), Wijk bij Duurstede - De Horden (fig. 4.28; Hessing 1989). Note that the construction phases of all these barrows may pre-date the Middle Bronze Age-B.

	river area (n)	river area (%)	southern NL (n)	southern NL (%)	easthern NL (n)	easthern NL (%)	northern NL (n)	northern NL (%)	West-Friesland (n)	West-Friesland (%)	ice-pushed hills (n)	ice-pushed hills (%)	coastal area (n)	coastal area (%)	min. total (n)	min. total %	max. total (n)	max. total %
(n)	59	100%	26	100%	16	100%	51 (93)	100%	138 (95)	100%	4	100%	14	100%	308	100%	308 (350)	100%
repairs	22	37 %	8-9	31 %	4	25 %	17	33 %	n.a.	n.a.	2	50 %	5	36 %	58 (170)	34 %	59 (170)	35 %
single-phased	42-45	71-81 %	22	85 %	13	81 %	57 (93)	61 %	44 (95)	46 %	3	75 %	0	0 %	181 (307)	59 %	184 (307)	60 %
multi-phased	14-17	19-29 %	4	15 %	3	19 %	36 (93)	39 %	51(95)	54 %	1	25 %	14	100 %	123 (307)	40 %	126 (307)	41 %
extended	2-4	3-5 %	2	8 %	1	6 %	16	31 %	9 (90)	10 %	1	25 %	1	7 %	32 (260)	12 %	34 (260)	12 %
rebuilt	6-10	10-17 %	2-4	7.5-15 %	2	12.5 %	0-3 (93)	0-3 %	14 (90)	16 %	0	0 %	5	36 %	29 (288)	10 %	38 (288)	13 %
overbuilt by house	3	5 %	0	0 %	0	0 %	17 (93)	18 %	11 (90)	12 %	0	0 %	2	14 %	33 (288)	11 %	33 (288)	11 %
overbuilt by outbuilding	12	20 %	0-1	0 - 4%	0-1	0-6 %	n.a.	n.a.	n.a.	n.a.	1	25 %	4	28 %	12 (67)	18 %	13 (67)	19 %

Table 7.2 Frequency and percentages for different house- and house-site properties compared across the different geogenetic regions.

Regional comparisons

From table 7.2 it is clear that the amount of archaeologically arguable repairs is similar for all regions (mean *c.* 34-35 % of the houses), and the higher value in the ice-pushed hills areas is a side-effect of the low overall number of houses known there. If one looks at the composition of single-phased versus multi-phased house-sites, much more regional variation is visible. Whereas in the river area *c.* 20-30 % of the house-sites were multi-phased, in the southern coversand area this occurred only in 15 % of cases. In the eastern coversand area and ice-pushed hills, figures may be comparable, but the overall number of documented cases there is low. For the northern Netherlands and West-Friesland similar numbers of house-sites as in the river area have been uncovered, but in these regions as many as *c.* 40 to 54 % of the house-sites showed more than one house-phase. The (near-)coastal areas present an even more extreme situation, as here all house-sites had more than one house-phase. The importance of these figures needs to be stressed explicitly: there is no region where exclusively single-phased house-sites (as to be expected with a wandering farmsteads model) occur. In the various regions, quite different settlement dynamics applied to between 15 % to 100% of the Middle Bronze Age-B house-sites, but a mean figure of 40 % may be forwarded. This means that for all Dutch Middle Bronze Age-B house-sites, in almost half of the cases single-phased occupation as predicted by the wandering-farmstead model does not apply. Yet evidently, in some regions – such as the southern Netherlands – single-phased house-sites are the norm. Moreover, periodical relocation may have been the true background to this patterning. What is important to stress once again here, that it is not the *mechanism* of wandering farmsteads that is criticized in this study, but rather its underlying assumptions, presumed periodicity and exclusiveness (*cf.* section 3.4 and table 7.2). Complementary to single-phased house-sites, multi-phased house-sites were part and parcel of Bronze Age settlement dynamics in most regions in The Netherlands during the Middle Bronze Age-B.

There remains considerable regional differentiation in the processes that caused house-sites to be multi-phased in nature. In the Dutch river area, a significant percentage (*c.* 10-17 %) of the houses were rebuilt, as has already been discussed above (*cf.* figs. 4.27; fig. 7.7). In addition, many cases of outbuildings overlapping houses were recorded. Some of thesecases of structural overlapping may have been deliberate (*cf.* 4.29), but particularly for those that deviate strongly in orientation, it is probable that these outbuildings belonged to another (younger?) use-phase of the site. Rebuilding of houses on the same house-site occurred in nearly all regions, but occurred with comparable frequency in West-Friesland (*c.* 16 %) and possibly in the coastal areas (*c.* 36 %; table 7.2). That this is no statistical artefact is shown by the values for the northern Netherlands, where large numbers of house-sites are known, yet rebuilding was rare (*c.* 0-3 %). For the southern and eastern Netherlands, the data set is rather small, so that the mean of *c.* 11 % rebuilt houses remains tentative. It is striking that rebuilding was more frequent in those areas (*i.e.* the river area, the coastal zone and West-Friesland) where houses with 'type A' roof-bearing frames were dominant (88 % or 100 %; table 5.6). Possibly, these areas were not that different in their settlement dynamics (*cf.*

Fokkens 2005d, 75) and it is tempting to speculate whether easy riverine and coastal contacts may have aided in this process of possible cultural amalgamation.

If we look at the importance of the extending of houses in creating multi-period houses-sites, altough documented in all areas, two regions take the lead. In West-Friesland, a tenth of the house-sites may have witnessed an extension of their defining house.[137] In the northern Netherlands, this figure reaches an astonishing 31% (table 7.2). I have already argued earlier that this region (and part of the eastern Netherlands?) can be characterized by compartmentalized house construction (section 5.2.3.3, esp. figs. 5.22; 5.23). This modularity has caused an overall high frequency of house-extensions and incidentally also some very long composite house plans (Kooi 2008, 62 figs. 3-4). By contrast, in the river area houses were very infrequently (*c.* 3-5 %) extended.

Some researchers have suggested that after relocation, Middle Bronze Age(-B) house(hold)s returned in a later phase to former house-sites.[138] The different implications of 'rebuilding' and 'overbuilding' (section 3.2.3; fig. 3.3) have presumably been overlooked, or in any case not systematically studied, in such claims.[139] Overbuilding was infrequent in the river area (*c.* 5 %), but occurred more common in West-Friesland (*c.* 12 %) and most frequently (*c.* 18 %) in the northern Netherlands. It remains dubious whether the situation in the northern Netherlands is representative for Middle Bronze Age-B settlement dynamics, as in many cases the overbuilding here concerns and/or involves Elp-type farmhouses (type B2; fig. 5.14), which have been argued to date to the two final centuries of the Middle Bronze Age-B and the Middle Bronze Age-Late Bronze Age transition (fig. 5.24).[140]

To sum up, from a comparison of house-site dynamics between several different regions, it is clear that distinct regions can be identified by the different causes that led to the multi-phased Middle Bronze Age-B house-sites there (table 7.2). The house-site dynamics of the river area can thus be characterized as a system of mostly single-phased house-sites, supplemented by multi-phased house-sites comprising mostly rebuilt houses. In the adjacent southern Netherlands area, rebuilding presumably was not as frequent, and single-phased house-sites are more common. For the ice-pushed hills directly to the north of the river area, too few data are available to allow reliable characterization. The Middle Bronze Age-B house-site dynamics in the eastern Netherlands may be similar to that of the southern Netherlands region, although here too the low number of documented cases affects the certainty of characterization. In the northern Netherlands, a pattern of house-site dynamics was current that is distinctly different from that of the river area. There, house-sites were more frequently multi-phased and both the extension of houses and the overbuilding of houses occurred with unparalleled frequency. The largest dominance of multi-phased house-sites is recorded for West-Friesland, as here both rebuilding and extending of houses occurred in significant numbers. From the (near-) coastal region, relatively few house-sites are known, yet these are all multi-phased.

Despite evident similarities between house-sites from the river area and West-Friesland, such as in house-types (table 5.6), the presence of house-site ditches (section 5.6) and common occurrence of rebuilding (table 7.2), some differences should also be noted. Overbuilding of houses and the extension of houses occurred more frequently in West-Friesland, and the overall percentage of multi-phased house-sites is higher there.[141] Consequently, the river area is best considered – like other areas – as a region with a system of house-site dynamics of its own.[142]

Towards new models?

In an earlier chapter, I discussed and criticized the current main model(s) for Bronze Age settlement dynamics (section 3.3; 3.3.4). I have argued that the validity of these models is decreased by the fact that several issues, such

137 The high value (25 %) for the ice-pushed hills is again dismissed because of the small sample size (n = 4; table 7.2).

138 *E.g.* Butler 1969, 66; Waterbolk 1987, 203; Roymans & Fokkens 1991, 12, *cf.* fig. 3.5.

139 Consequently, the 'special' position of West-Friesland as showing houses being rebuilt on the same house-sites, as forwarded by Roymans & Fokkens (1991, 12), consists of rebuilding (16 %), extending (10 %) and overbuilding (12 % ; table 7.2).

140 Compare this to figs. 5.12-5.13 or Bourgeois & Arnoldussen 2006, 21 fig. 6, where the majority of (predominantly indirect) dates for Middle Bronze Age-B houses from all areas clusters around 1500-1200 cal BC.

141 Additionally, it is possible that the use-life of Bronze Age settlement sites in West-Friesland was somewhat longer, as here various radiocarbon dates spanning the end of the Middle Bronze Age-B and into the Late Bronze Age are known (*e.g.* Van Regteren Altena, Van Mensch & IJzereef 1977, 250-251; Buurman 1996c, 112; Lanting & Van der Plicht 2003, 185-186; 205).

142 In particular, the occurrence of type W2 walls and elaborate entrance portals is documented for the river area, but absent in West-Friesland (table 5.6).

as causality (*e.g.* why did house-relocation occur?, are barrows always present near houses?), representativeness (to what percentage does this model apply?), periodisation (for which period is it valid?) and regionality (to what areas does it apply?) are rarely discussed explicitly. In this study, these issues have therefore received special attention.

The causality of periodical relocation of the house(-site) has been investigated in Chapter 3. It has been argued that wood-decay (section 3.4.2) and soil-depletion (section 3.4.4) need not have been prime motives in different geogenetic regions. Moreover, direct evidence suggests that the longevity of Bronze Age timber may be a factor two to three times higher than previously assumed. This complicates a direct correlation between human generational cycles and house-relocation. Additionally, I have shown that inorganic depositions in houses are not representative correlates for studying house-household interrelations (section 3.4.3). At this point, however, no other generally valid causes for domestic mobility can be brought to the fore that can be supported archeologically. House-site relocation may, for instance, still have been caused by limited life-span of the timber, but in such a scenario it is rather a multi-generation farmhouse that was abandoned after 50 to 100 years, rather than a house being abandoned after having been occupied by just one human generation. Alternatively, archeologically invisible causes such as sociological or ideological, or more pragmatic motives such as animal infestations or the decreased size of usable land in a fluvial setting may have been valid reasons for relocation. An element of key importance here, is that from an occupant's perspective, the mobility of houses will have been considered very low.[143] Rather, houses may have been perceived as being 'rebuilt', regardless of whether this occurred on the spot or at a more distant location. Undoubtedly, additionally houses were built that accompanied – or were 'branched-off' from – other co-existent houses and that may have been perceived as 'new' houses. These houses, however, conform in various aspects to regional and supra-regionally shared construction properties which were, evidently, not open to manipulation. This suggests that upon rebuilding Middle Bronze Age(-B) houses, communal or even ancestral values were stressed, rather than individual (household) values (*cf.* section 5.2.3.4).

Due to a lack of chronological resolution (section 5.2.3.1), the periodicity of Middle Bronze Age-B house-relocation – regardless of its motives – presently remains largely unknown. It is however clear that in the river area, more so than in the adjacent southern coversand region, agglomerations of house(-site)s evolved. While the indirect dates for such sites in the Dutch river area frequently allow for contemporaneity (*e.g.* section 4.2-4.3.4; Appendices I-II) this is not proven. However, the date ranges obtained, the typological similarities of houses within single Middle Bronze Age-B settlement sites (Chapter 4 and section 5.2.3.2), the observable correspondence in orientation (section 6.4.1) and the placement within wider systems of fences that shared this orientation (section 6.4.3) are all indirect arguments in support of contemporaneity (*cf.* fig. 7.9, B). Moreover, I have argued that in (suitable locations within) the river area, Middle Bronze Age-B house-sites are generally only between 20 to 80 m apart (section 6.5).

In various Middle Bronze Age-B settlement sites outside the river area, agglomerations of house(-site)s of comparable sizes and orientation are known.[144] In those cases, however, feature preservation did not allow for fence-lines to be preserved and direct dates are (again, through poorer preservation conditions) absent. To my mind (partial) contemporaneity of several of such house(-site)s should be seriously considered (*cf.* fig. 7.9, B). Future research at locations with adequate preservation conditions may in future confirm (or refute) the contemporaneity of small (yet presumably up to 4 or 5 (or more?) house-sites large) agglomerations of Middle Bronze Age-B house-sites in the various regions. Nonetheless, issues of representativeness should not be overlooked. There are several good examples of extensively excavated areas where only a single Middle Bronze Age house plan was uncovered.[145] Therefore, in some regions beyond the river area, settlement systems comprising (and combining?) isolated and conglomerate house-sites may have existed. The more detailed study of these regions, however lies beyond the scope of the present investigation.

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143 Moreover, some anthropological examples suggest that immobility and 'old age' may be important valued features of houses (and Houses); see Chapter 3, note 73.

144 *E.g.* at Andijk (IJzereef & Van Regteren Altena 1991), Angelslo (Van der Waals & Butler 1976; Kooi 2008) and Bovenkarspel (IJzereef & Van Regteren Altena 1991), Boxmeer (Hiddink 2000), Hijken (Harsema 1991), Hoogkarspel (Bakker *et al.* 1977) and possibly at Breda - Huifakker (Berkvens, Brandenburgh & Koot 2004), Borger (Kooi 1996; 2008), Colmschate (Verlinde 1991), Dalen (Kooi 1991), Noordbarge (Harsema 1997a) and Rhenen (Van Hoof & Meurkens 2007).

145 *E.g.* Oss - De Geer (fig. 5.10; Jansen & Van Hoof 2003), Breda - Moskes (Berkvens, Brandenburgh & Koot 2004, 55 fig. 4.1) or Den Dungen (Verwers 1991).

As I have shown in sections 3.3.3 and 3.3.4 that graphic models of Middle Bronze Age settlement dynamics are prone to implicitly communicate aspects whose relevance, causality and domain of applicability is not specified, I will refrain from offering an alternative graphic model here. But this does not mean that Middle Bronze Age-B settlement dynamics in the Dutch river area cannot be modeled approximately. Rather, it means that textual descriptions of these dynamics can be as accurate, while providing less room for misinterpretation. Lastly, it should be stressed that the causalities and temporalities of Middle Bronze Age settlement dynamics are still ill-understood and warrant further study. The section below can thus offer no more than a preliminary interpretation, which hopefully may inspire more specific research questions into the nature and dynamics of (Middle) Bronze Age(-B) settlements.

A tentative generic model for Middle Bronze Age-B occupation in the Dutch river area
During the Middle Bronze Age-B in the Dutch river area, house-sites were constructed on levee and crevasse-splay deposits where no excess flooding or sedimentation took place. These were frequently the levee- and/or crevasse-splay deposits of (long) inactive fluvial systems, but also crevasse splay deposits belonging to – or situated in the close vicinity (< 500 m) of – active fluvial systems. In the latter case, the crevasse inlet channel had presumably already silted-up, which means that only in incidental cases flooding or sedimentation from the residual crevasse gully occurred. These locations were selected for a combination of factors. The lobate sand-sheets of the crevasse splay deposits offered well-drained settlement areas that could often be exploited for habitation or crop-cultivation without having to remove prior shrub or alluvial woodland vegetation. By contrast, for the levees it may have been their alluvial forest vegetation (and the associated plants and animals) that appealed to Bronze Age occupants. Both crevasse splays and levee deposits were very fertile locations for crop-cultivation, and the transitional zones from these areas into the lowermost parts of the floodbasin – where some patches of open water may have been present – were equally excellent (potential) pastures. Presumably, these good physical conditions for habitation, crop-cultivation and livestock rearing, combined with the small distances in-between (because of the mosaic character of such landscapes) formed important 'pull factors' for Middle Bronze Age-B habitation.

In addition, the various clues the cultural landscapes offered of prior human activities, such as finds, visible changes in vegetation or visible structures such as larger pits, palisades or barrows, may have conveyed notions of ancestral success and approval that added to the draw of particular plots. The construction of houses and granaries may have involved a significant workforce, as five different axe tool-marks were found on the posts of a single granary (Knippenberg & Jongste 2005, 123). The fact that initial agriculture by new households may have been a risky business, but also that help in harvesting, exchange of breeding stock and other agricultural labour and help was needed, will have favoured habitation in locations not too distant from relatives or others that were able and willing to offer help. Once constructed, houses presumably stood for several generations, and were respected by other houses erected in the vicinity. Several such additional houses may very well have been contemporaneous, as they commonly are of comparable types and frequently conform in orientation. The houses in such agglomerations were generally placed at 20 to 80 m from each other.

The shared orientation of houses needs not to have been derived from the orientation of other houses *per se*. Around the houses, frequently extensive systems of land-parcelling were constructed with fences. While in some parts of the settlement site the trajectories of such fences may have been steered by the morphology (and/or related vegetation) of the subsoil, at most sites the fence-lines form extensive, moderately straight, bi-axial (perpendicular) lines across the land. Such fences could have acted as field- or livestock boundaries and almost never seem to have been constructed with the intent to surround individual house-sites. House-sites nonetheless are sometimes *de facto* bounded by such fence-lines.

Directly around the houses, within a zone of 10 to 40 m from the houses, a few granary-type outbuildings are commonly constructed and sometimes a barn/shed-type of outbuilding. When it was thought necessary to replace them, the outbuildings are frequently rebuilt on the near same spot, with the same ground plan and the same orientation. Pits are frequently found on Middle Bronze Age-B house-sites, but they were only rarely used as refuse dumps and seldom cluster in the vicinity of the houses. Therefore, pits seem to be part of distributions across settlement site space as a whole, rather than being related to house(-site)s proper. The location of wells presumably is also not related to that of house(-site)s, but to the availability of good usable aquifers, which explains why clusters of wells sometimes formed in such locations.

Based on the rebuilding of granary-type outbuildings it can be assumed that a certain, preset, house-site structuring was considered desirable to maintain over longer periods. The same argument applies to rebuilt houses. For up to a fifth of the house-sites, the main farm building was rebuilt. This was frequently done with such comparability in dimensioning, orientation and post-placement, that it may be assumed that the same local group (among which specific details of house construction were presumably shared) or household was responsible for the construction of both house-phases. While houses were normally rebuilt only once, cases of houses being rebuilt three times are known as well.

There are no indications (such as abandonment deposits) that houses may have been deliberately abandoned shortly (*e.g.* < 30 years) after construction of well prior to structural decay. Moreover, processes such as the rebuilding of house-site elements, adding extensions to houses and normal repairs executed, all convey an image of Bronze Age farmers that were 'there-to-stay'. Nonetheless, when locations were abandoned, posts were cut or snapped-off at surface level to be salvaged and re-used, although possibly some were left standing above-ground. Regardless what was done with old posts, the changed surface area of the former house-site in terms of vegetation and ubiquitous debris, indicates that such plots will have been visible for decades and could possibly be remembered even longer. At some sites, outbuildings – that still conformed in orientation to that of the former house and/or houses in the vicinity – may have been constructed on the location of former houses. Possibly, this was a deliberate (symbolic) act to create ties between (un)known former household members and the household that used the particular outbuilding.

Not all later uses of former house-sites may have been so deliberate. Frequently, outbuildings with different orientation overlap with former house ground plans. Their deviant orientation may indicate that sufficient time had lapsed for the former systems of orientation to have been lost or altered. Additionally, some house-sites were later used as fields, as indicated by the ard-marks that have been found cross-cutting house-site structures.

The reasons to abandon Middle Bronze Age-B settlement sites need not have been related to fluvial processes, but in some cases clearly were. At several settlement sites, new crevasse formation presumably brought areas previously unaffected under more intense fluvial influence. This could result in prolonged or more frequent flooding, or – in more rare cases – in the deposition of crevasse splay deposits on top of the house-sites. While a period of more frequent avulsion and crevasse splay formation is thought to have affected the delta as a whole at the Middle Bronze Age-Late Bronze Age transition, habitation could locally continue unproblematically into the Late Bronze Age.

7.4 The aftermath: Late Bronze Age and Early Iron Age occupation in the Dutch river area

7.4.1 Problems of periodisation

According to established views, during the 11th century cal BC, and somewhat earlier in the northern Netherlands (Gerritsen 2003, 121; Van den Broeke 2005a, 482) the first urnfields emerge (with the typical long-bed barrows) as the defining element of the Late Bronze Age (Van den Broeke, Fokkens & Van Gijn 2005, 31).[146] Traditionally, the introduction of *Urnenfelderkultur*-related pottery in the southern Netherlands and two-handled and biconical vessels in the northern Netherlands, were also defining traits (Anonymous 1967, 9; Lanting & Mook 1977, 7). As there are indications that such vessels may have already emerged prior to the 11th century, presently only the (typical grave forms in) urnfields are used as the starting point of the Late Bronze Age (Van den Broeke, Fokkens & Van Gijn 2005, *loc. cit.*).[147] The Gasteren long-bed barrows in the north presumably date between the (late) 14th and initial 10th

146 Lanting and Van der Plicht (2003, 152) argue that the Middle Bronze Age-B/Late Bronze Age transition should be placed at 1200 cal BC or 2950 BP. They do not explicitly state which dates for what specific cultural traits this is based upon. The discussed dates relating to the periodization (*op. cit.*, 132), all pertain to HaA2 complexes and no good end-dates for the Br.D. are offered. This complicates the evaluation of the suggested Late Bronze Age start at 1200 cal BC.

147 See Bourgeois *in prep.* who argues that in the northern Netherlands biconical pots with looped handles (the so called G*asteren* urns) date to between 1400-1200 cal BC (as suggested by radiocarbon dates of their cremations, *e.g.* those from Balloërveld - Tum. 6 (GrA-18967: 3070 ± 40 BP; Lanting & Van der Plicht 2003, 213), Gasteren (GrA-16282: 3005 ± 40 BP; Lanting & Van der Plicht 2003, 162), Annertol (GrA-19082: 3020 ± 50; *ibid.*, 213) and Borger (GrA-17602: 3045 ± 40 BP; *loc. cit.*)). See also Arnoldussen & Ball 2007 on the dating of Late Bronze Age pottery in the southern Netherlands, which seems to start to change in some aspects from that of the Middle Bronze Age-B around or in the 12th century.

century BC (*cf.* Verlinde 1987, 173-193),[148] and the Goirle/Riethoven long-bed barrows in the southern Netherlands (*cf.* Roymans & Kortlang 1999, 42-53) span the 12th to 9th centuries,[149] although some will have been constructed during the Early Iron Age as well (Tol 1999, 103; Kortlang 1999, 163). Some significant changes in ceramic- and funerary styles may have occurred well prior to the 11th or even 12th century cal BC, and this weakens their applicability as (singular) indicators for the start of the Late Bronze Age.

Therefore, the start of the Late Bronze Age cannot be unambiguously related to the introduction of a new set of material culture and customs. Rather, the time-frame bracketed by the traditional periodisation (1100-800 cal BC) can only serve as a crude chronological index against which various changes in material culture and human activities – that have different trajectories (*cf.* fig. 8.13) – may be plotted. An (less desirable) alternative would be to shift the start of the Late Bronze Age forward some centuries, but that implies the preference of one trait (*e.g.* funerary traditions) over several others (*e.g.* bronze- and ceramics typochronology, wherein nonetheless significant changes occur after the 11th century). Moreover, Van den Broeke (2005a, 479) states that 'according to the evidence currently available, no fundamental changes seem to have taken place in settlement patterns or the economy at the transition from the Middle Bronze Age to the Late Bronze Age.' (*cf.* Gerritsen 2003, 123). For a study of settlement dynamics, as much as for the occupants of 13th to 11th century BC settlements, no evident caesura need to have been present. Yet, I will argue below that, as far as settlement pattern is concerned, some fundamental changes may very well have occurred between 1100 and 800 cal BC.

7.4.2 Where have all the houses gone? Late Bronze Age settlement sites in the river area

After a phase during which – for the Dutch river area, or The Netherlands as a whole for that matter – relatively many settlement sites are known, a remarkable drop in the number of known settlement sites occurs for the 12th to 9th century BC, which is roughly the period of the Late Bronze Age.[150] While find-spots of finds datable to the Late Bronze Age are by no means scarce, they can rarely be interpreted as representing a Late Bronze Age settlement site. This is partly caused by the fact that some find-spots represent stray finds and that clear-cut Late Bronze Age settlement site elements are difficult to recognize in large-scale excavations. In this, the Late Bronze Age period finds a perfect parallel in the situation during the Early Bronze Age and Middle Bronze Age-A. For these periods as well, the majority of find-spots known concerns isolated finds or pits with finds mixed with materials from other periods. A more detailed study of the nature of the Late Bronze Age remains in the different macro-regions and the river area as a whole may shed light on the reasons behind the observed decrease of known settlement sites.

Late Bronze Age find-spots in the central river area

During the Late Bronze Age in the Zijderveld macro-region, the Zijderveld fluvial system's residual gully was reactivated (De Jong 1970-1971, 83; Van Zijverden 2003a) and new sedimentation took place on top of parts of the landscape previously occupied by Middle Bronze Age-B communities (Hulst 1967a, 7; Berendsen & Hoek 2005). This presumably rendered the area economically unattractive, although a single wooden stake that was radiocarbon dated to the Late Bronze Age, indicates that the area was not completely inaccessible (Knippenberg & Jongste 2005, 17; Appendix I).

A similar situation existed in the Eigenblok macro-region, where – presumably during the 12th century BC – the residual gully of the eponymous fluvial system was also reactivated by crevasse activity (Van Zijverden 2004a; Appendix II). Combined with subsidence and ongoing sedimentation (Jongste 2002b, 590) the suitability of the area previously used for habitation decreased beyond what was considered acceptable. As at Zijderveld, the usage of the (excavated) area seems to have changed, rather than that complete abandonment of the micro-region occurred. Hoof-imprints testify to use as pastures and the higher parts may have been converted into fields. Some burnt patches of

148 Kooi 1979, 131; Lanting & Mook 1977, 131; Lanting & Van der Plicht 2003, 214-215.

149 Lanting & Mook 1977, 137; Lanting & Van der Plicht 2003, 222-223. A single older date is known for the 'De Heibloem' barrow (GrA-19132: 2990 ± 45 BP; Lanting & Van der Plicht 2003, 222; Modderman & Louwe Kooijmans 1966).

150 Van den Broeke 2005a, 483; Jongste & Van Zijverden 2007, *cf.* Fokkens 2005d, 73 on a similar situation during the Late Bronze Age of West-Friesland.

unknown function may date to this period as well, while also for a handful of pottery fragments uncovered at the Eigenblok excavation, a Late Bronze Age date is forwarded (Jongste & Van Wijngaarden 2002; Appendix II).

In the De Bogen macro-region, several fluvial systems remained active during the Late Bronze Age (Van Zijverden 2002b, 67; 78; 2004b). Two larger fluvial systems (Erichem and Bommel; Appendix III) presumably recombined at the point of the De Bogen excavation, although the Meteren system south of this junction may have become inactive during the Late Bronze Age (Van Zijverden 2002c, 40; 2004b). The extensive crevasse splays that eroded and covered the previous Middle Bronze Age-B occupation traces, originated from one, or all of these three systems.[151] There is no accurate date for the start of this period of crevasse splay formation, so it may be that some of the features uncovered at the Late Neolithic to Middle Bronze Age-B level in fact dated to the Late Bronze Age. Presumably, the highest parts of the micro-topographic landscape were not even affected by sedimentation. For instance, one of the interments in the barrow at De Bogen site 45 (fig. 4.21, E) may very well date to the Late Bronze Age (Bourgeois & Fontijn 2008; Meijlink 2008). It remains remarkable nonetheless, that not a single clear-cut Late Bronze Age sherd was recognized during the various excavations (Appendix III). This could suggest that crevasse formation took place exactly during the (start of the?) Late Bronze Age. In any case, after a period of fluvial sedimentation, a more quiet period occurred as a vegetation horizon formed in the top of the new crevasse deposits and peat growth was dated to *c.* 1010-820 cal BC (Van Zijverden 2002b, 78-79; Appendix III). In some parts this vegetation horizon was preserved and showed cattle hoof-imprints (Van Zijverden 2002b, 68-69) and pottery classified as ‘Bronze Age’ (Appendix II, fig. III.36, no 995). As this layer stratigraphically overlies the Late Neolithic-Middle Bronze Age-B level, these sherds may represent the remains of a Late Bronze Age(-Early Iron Age?) settlement site, although the dating of the pottery is imprecise.[152] At this site as well, like at nearby Eigenblok, continued subsidence and sedimentation may have necessitated a change in landscape usage. To the former occupants, such a change may very well have been conceived more as a lateral shift, than as a categorical change: habitation sites may have shifted into use as fields, former fields may have been rendered into pastures and former pastures into areas of mud, peat or open water. None of these were new landscape types or uses for the occupants. It is their distribution that shifted, rather than change in landscape use in the strict sense.

Within the Wijk bij Duurstede macro-region, an avulsion of the Kromme Rijn from the Houten fluvial system took place around *c.* 1380-950 cal BC (Berendsen & Stouthamer 2001, 212; Van Zijverden 2004a). This led to the deposition of an up to 1 m thick sediment cover at the location of the previous Middle Bronze Age-B occupation at the site ‘De Horden’ (Steenbeek 1990, 67-70; 92; 188). Presumably, the absence of clear-cut Late Bronze Age finds from the Wijk bij Duurstede micro-region must be attributed to this prolonged period of sedimentation (Steenbeek 1990, 121-122).

At the Middle Bronze Age-B settlement site of Lienden as well, sedimentation covered (and partly eroded) the Middle Bronze Age-B settlement traces (Van Dinter 2002; Appendix V). New crevasse splays were most likely created by the Echteld fluvial system, whose sedimentation in the southern part of the Lienden macro-region starts around *c.* 1220-790 cal BC (Berendsen & Stouthamer 2001, 198; Van Dinter 2002, 50). While sedimentation and reactivation of the Westerveld fluvial system may have ended occupation on its levee- and crevasse deposits, the Lienden macro-region would not have been deserted completely. In the north, close to the still active Herveld fluvial system, some bronze objects and a flint sickle were found that may tentatively date to the Late Bronze Age (Willems 1981, 98; Hulst 1995). These finds were however not associated with traces that could be (indirectly) associated to a Late Bronze Age settlement site.

In the Dodewaard macro-region, two new fluvial systems may have become active at the end of the Late Bronze Age.[153] As no direct dates for their start of sedimentation are known, the date of *c.* 920-760 cal BC for the vegetation horizon that underlies floodbasin deposits attributed to these systems, provides a crude *terminus post quem* age (Steenbeek 1990, 233-237; Van Zijverden 2003b). This means that much, or in any case the higher parts of

151 See Van Zijverden 2002b, 64 fig. 3.2; Appendix III, fig. III.36.

152 Some pottery from the Middle Bronze Age-B/Late Bronze Age transition and start of the Late Bronze Age is of comparable fabric to that of the Middle Bronze Age-B (Arnoldussen & Ball 2007) which may explain the interpretation. A possible Late Bronze Age-Early Iron Age sherds was found at Geldermalsen - Middengebied (De Jager & Heunks 1998, fig. 7; Appendix III).

153 Wuustegraaf & Boelenham; Steenbeek 1990, 233; 237; Berendsen & Stouthamer 2001, 245-256.

the landscape accessible during the Middle Bronze Age-B, may have remained accessible up to the 9th century BC, although some water-level fluctuations in the floodbasin are documented.[154] Thus, it is no surprise that from three different locations in the Dodewaard micro-region, possible Late Bronze Age ceramics have been reported.[155]

In addition to the information obtained within the predefined macro-regions, the site of Tiel - Medel 8 has provided valuable information on the nature of Late Bronze Age settlement sites (Van Hoof & Jongste 2007). At this site, both Middle Bronze Age-B and Late Bronze Age settlement site elements have been recognized at the same stratigraphic level (*ibid.*). These remains are situated on levee or crevasse-splay deposits of the Zoelen fluvial system, which was presumably reactivated around the Middle Bronze Age-A (Van Zijverden 2007). During the Late Bronze Age, an active river system was found at 0.7 to 2.5 km to the south. An avulsion of the oldest phase of this system (known as the Bommel fluvial system) into the younger Echteld fluvial system took place around *c.* 1290-790 cal BC, *i.e.* during the Late Bronze Age (Berendsen & Stouthamer 2001, 198; Van Zijverden 2007). While the floodbasin to the south of the excavated site may have been flooded regularly during the Late Bronze Age, occupation – and economic exploitation – of the micro-region was evidently possible (fig. 7.15).

An important observation on the Late Bronze Age occupation traces at Tiel - Medel 8 is that they are deceptively similar to those of the preceding Middle Bronze Age-B occupation phase (Van Hoof & Jongste 2007). The recognized houses are mostly still three-aisled, and differ mainly by a less strict adherence to regularity in post-placement and a more confined length (*op. cit.*, 38-43). The granary-types of outbuildings are of comparable types and sizes, but appear no longer to be closely (conceptually and?) spatially associated with houses (*cf.* section 6.3.11). The remainder of the features dated by association to the Late Bronze Age, such as fences, pits, wells and stray postholes do not differ enough for them to be identified as Late Bronze Age in situations devoid of datable finds. This indicates that, from the perspective of settlement site analysis, Late Bronze Age settlement sites may be easily masked by, or misinterpreted as, settlement sites of different periods. Detailed (ceramic) typochronological studies and extensive radiocarbon dating may be the most readily available tools to facilitate correct dating.

Considering the fact that at Tiel - Medel 8 Late Bronze Age traces are ubiquitous and that no new fluvial systems emerge during the Early Iron Age, the absence of Early Iron Age traces at this site is in need of explanation. Presumably, the trajectory of the Echteld fluvial system closed-off (or at least significantly hampered) the westward drainage of the floodbasin to the south of the site. Therefore, reduced drainage may have led to stagnation and increased sedimentation in this floodbasin, as well as to a relative rise of the water-table. It is plausible that by the Early Iron Age, these processes combinedly rendered the exploitability of this area locally unsuitable.[156]

Intensified fluvial dynamics?

It is remarkable that the Late Bronze Age seems to have been a period of widespread increased fluvial dynamics. Within the Zijderveld, Eigenblok, Lienden and Wijk bij Duurstede macro-regions, crevasse splays were deposited on top of the areas occupied during the Middle Bronze Age-B, and in all but the latter case, an inactive residual gully was reactivated (*supra*). In the De Bogen macro-region a reorganization of the drainage structure occurred, which may have caused additional crevasse formation, but the highest parts of the micro-topographic landscape may have remained unaffected. At Tiel - Medel 8, and in the Dodewaard macro-region as well, only the lowermost parts of the micro-topographic landscape may have been affected, despite the emergence of new fluvial systems.

During the Late Bronze, an increase in the number of emerging fluvial systems in the central river area can be observed (Berendsen & Stouthamer 2001, 87-90 fig. 9.9, *cf.* Chapter 2, fig. 2.13, B). Possibly, increased bankfull discharge or increased within-channel sedimentation (as a result of decreasing gradients) or both combinedly were responsible for this increased avulsion rate (Stouthamer 2001, chapter 3). What exactly the trigger was for these processes remains unclear. A phase of climatic deterioration may have increased bankfull discharge, but this is

Fig. 7.15 (overleaf) Overview (A) and details (B, C) of the Late Bronze Age period structures at Tiel - Medel 8 (re-interpretation after Van Hoof & Jongste 2007).

a: not excavated, b: recent disturbances, c: presumed (filled features) and possible LBA structures, d: pits (light fill) and wells (dark fill), e: other features, f: find-spot of bronze socketed axe.

154 Steenbeek 1990, 175; 186; 194; Appendix VI, fig. VI.13.
155 Jongste 1997, 13-14; Peters 1999; 15; 19; Appendix VI, fig. VI.12.
156 Van Zijverden 2007, fig. 2.7; Van Zijverden, Jongste & Zuidhof *in press*.

thought to have occurred mainly after the Late Bronze Age.[157] Nonetheless, some recent studies have outlined the possibility of an increasingly wet climate near the end of the Middle Bronze Age-B and in the Late Bronze Age of north-west Europe.[158] Future research should target not only the exact chronology, but predominantly the local variations in, and severity of, claimed climatic deterioration (*cf.* Berglund 2003, 9).

157 Van Geel, Buurman & Waterbolk 1996a-b; Stouthamer 2001, 97; Van Geel *et al*. 2004, 1737. Note that the increase in numbers of Scythian sites, which is pivotal to Van Geel *et al*.'s argument is dated to 3000 BP (Van Geel *et al.* 2004, 1741; figs. 3-4), rather than as 'after 850 BC' and may be an artefact of research intensity or recognizability (Riehl & Pustovoytov 2006; *cf.* section 5.2.3.1 esp. fig. 5.12).

158 Dark 2006; Amesbury *et al.* 2008 and references therein, *cf.* Barber 1982, 110; Menotti 2002, 240 fig. 13.2; Berglund 2003; Tinner *et al*. 2003, esp. 1456.

Moreover, human factors may also have influenced river bankfull discharge. Increasing population densities and the woodland clearing associated with them in the upstream catchment areas of the Rhine and Meuse rivers may have increased bankfull discharge.[159] Deforestation reduces evaporation of rain and leads to increased surface runoff, the effect of which is most severe in the downstream delta (De Mulder *et al.* 2003, 231). Added to this increase in bankfull discharge (presumably by both climatic conditions and human interference), the drainage capacity of the Rhine-Meuse delta as a whole played a part. The number of coastal inlets through which the main rivers debouched decreased, which will have resulted in heightened groundwater tables, peat extensions and increased rates of floodbasin sedimentation (Stouthamer 2001, 187; Cohen 2003, 70-71; 97; De Mulder *et al.* 2003, 231). These factors all led to a quicker 'drowning' of marginal areas (*e.g.* areas prone to subsidence and sedimentation).

On the low numbers of known Late Bronze Age settlement sites in the river area

At this point, the difficulties in recognizing Late Bronze Age settlement sites in the river area may be summarized. First, the Late Bronze Age was a period of increased fluvial dynamics, which caused various avulsions and presumably intensified floodbasin sedimentation. Many former Middle Bronze Age-B settlement sites could be proven to have been affected by sedimentation during this period. In several cases, this sedimentation necessitated a change in landscape use and consequently a relocation of the domestic sites.

The options of where Late Bronze Age settlement sites could be located, may have been more limited than in the preceding period. Only few fluvial systems became inactive at the end of the Middle Bronze Age-B, which means that the number of relatively higher (*i.e.* less exposed to sedimentation) deposits was limited (fig. 2.13; Van Zijverden, Jongste & Zuidhoff *in prep.*). Nonetheless, excavations such as that of Tiel - Medel 8 show that locally, some parts of the formerly inhabited landscape could also be settled in the Late Bronze Age (fig. 7.15; Van Hoof & Jongste 2007).[160]

Additionally, research intensity and problems of preservation and recognizability may be important factors. The Late Bronze Age occupation is never targeted specifically, which means that most known finds concern stray objects or finds from small test-pits.[161] Preservation is also a problem, as finds-layers and vegetation horizons datable to this period are generally situated high enough to have been disturbed by modern ploughing (*e.g.* Van Zijverden 2002b, 69 fig. 2.5). Furthermore, I have argued that the nature of the settlement site elements and their association may have been less regular than in the Middle Bronze Age-B, which reduces recognizability. The post-configuration of houses was less regularly spaced (section 5.2.4) and no evident uniformity in orientation and placement of elements within (and between) house-sites can be outlined for this period (section 6.5, figs. 6.57-6.58). To put it otherwise: Late Bronze Age house-sites were not as strictly or visibly structured as those from the Middle Bronze Age-B and by the absence of corresponding orientation of houses and outbuildings, as well as by the larger number of outbuildings per house, they will be more difficult to identify on multi-period sites. Consequently, Late Bronze Age house- and settlement sites (or the houses on which these are centered) are difficult to identify outside the river area as well (section 5.2.4).

In any case, it should be stressed that no significant decrease in population should be assumed for the river area during the Late Bronze Age. The processes of avulsion (and crevasse- and floodbasin sedimentation) need to be evaluated at a local (*i.e.* micro-region) scale. Most likely, the intensified fluvial activity led to a fragmentation and/or contraction of habitation, rather than depopulation.[162] Moreover, as on most sites a (different) usage of the area can be outlined during the Late Bronze Age(-Early Iron Age) period, such relocation need not have involved movement at larger spatial scales (*e.g.* from the river area to the adjacent Pleistocene areas). Essentially, the "Late Bronze Age problem" (Van Zijverden & Jongste 2007; Koot *in prep.*) is more a problem of archaeological detectability than of *supra*-local prehistoric landscape crisis.

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159 Richard 2000; Berendsen & Stouthamer 2001, 103; Berglund 2003, 9; Mäckel, Schneider & Seidel 2003, 495; Dark 2006, 1392; Jongste & Van Zijverden 2007.

160 *Cf.* Louwe Kooijmans 1974, 114; Deunhouwer 1986, 147.

161 Van Zijverden & Jongste 200; Van Zijverden, Jongste & Zuidhoff *in prep.*; Appendices I-VI, *cf.* Louwe Kooijmans 1974, 364, no 28; 366, no 49; 367, no 52; 372, no 93).

162 *Cf.* Louwe Kooijmans 1974, 114 on a phase of reforestation on the Schoonrewoerd stream ridge at Molenaarsgraaf prior to the Early Iron Age.

Nonetheless, It will be clear that the very few Late Bronze Age settlement sites presently known hamper a discussion of settlement site dynamics for this period. New research should focus on recording the distribution and differences in site types and their use-lives by means of excavations with detailed chronological control in areas of adequate preservation conditions. In any case, concepts of what 'proper' house-sites should look like in the Late Bronze Age, seem to have differed from the Middle Bronze Age-B and were open to more variation. Even the roof-bearing structure of the farmhouses, which was previously least open to manipulation, now shows significant differences at several scales (section 5.2.4). However, without more detailed studies, the similar appearance and site location of the Late Bronze Age to the Middle Bronze Age-B occupation period may prove deceptive, as no detailed information on chronology, subsistence strategies and landscape usage is presently available for Late Bronze Age settlement sites in the central river area or beyond.

7.4.3 The Early Iron Age: much continuity and some changes?

The Early Iron Age is a period which is difficult to characterize as being distinct from the preceding Late Bronze Age. For many fields of human behavior, the remains uncovered do not differ categorically, or do not differ at all from the preceding period. The subsistence strategy appears to be broadly comparable and a mixed-farming strategy comprising livestock herding (still predominantly cattle) and crop cultivation (yet now also with linseed, gold-of-pleasure and more frequently millet) was dominant (Brinkkemper & Van Wijngaarden-Bakker 2005, 494-501). The urnfield funerary tradition continued in a similar vein as well, regardless of the different types of urns and objects interred and variations in barrow forms (Gerritsen 2003, 126, *cf.* Waterbolk 1985, 41). The common use of iron for weaponry after the 8th century BC (*op. cit.*, 605; Fontijn 2003, 171-172) and innovations in material culture such new pottery types (Waterbolk 1985, 39; Van den Broeke 2005b) therefore form somewhat arbitrary handles for the start of a new period. While the types of houses change around the late 9th and 8th centuries BC to a type distinctly different to those of the preceding periods (fig. 5.31),[163] the types and associations of settlement site elements did not differ categorically from the preceding (Middle- and?) Late Bronze Age.[164]

As for the settlement dynamics, Early Iron Age settlement sites are rarely discussed in their own right. Rather, the settlement dynamics of this period are most frequently part of more long-term narratives spanning the Bronze- and Iron Age periods.[165] The most salient frequently outlined difference with Bronze Age occupation is the facts that for this period farmsteads (exclusively?) wandered and sometimes returned to previously used locations (Schinkel 2005, 524) and that the larger number of known urnfields suggest a demographic expansion (Gerritsen 2003, 200; 238-239; but see table 8.4). Additionally, it may have been during this period that the 'celtic field' systems took on their typical appearance with raised (and cultivated?) banks (Gerritsen 2003, 167-180; Spek *et al.* 2003, esp. 167). Gerritsen (2003, 173, 226-231) sees the dynamic and extensive use of plots within celtic fields and the soil-degradation in loam-poor sandy areas as important motives for the wandering of farmsteads during this period. But do such ideas also apply to the Dutch river area, where celtic fields are not found and soil-depletion need not have applied (section 3.4.4)?

Early Iron Age sites in the Dutch central river area

Several of the macro-regions saw habitation during the Early Iron Age. At Zijderveld, a single farmhouse and an outbuilding could be radiocarbon dated to the Early Iron Age, but presumably more features and structures such as fences may date to this period (Theunissen & Hulst 1999b; Appendix I, fig. I.21). The occupation took place on top of the deposits overlying the Middle Bronze Age remains (Hulst 1967a, 7) and the pottery suggests a 7th century BC return of habitation (Theunissen & Hulst 1999b, 174). At that time, no fluvial systems were active in the Zijderveld macro-region, but some flooding by the Buren system east of the macro-region may have occurred (Van Zijverden 2003a). The Early Iron Age house was situated on the highest parts of the excavated micro-topographic landscape and spade-marks at similar locations may suggest agricultural use (Hulst 1967a, 7; 18). There is also evidence to

163 Type Een/Kleuvenveld or Ussen-2 (section 5.2.5). These houses are generally shorter (< 20 m; fig. 5.32, A), have entrances opposed midway in the long sides and posts placed outside the walls that carried part of the roof-burden.
164 *Cf.* Schinkel 1998, 168 fig. 148; 177 fig. 157; Gerritsen 2003, 103 fig. 3.33.
165 *E.g.* Schinkel 1998, 167-179; 2005; Gerritsen 2003, 242-244.

suggest that similar higher locations on long fossil levee deposits (Arnoldussen & Van Zijverden 2004) as well as available aeolian dunes were possibly used for habitation.[166]

In the Eigenblok micro-region, floodbasin sedimentation as well as incidental crevasse splay formation occurred during the Early Iron Age (Van Zijverden 2002a; 2004a). One sample from a residual channel of such a crevasse was dated to *c.* 740-410 cal BC (Jongste 2002a, 36; Appendix II). Nonetheless, parts of several sites were accessible, as posts from sites 2 and 5 could be radiocarbon dated to the Early Iron Age (Jongste 2002a, 35). At Eigenblok site 2, a six-post structure was erected at the transition to a more peaty and lower lying part of the floodbasin, where also an area was burnt and a large pit with some Early Iron Age ceramics was uncovered.[167] These remains, and several others from the Eigenblok macro-region, suggest a human presence although no clear-cut settlement sites can at present be outlined (Appendix II, fig. II.18). Presumably, such sites may be situated just outside the excavated areas (*ibid.*).

Sedimentation and crevasse splay formation may also have continued in the De Bogen macro-region during the Early Iron Age (Van Zijverden 2002c, 40), which may explain why no Early Iron Age finds are known from the various De Bogen excavations. A similar situation may have existed in the Lienden and Dodewaard macro-regions. In the Lienden macro-region, continued sedimentation and reactivation of the Westerveld residual gully was caused by the active Echteld system (Van Dinter 2002, 48). In the Dodewaard macro-region, combined sedimentation by the Herveld, Wuustegraaf and Boelenham fluvial systems covered the previously accessible areas.[168] Nonetheless, fluvial activity need not imply human absence in all parts of the macro-region. For example, the various find-spots in the wider De Bogen macro-region indicate that fluvial systems which had become inactive relatively recently, supported Early Iron Age activities in various parts.[169] However, within the excavated parts of the De Bogen, Lienden and Dodewaard macro-regions, the areas of limited or absent fluvial sedimentation were presumably too small or too discontinuous to be profitably used for agriculture and habitation during the Early Iron Age.[170]

In stark contrast, the Wijk bij Duurstede - De Horden excavations have yielded traces of presumable Early Iron Age habitation and funerary use on top of the former Middle Bronze Age-B settlement site area (fig. 5.16; Hessing 1989; Appendix IV). The urnfield ditches (deliberately?) overlapped with the location of the possible Bronze Age barrow (fig. 7.16, A, *cf.* fig. 4.28). The Iron Age features were dug into a vegetation horizon that had formed in the top of the (thick) crevasse splay deposits (Steenbeek 1990, 70; 118; 132). Throughout the Early Iron Age, the nearby (< 500 m) Kromme Rijn system remained active but apparently did not render occupation impossible.[171]

To sum it up, the evidence from the different macro-regions indicates that a diverse spectrum of locations was used during the Early Iron Age. Both long fossil levees (*e.g.* Culemborg - De Heuvel; Arnoldussen & Van Zijverden 2004) and relatively young crevasse splay deposits (overlying older deposits, *e.g.* at Wijk bij Duurstede and Zijderveld) were suitable settlement site locations. If local conditions were characterized by low fluvial dynamics (*i.e.* none to normal (floodbasin) sedimentation) occupation could take place at close distance to active fluvial systems (*e.g.* at Wijk bij Duurstede). In other areas, where more dynamic conditions prevailed (*e.g.* at Lienden and Dodewaard), circumstances may have been perceived as unfavorable to Early Iron Age habitation. Nonetheless, in such locations, as well as in locations where only small areas may have been left unaffected by sedimentation (*e.g.* Eigenblok), other types of landscape use than habitation may still have taken place. The available data suggest a flexible, maximizing and tailored strategy of landscape use that is perhaps akin to that of the Middle Bronze Age-B (section 7.3).

166 De Kok 1965, 122; Louwe Kooijmans 1974, 115; 370-371). Since this pottery was not dated more precisely than 'Iron Age', an Early Iron Age date must remain tentative.
167 Remarkably, a post datable to the Middle Bronze Age-B was also recovered from this pit (Hielkema, Prangsma & Jongste 2002, 106-108; Appendix II, fig. II.19, d).
168 Steenbeek 1990, 180-188; 194; Van Zijverden 2003b.
169 De Jager 1996, 11-13; Hulst 1994, 72; Appendix III, fig. III.37.
170 From both the De Bogen (Hielkema, Brokke & Meijlink 2002, 160; 185-187; 210-211; 225; Milojkovic & Smits 2002; Gehasse & Leijnse 2002) as well as from the Lienden macro-region (Siemons 2001, 82-90; Wiepking 2001, 143; 148) indications of Middle Iron Age activities are known.
171 Berendsen & Stouthamer 2001, 212; Hessing & Steenbeek 1990; Appendix IV.

Fig. 7.16 Overview (A)of the (Early) Iron Age habitation and urnfield at Wijk bij Duurstede - De Horden in relation to prior MBA-B occupation traces and two details (B-C).

a: not excavated, b: distribution of Early Iron Age structures, c: distribution of Middle Bronze Age-B structures, d: extent of Early Iron Age urnfield, e: Early Iron Age ditch system, f: Early Iron Age structures.

7.5 Settlement site dynamics and dynamics landscapes: a summary

In this chapter, different types of dynamics affecting Bronze Age occupation have been discussed from a long-term perspective. I have argued that differences in settlement dynamics must be evaluated against the differences and different dynamics of various geogenetic regions (horizontal plane) as well as against the (chronologies of) cultural processes of change (vertical plane). Essentially, for particular periods, answers to questions like 'how were which parts of the landscape used differently within the respective settlement system?' can only be properly understood in relation to landscape use and settlement dynamics of preceding and ensuing periods. Therefore, this chapter has started with a discussion of (models for) Neolithic settlement dynamics.

For the Middle Neolithic period, only limited information is available. I have suggested that a lack of targeted research into the Middle Neolithic usage of fluvial systems may be at the heart of this. In addition, the relatively deeper position of such fluvial systems indicates that they have been both more prone to later fluvial erosion, and also that the detectability of finds and finds-layers from this period is poorer compared to later periods. Nonetheless, there are indications that the levee and crevasse deposits of active fluvial systems were used, yet probable settlement sites can at present only be indicated on long fossil levees and on the aeolian river dunes (fig. 7.10).

During the Late Neolithic period, a wider range of landscapes (of different fluvial dynamics) can be proven to have been used. The diversity and numbers of remains recovered from crevasse splay deposits belong to, or located in the direct vicinity of, active fluvial systems suggests that such locations were intensively used, possibly as settlement sites. Presumably, such activities also took place on crevasse splay deposits whose inlet-channels were blocked relatively soon after initial formation, as well as on stacked crevasse splays that were less prone to subsidence. The fact that houses cannot easily be identified for this period, complicates the interpretation of these sites as settlement sites. In addition, several of the sites discussed in this study have also seen later (continuous?) use, which complicates the study of settlement site(dynamic)s in isolation. Consequently, even *if* indicators of settlement use duration (*e.g.* zoological seasonality indicators) are discovered, their applicability is frequently low.

As to the different types of sites, I have argued that preconceived notions of 'what Neolithic habitation should be like' may have overly steered interpretative frameworks for pre-Middle Bronze Age-B settlement site remains (figs. 7.2; 7.6). The importance of hunting as a subsistence strategy may have decreased significantly after the Middle Neolithic, and the examples for logistic site types such as fishing camps all originate from outside the river area. Nevertheless, the interpretation 'special activity site' has been assigned to several pre-Middle Bronze Age-B find-spots that were either (1) confined in spatial size or (2) thought (otherwise) to have been used only briefly. Unfortunately, some of these sites have not seen more extensive excavation, and others proved hard to distinguish from 'normal' settlement sites. Despite the weak evidence, I have suggested (fig. 7.6) that such additional (*e.g.* logistic-, extraction-) sites may very well have existed for Neolithic and Bronze Age periods alike. Their presence is by no means doubted, but it is their exact nature (*e.g.* qualitative and quantitative importance, duration of use(s)) that still needs to be investigated. At present, information on such sites within, and even outside, the central river area is limited and would benefit from targeted research. Only if based on factual observations, can the role of such sites in the settlement dynamics for different periods be veritably assessed.

During the Early Bronze Age the types of locations used and the nature of this usage does not seem to have changed fundamentally from the Late Neolithic. The recognition of individual settlement site elements remains as problematic as before, and the diagnostic pottery is rarely found in contexts that allow features or structures to be dated to the Early Bronze Age with certainty. Nonetheless, the diversity and quantities of remains uncovered at Molenaarsgraaf and De Bogen suggests that settlement sites were in any case situated on long fossil levee- and crevasse splay deposits. The frequent presence of Early Bronze Age remains in areas of different fluvial dynamics (especially crevasse splay deposits near, or next to active systems) need not have differed in nature, but this has not been investigated extensively enough to be certain. A paradoxical situation exists in that diagnostic pottery is easily recognized (leading to large numbers of sites known in various types of landscapes), while the nature of the occupation and settlement dynamics at large are essentially unknown for this period (and the two neighboring periods as well).

The scarcity of known (possible) settlement sites (and knowledge on their dynamics) only increases during Middle Bronze Age-A. For this period, only a single tentative settlement site location can be outlined (fig. 7.10). This is all the more remarkable as (continued) usage of several sites is suggested by radiocarbon dates. Two factors may be at play here. First, the nature of the Middle Bronze Age-A settlement site elements must be discussed. It is clear that Middle Bronze Age-A settlement site elements share properties with preceding periods (*e.g.* irregularly in plan) that render them archaeologically invisible, especially on palimpsest sites. Consequently, settlement site elements cannot easily be outlined for this period. Second, at locations more distant from the near-coastal areas (*cf.* sections 5.2.2 and 7.2.4.1) the quantitative presence of diagnostic pottery is very low. Only very few fragments decorated in the typical Hilversum-style (table 5.1) are found at the various settlement sites. Possibly, the central river area was a periphery to a coastal centre of gravity and the tradition of decorating pots in this fashion (or even the pots themselves?) percolated slowly and never dominantly into other areas. The point I want to make here does essentially not concern the distribution of the typical pottery, but rather that this must have been a period of low-diagnostic pottery in most regions of the Netherlands. Much of what is considered Middle Bronze Age-B or generic 'Bronze Age pottery' may thus in theory date to this period. Evidently, only detailed research involving refined absolute dating strategies can shed light on the nature and dynamics of Middle Bronze Age-A sites in the river area and beyond.

With the start of the Middle Bronze Age-B, settlement sites can be outlined in various landscapes of different fluvial dynamics in the Dutch river area (fig. 7.10). This is predominantly a consequence of better recognizability of the settlement site elements (Chapter 5), but more intensive and targeted research (sections 1.6-1.7), as well as better preservation conditions (furthermore increasing detectability; section 2.7.4) are important factors as well. The ubiquitous presence of settlement sites in a variety of fluvial landscapes suggests an adaptive and maximizing strategy of land use. To put it otherwise: most available areas which could sustain occupation, appear to have been settled.

These settlements comprised possibly several contemporaneous houses, which were spaced evenly within a system of land-division set up by fences. At the settlement level, a shared system of (bi-axial, perpendicular) orientation to which the houses, fences and outbuildings conformed can frequently be outlined. Presumably, at some sites the orientation of this system may have been inspired by features of the micro-topographic landscape, such as topographic gradients or the orientation of residual gullies.

At the level of the house-site, several elements reflect an attitude to prolong occupation on particular spots. Structural properties such as the post-configuration, dimensioning and orientation were generally retained when houses or outbuildings were rebuilt (sections 6.4-6.5). In some cases, houses were even rebuilt more than once (fig. 7.7). Moreover, detailed campaigns of radiocarbon dating suggest that occupation of individual Middle Bronze Age-B house-sites may well have spanned five decades (section 3.4.2). Once constructed, houses are rarely overbuilt by other houses also dated to the Middle Bronze Age-B, which suggests – yet does not prove – contemporaneity of multiple houses and the fact that the singular domestic use of plots was respected in the long-term. Consequently, the fact that at most house-sites still only one house-phase is present, need not indicate the frequent wandering of farmsteads. Rather, their typological similarities, shared (biaxial) orientation and close proximity suggest that agglomerations of houses (*i.e.* hamlets or small villages) may have existed. The house-sites were part of a single system of land-parcelling and land-use communicated spatially by the fences. Such systems seem to extend for over hundreds of meters (yet presumably not several kilometers), and physically integrated plots usable for habitation, crop-cultivation or as pastures into settlement site space (*cf.* fig. 7.9, B; section 8.2.1). The detailed dynamics of domestic mobility (particularly periodicities) of and within such possible agglomerations of house-sites, need to be studied in more detail with extensive dating strategies. In addition, I have argued that there is significant regional variation in the ways in which multi-period house-sites developed between the different geogentic regions of The Netherlands (table 7.2). Finally, the nature, usage(s) and importance of logistic sites in general, but for this period in particular, is in need of more detailed study.

During the Late Bronze Age, a period of increased fluvial dynamics affected the delta as a whole. Avulsions were common and widespread and sedimentation by new systems, new crevasse formation and residual gully re-activation occurred at the locations of former Middle Bronze Age-B habitation in most of the macro-regions (Stouthamer 2001, 88 fig. 3.7; Appendices I-VI). Excessive and/or prolonged sedimentation in the already compartmentalized, mosaic, micro-topographic landscapes (*cf.* fig. 7.12) may have rendered the agricultural exploitation of these landscapes unacceptably difficult or even impossible. Some areas may have been completely abandoned, whereas others witnessed a change – or more precisely; a shift – of landscape use. It is important to stress that the local impact of *supra*-local effects such as the increased number of avulsions, will have differed significantly between the macro- and micro-scales. For example, the presence or absence of older deposits, whether they are more or less prone to subsidence, or the size and drainage possibilities of the floodbasin areas next to occupied areas, all affect the degree and timing of landscape changes. The fact that at Tiel - Medel 8, occupation took place both in the Middle Bronze Age-B and the Late Bronze Age (fig. 7.15) will hopefully be proven by future research not to have been a unique case. Nonetheless, it should be stressed again that only few fluvial systems cease their activity prior to the Late Bronze Age, compared to during the previous period (fig. 2.13). This means that the spatial distribution of Late Bronze Age remains may be more confined than those of the Middle Bronze Age-B. Whether this also corresponds to a demographic change, remains to be seen (*cf.* section 8.3.2). The less rigid landscape structuring, the less strict associations between houses and outbuildings, the increased diversification in house plan structure and poorer preservation conditions all affect the recognizability of settlements from this period. The much smaller range of landscape types that appears to have been used (fig. 7.10), may be an under-representation.

Within the river area, the Early Iron Age occupation appears unrelated to that of the preceding Bronze Age in several aspects. First, a new type of house emerged that may have been perceived as a radical break from the tradition of building relatively long houses (with short-side entrances). Second, sedimentation on top of the Bronze Age occupation traces is likely to have completely (Wijk bij Duurstede) or partly (Eigenblok, Zijderveld) masked and/or destroyed the pre-existing landscape parcelling structures and settlement site elements. To put it more simply; the slate had been wiped clean. This implies that a new settlement site structuring, with new house-types and other axes of orientation could develop. At sites where no full covering or destruction by pre-Early Iron Age sedimentation took place, the remains from older periods may have remained partly visible. This may have caused a crude correspondence in orientation of the parcelling systems and/or houses (*e.g.* at Zijderveld), or the re-use of older materials (*e.g.* at Eigenblok). In addition to the occupation of such 'fresh' landscapes, the excavations at Culemborg - Den Heuvel have shown that the highest parts of some already centuries old fossil fluvial landscapes could still be used for habitation (Arnoldussen & Van Zijverden 2004).

In short, the long-term overview of settlement dynamics offered in this chapter has shown that the evidence available for analyses of the interplay of cultural-, landscape- and settlement dynamics in the Dutch river area is still rather limited for several periods. While for the Middle Neolithic a limited research intensity is the most influential factor, the low recognizability of houses severely affects studies of Late Neolithic to Middle Bronze Age-A settlements. Only for the Middle Bronze Age-B is the data set of sufficient size and quality to start to address more specific problems of settlement dynamics. I have shown that several arguments argue against the exclusive validity of the 'wandering farmstead'-interpretation of Bronze Age settlement dynamics in the river area. At the end of the Middle Bronze Age-B and the transition to the Late Bronze Age, a combination of increased cultural- (*i.e.* changes in the nature of settlement sites) and fluvial dynamics (*i.e.* increased discharge and avulsion rate) decreases the detectability of settlement sites in the river area. During the Early Iron Age, increased fluvial stability facilitated habitation and settlement sites are known in somewhat larger numbers again. Unfortunately, for nearly all periods, the lack of chronological resolution and seasonal indicators assigned to individual use-phases, hamper a discussion of the duration and permanency of use of different types of sites. In short, much work still needs to be done.

8 Synthesis: a living landscape

8.1 Introduction

This chapter provides a synthesis of the data and interpretations offered in this study. It aims to answer the question why the Dutch river area – particularly during the (Middle) Bronze Age(-B) – should be labelled a 'living landscape'. This calls for a narrative in which data on geological properties of the river area (Chapter 2), known settlements (Chapter 4) and specific analyses of the general nature (Chapters 5-6) and dynamics (Chapter 7) of Bronze Age occupation is recombined. This involves analyses focussed on understanding the interplay of the various different arguments put forward in this study, but now at an interpretative scale surpassing that of the preceding chapters. Instead of targeting particular settlement site elements, their interplay or long-term settlement dynamics, in this chapter I aim to characterize the essential elements of the Bronze Age cultural landscape in the Dutch river area and the communities present in it.

This entails a narrative in which technical observations on – physical properties – of the Bronze Age cultural landscape are supplemented by more interpretative comments on the societies at hand. I will argue that the essential property of the Bronze Age cultural landscape is (the process of) categorization. Taking examples from the structuring of house-sites and settlement site space, I will show that landscape parcelling may have been instrumental in achieving a physical compartmentalization of space. However, I will also show that while such landscape structuring may seem extensive and uniform, Bronze Age societies by no means cloned pre-defined 'templates' onto blank landscape canvasses . Rather they were knowledgeable landscape 'readers' that incorporated or sometimes even copied landscape traits in the (archaeologically visible parts of their) cultural landscape. Moreover, I will argue that the process of categorisation may have played a significant part in the spatial separation of the domestic, funerary and ritual domains of Bronze Age societies. Monumental burials, long-term deposition zones and settlements seem to have occupied distinctly different places in the cultural (dynamic) landscape.

The study of object deposition may help to identify and map the distribution of such spatial domains. Therefore, in this chapter attention is paid to patterns of object deposition. In this, not only the often studied metalwork from 'wet' places in the landscape is discussed, but particular attention is given to the evidence for depositional activities within settlement sites and the categories of material culture that figure most prominently in them (*i.e.* pottery, querns and animal skulls).

At the close of this study, I will finally deal explicitly with the characterisation of the Dutch river area as a Bronze Age 'living landscape' and discuss some directions for future research. In these final sections, comments and suggestions are provided that may help academics, field archaeologists as well as heritage professionals to better identify, protect and study Bronze Age settlement sites from the Dutch river area.

8.2 The Bronze Age cultural landscape

The essence of the (Middle) Bronze Age(-B) cultural landscape is in the new ways and scales in which landscape use was compartmentalized. However, there is eminent risk in assigning inappropriate significance to the most (archaeologically) visible parts of the cultural landscape. Nonetheless, it is clear that the extent and ways in which the areas around Bronze Age settlement sites were parcelled and integrated into settlement site space, differed distinctly from preceding periods.

8.2.1 A man-made landscape: the role of fences

The excavations executed at Meteren - De Bogen, Rumpt - Eigenblok and Zijderveld have all provided vivid examples of the extent to which space in and around settlement sites was parcelled with fences (*cf.* figs. 4.19, 5.45-5.46). The nature of these fence-systems has been labeled bi-axial, as the majority of fence-lines are generally orientated parallel or perpendicular to a dominant axis of landscape structuring. Natural phenomena, such as the orientation of residual gullies or levee deposits, may have determined or influenced the orientation of such dominant axes of orientation. Generally, the lack of datable material and limited spatial extents of the excavations, do not allow investigation of whether such systems started as a single-axis (*i.e.* strip) parceling, to which sub-divisions by perpendicular fence-lines were later added, or whether they were bi-axial from the start. The fluidity of such systems should also be stressed, and at all sites various fence-lines can be reconstructed that, because of their deviating orientation or curvilinear trajectory, cannot be interpreted as evidently belonging to a single bi-axial system. In addition, it is generally difficult to recognize individual plots within such systems of fences.

This near absence of identifiable plots is an important observation. First, it may indicate that in the processes of creating and defining settlement site space, confining plots seems not to have been the primary aim. Only very rarely do curvilinear trajectories of fences suggest that they were intended to enclose a particular plot from the start (*cf.* fig. 5.47). In this aspect, Middle Bronze Age parceling strategies differ markedly from later prehistoric 'celtic field' systems, in which there appears to be a more rigid and uniform strategy of creating roughly square *c.* 20 to 40 m plots.[1] Moreover, this implies that delimiting house-sites was not the reason for the creation of such systems in the first place (section 6.5). Second, another reason why no identifiable plots can readily be recognized may be the fact that the parceling systems are multi-phased. Especially at De Bogen (fig. 4.19) and Zijderveld (figs. 6.26-6.27), it is clear that fence-systems were reconstructed over time. While the limited durability of exposed small-diameter softwood stakes may have necessitated upkeep (table 3.8), it seems that rebuilding rather than repair was the common solution. The nature of the systems (*i.e.* a bi-axial system of fences using both single- and double stake types of fences) does not appear to change between phases, although the orientation is sometimes (slightly) different and the location can be off-set by several meters. The presence of such reconstruction phases explains the close (*e.g.* at 10 m or less) proximity of parallel fences, such as at Zijderveld (fig. 8.1), which – if considered contemporaneous – seem to be placed impractically close to each other for agricultural uses. Moreover, repeated rebuilding of fences may have led to dense bundles of fences like those present in parts of the Zijderveld (fig. 8.1) or Enspijk (fig. 7.14) excavations.

Although Middle Bronze Age fence-systems may have defined particular plots for agricultural use and have *de facto* delimited some Middle Bronze Age-B house-sites, I have argued that such functionality was not the prime or sole reason for their construction. Evidently, considerable effort was made by Bronze Age communities to create and maintain very extensive fence-systems (spanning areas of several hundreds of meters) that physically connected to, and shared orientation with house-site elements. Such systems may have been primarily about integrating the wider environment into settlement site space. Had only purely practical motives to fence-off areas been at play, a system in which – piece by piece – different plots were fenced and used could have functioned just as well. However, this option was not chosen. Rather, a tangible mark was made on an extensive area, presumably from the very start of habitation. These fence-systems were presumably not constructed as claims of ownership or functional (pre)destination, although both may very well have been conveyed after construction.

Probably, such fence-systems were essentially about the domestication of space. From the very start of landscape occupation, Middle Bronze Age communities deemed it necessary to leave a human mark on an area that was much more extensive than that of individual farmsteads (*cf.* section 6.5). It may hint at the fact that these communities strived to render physical an ambitious aspiration to acculturate space (*cf.* Lovell 1998, 72; Field 2001, 59). Possibly, Bronze Age communities considered it important to convey to 'others', that the former (if any) human use of the landscape was to change, and that this change was to be carried out by their hands, in agricultural modes. Such 'others' are more likely to have been supernatural entities encountered in – and bound to – the yet 'wild' land, or mythical and ancestral entities, rather than humans. If in Bronze Age agricultural communities any anxiety existed over perceived boundaries at the border of settlement site space (as often documented in non-industrial societies, *cf.* section 5.5), they seem to have been keen on placing such boundaries at considerable distances from their houses. The fence-systems may have legitimized (change of) use of the landscape in non-legislative ways: they may have been used to carve-out a domain in which humans were to be the dominant and authoritative dwellers, as opposed to areas outside settlement site space where non-human, mythical or ancestral beings may have been perceived as being more prominently represented. If interpreted along such lines, the parceling of space was a necessary element

1 Spek 2004, 142; *infra*. See Bakker (*et al*. 1977, 194 fig. 7; 214-222); Reichman (1982, 438 fig. 2); Hagers (*et al*. 1992, 73 fig. 5b); Harding (2000, 162 fig. 4.15); Van der Velde (2008, 162 fig. 2) for examples of the shapes (often rectangular, possibly with rounded corners) of possible Bronze Age fields, often of uncertain age. Sizes of Bronze Age fields range between *c.* 0.07 ha (Noordwijk, EBA; Van der Velde 2008, 162 fig. 2) and *c.* 4-6 ha (Hoogkarspel, LBA; Bakker *et al.* 1977, 218), but surface areas of *c.* 0.10 to 0.17 ha seem more common (*cf.* Reichmann 1982, 438 fig. 2; Harding 2000, 162 fig. 4.15 on LBA(-EIA?) fields).

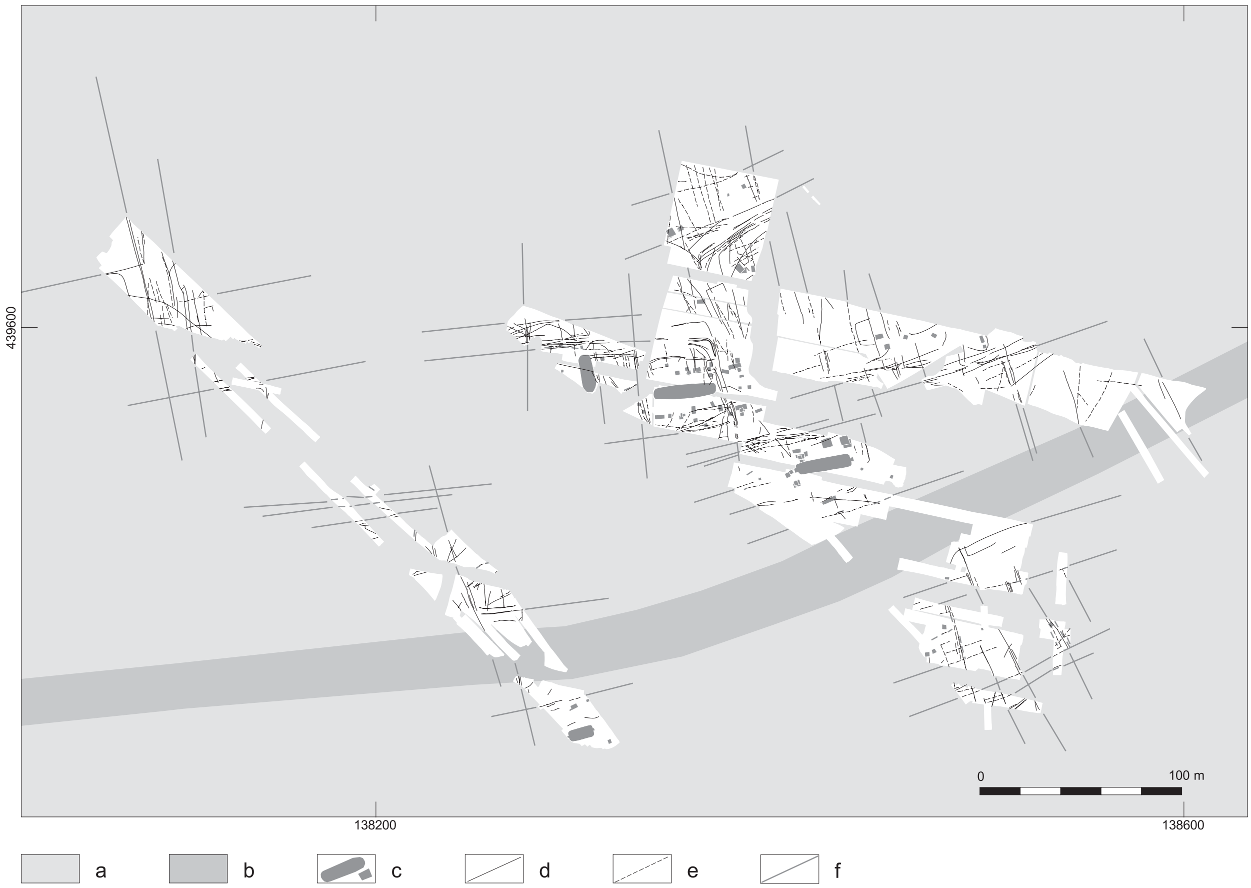

Fig. 8.1 Fence lines and hypothetical continued trajectories and Middle Bronze Age houses and outbuildings at Zijderveld.

a: not excavated, b: location of Zijderveld fluvial system's residual gully, c: Middle Bronze Age houses and outbuildings, d: single stake-type fence, e: double stake-type fence, f: hypothetical fence trajectories.

or prerequisite of the agricultural strategy, as it was crucial to the well-being and fertility of crops, people and livestock confined within it. The functional purposes of such systems, such as the definition of plots for cattle to be penned, as field boundaries or to ward-off livestock, were complementary to such more ideational reasons for their construction.

Unfortunately, several aspects of such Bronze Age parceling systems are still poorly understood. The evolution and internal chronology of these systems are particularly in need of detailed study, but preservation conditions rarely allow for extensive campaigns of absolute dating. For example, it is unknown whether certain stretches of fence were constructed first, or relatively early (prior to houses?) and to what extent they may have guided later filling-in or expansion of the fence-line systems. Even extensive excavations such as at Eigenblok or Zijderveld have not been successful in mapping the limits of such systems. In any case, they appear to span areas over 300 to 400 m in size. If the orientation of houses and fence-systems is anything to go by (section 6.4.3), the different orientation of houses at Eigenblok and at De Bogen (fig. 6.15) suggests that such systems did not bridge the four kilometers that separates these sites.[2] I have suggested that this need not be a consequence of feasibility, but that the orientation of fences – and the houses and outbuildings within it – may have been deliberate community (boundary) markers during the Middle Bronze Age-B (*cf.* fig. 6.30). Another comparatively unknown property is

2 *Cf.* Field (2001, 59), who argues that individual Bronze Age field systems in the United Kingdom usually cover areas of 4 km length by 2-4 km width.

the density of house-sites and other settlement site elements within such systems (*cf.* fig. 8.4). Due to the frequently confined or fragmentary extent of the excavation trenches, it is often clear that fence-systems continue, but unclear whether house-sites were present there as well (*e.g.* in the western trenches at Zijderveld; fig. 8.1). This can only be investigated by more extensive excavations in areas with adequate preservation conditions.

To conclude, it should be emphasized that the nature of this land-division system is something that appears to be typical of the Middle Bronze Age(-B) cultural landscape in the Netherlands. While fences and fence-line enclosures from the Neolithic are known (Waterbolk 1960; Hamburg & Louwe Kooijmans 2006), they are distinctly different from those of the Middle Bronze Age. The Neolithic use of fences may have been predominantly about delimiting and defining small parts within the (cultural) landscape. Neolithic fence trajectories are frequently rounded to curved and sometimes correspond to the distribution of finds. They are thus more about 'encircling' and 'setting apart' a (domestic) site. The Middle Bronze Age fence-systems, by contrast, convey notions of 'division' and 'integration'. Thus, while technically comparable, this may be a contrast between an inward and an outward perspective. To relate such different perspectives to different agricultural uses of (*e.g.* manuring), and/or perspectives on, the vicinity of domestic sites is difficult (Arnoldussen & Fontijn 2006) and in need of more detailed study. A discussion of when exactly such fence-systems came into being is complicated by the low numbers of settlement sites known for the Early Bronze Age and Middle Bronze Age-A (sections 5.2.1-5.2.2; 7.2.3-7.2.4). A comparable problem occurs with the Late Bronze Age, for which again comparatively few settlement sites are known (sections 5.2.4; 7.4.2). No comparable fence-systems have been uncovered on Late Bronze Age sites thus far. The closest parallels in space and time may be the 'celtic field' systems known from the Pleistocene areas, whose exact chronologies are as yet still poorly understood (Spek *et al.* 2003; Gerritsen 2003, 167).[3] In short, while the fence-systems described above are typical for the Middle Bronze Age-B cultural landscape,[4] one should be hesitant to altogether dismiss their presence beforehand in directly preceding and ensuing periods.

8.2.2 The nature and distribution of Middle Bronze Age-B house-sites

One of the main goals of the present study was to investigate the nature of Middle Bronze Age house-sites. I have argued that using an ill-defined 'farmstead' concept (*i.e.* using it as shorthand or catch-all terminology for settlement site remains) leads to a hollowing-out of its associated meanings (section 3.2.2). In addition, I have suggested that archaeological conceptions of prehistoric farmsteads may partly have been derived from inordinate analogies with (sub-)modern farmsteads (section 1.2; *cf.* Brück 1999a, 64). As a way out, the technique of 'Visual Analysis of Spatial Overlays' was forwarded as a tool to compare Middle Bronze Age house-sites and test specific hypotheses based on established notions of what the nature and dynamics of such house-sites were (presumably) like (Chapter 6). While this technique (VASO) facilitates comparability and does answer certain – as yet poorly investigated – properties of prehistoric house-sites, it also has several limitations.

To start, the chronological resolution is often poor, which means that the data set is prone to distortion in the case of multi-period sites. Consequently, it is also hardly informative on the internal evolution of house-sites. For example, questions like 'Which elements were first established, and in what order were repairs and replacements undertaken?' cannot be answered. The VASO results do, however, clearly show distinct spatial patterning (*e.g.* the preferred placement of features or structures, conformity of orientation within and between house-sites) and frequency of occurrence (*i.e.* correlation) of specific settlement site elements on house-sites. Yet by and large, the

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3 In any comparison of (Middle) Bronze Age fence-systems to the 'celtic fields', it is important to stress the differences in intentionality and causality. Whereas Bronze Age fence-systems appear to have been structures that were principally intended as landscape parcelling features (*i.e.* literally *landscaping*) and for which the delineation of plots for agricultural use presumably was a complementary or secondary aspect, the form and extents of 'celtic fields' boundaries are presumably more intrinsically – *e.g.* by cycles of crop-rotation and regeneration, manuring and gradual extension (Gerritsen 2003, 172-178 and references therein) or a combination of such factors – related to their function as crop-fields. This is a again a contrast between an outward (*i.e.* landscaping, integrative) versus an inward (*i.e.* enclosing, agricultural function) perspective.

4 *Cf.* Harding 2000, 151; Evans & Knight 2001, 85; 91 and references therein; Yates 2007 (and references therein), esp. (dating) evidence discussed for fences on pages 16; 25; 38; 61; 70; 93; 98; 112; Marcigny & Ghesquière 2003. See also Clay (2006, 16) for a fence-line field system in the United Kingdom dated to *c.* 1390-1040 cal BC. Older (*e.g.* Late Neolithic; Britnell 1982; Johnston 2005, 8) fence-systems are found in the United Kingdom as well (but see Yates 2007, 141).

way in which house-sites functioned in the wider agrarian economy of the Middle Bronze Age communities remains poorly understood. Nonetheless, some important observations can be made.

First of all, this study has shown that delimiting structures such as surrounding ditches and fences that are typical to (sub)modern house-sites, are generally absent from Middle Bronze Age house-sites in the Dutch river area. Only in incidental cases (fig. 5.47), have fences been used to deliberately gird house-sites. For the ditches encountered at some Middle Bronze Age house-sites in the study area, their drainage function was most important and they seem to have been *placed on* – rather than to have *defined* – house-sites (section 5.6). In this aspect, the Middle Bronze Age occupation in the river area differs from that on the creek-ridge landscapes of West-Friesland. There, particularly at the end of the Middle Bronze Age-B and start of the Late Bronze Age, ditches are more common and ditch-systems seem to be present between and around individual house-sites (section 5.6, *cf.* figs. 5.53; 7.8). Considering the fact that in the river area preservation conditions were adequate, it is evident that archaeologically visible boundaries of house-sites, were not part of the Bronze Age mental template of 'what house-sites should look like'. But what does this mean?

In any case, discussions of property and ownership are moot points. To infer communal ownership of (settlement) land from the absence of parceling structures is myopic. Not only may such boundaries very well have been present but not archaeologically visible, but I have also given several examples of boundaries (in non-industrial societies) which are enforced, yet partly to fully notional.[5] Conversely, from the documented fence-systems (*supra*), no private land-ownership can be inferred. Essentially, ideas on ownership of land are hardly archaeologically visible and may have ranged (in scale) from personal, household, kin group, local community to ancestral ownership, and may be expressed differently depending on the context.[6] The absence of individual house-site delimiting structures and the integrative and extensive nature of the fence-systems that incorporate multiple house-sites, suggests that land was not owned, used or worked by single households. I would argue that life at Middle Bronze Age settlements was not so much *focused at*, but certainly *based on*, coping with the risks inherent to the agricultural strategies and the landscapes in which they were played out. Such risks were perhaps best shared.

This is no nutritional determinism, but simply it stresses the fact that risks were minimized and solutions sought to maintain living in specific landscapes in the long run, and to facilitate the execution of tasks and activities that Bronze Age communities may themselves have considered more important or pleasurable than the ongoing work of mixed-farming. Moreover, I have argued that the proximity of helping hands, whether related by blood or not, may have been vital to the success of (particularly starting) agricultural households. For example, without the initial sowing grain, exchanges of breeding stock or extra hands offered during harvesting or house construction, coping would have been much harder to impossible (*cf.* section 3.4.1). The fact that in the Dutch river area (and in West-Friesland) during the Middle Bronze Age-B agglomerations of house-sites develop (Chapter 4, *cf.* fig. 7.9) presents a conundrum. If we assume that the areas around houses were put to agricultural use (be it as gardens, fields or pastures) there is less surface area available at close proximity in the case of house-site aggregation. Ergo, was the proximity of helping neighbours a prerequisite for sustained (agglomerated, nucleated) occupation, or conversely, were the agricultural yields sufficient to allow for such agglomeration? The truth is presumably situated midway between such extremes of sociological and ecological determinism. Moreover, I have argued that the distribution of clustered house-sites need not be confined to the river area and West-Friesland. Several sites in other geogentic regions yielded multiple house plans of comparable type and orientation within a single settlement site, which may suggest contemporaneity (section 7.3.6, esp. note 144).[7] But are such agglomerations from different regions comparable?

The agglomerations in the river area stand out in analyses of the house-site use-histories (as do those in West-Friesland and the coastal area; table 7.2). Houses on Middle Bronze Age-B house-sites in the river area were rebuilt quite frequently (*c.* 10-17 %; table 7.2). As I have shown that wood-decay need not have necessitated rebuilding during at least two (to three?) human generations of use (section 3.4.2), this rebuilding reflects intentions

5 See this study page 251, note 267; 329 note 96.

6 Bloch 1975; Fokkens 1999, 34; Gerritsen 2003, 114; 179-180, *cf.* Roymans & Kortlang 1999, 40; Brück 2000, 282; Earle 2002, 326-327.

7 Due to poorer preservation conditions in the other regions, it is frequently unclear whether systems of fences were present there that may have steered or bound properties (*e.g.* orientation or placement) of house-sites like in the river area.

to prolong occupation of particular house-sites in the long-term. This attitude of 'we are here to stay' is vividly illustrated by the house rebuilt three times at De Bogen site 30 (fig. 7.7, *cf.* Van Regteren Altena, Buurman & IJzereef 1980, 30). Moreover, I have argued that the sedimentological (*e.g.* nutrient composition and drainage; sections 2.5 and 3.4.4) and topographic (*e.g.* mosaic and gradient-rich; section 7.3.4) properties of the fluvial landscapes that these communities settled, may have been ideal for the combined and interdependent crop-cultivation and livestock herding that formed the core subsistence strategy (fig. 7.11; Louwe Kooijmans 1993a, 104). It is this close proximity of active water courses, excellent pastures and crop-field locations that may have been the main factor attracting Middle Bronze Age occupation in the central Dutch river area. The rebuilding of houses (and other arguments for the long-term use of house-sites; sections 3.4.2, 6.4.2 and 7.3.2) and possibly also the agglomerations of house-sites indicate that a successful agricultural strategy must have been in place.

But what about the other regions? For example, what does the much less frequent occurrence of rebuilt houses and larger distances in-between houses in the southern coversand areas indicate? It is tempting to interpret this as reflecting a different system of settlement dynamics, related to differences in subsoil. Put provocatively: are some of these house-sites on the Pleistocene soils attempts at bringing a landscape under cultivation that could (locally?) not sustain (prolonged?) clustered occupation? A mode of exploitation in which after a single occupation phase the house-site was relocated beyond the depleted soils, would indeed result in a pattern of more widely spaced, single phased house-sites. Here I verge upon ecological determinism and there are various points that have to be kept in mind. First, such interpretations assume that some of the social or agricultural pillars upkeeping everyday life could not be maintained in the long run. Soil depletion is commonly forwarded as a possible culprit, but the local severity and applicability of this phenomenon is in need of further study (section 3.4.4). Alternative, or complementary, factors like the absence of suitable meadows, nearby farmhands or difficult exchange of breeding stock may also have been more problematic. Perhaps it is thus no coincidence that in the very extensively excavated (over 50 ha) coversand area north of the town of Oss, the (single-phased) Middle Bronze Age house-sites are all confined to a zone directly bordering the river clay area (fig. 8.2; Jansen & Arnoldussen 2007). This was a zone that (like the levee- and crevasse deposits of the central river area) was graded and thus offered different vegetation types close-by, with grazing grounds near the Meuse precursor and with possibilities for crop-cultivation on the higher sandy parts at close distances.

Yet, some more pitfalls remain. Not only is the subsistence strategy known for (and from) wetland areas extrapolated to include the upland areas,[8] but Bronze Age local communities are also robbed beforehand of the flexibility to adapt subsistence strategies. While the subsistence strategies within the river area (and from other wetland areas; Clason 1999; Arnoldussen & Fontijn 2006) are reasonably uniform, direct data from upland sites are much needed. In addition, it should not be overlooked that the wider inter-house distances and smaller numbers of multi-phased house-sites may just be the result of regionally different settlement dynamics. For comparison, the extension of houses like that which occurred at the end of the Middle Bronze Age-B in the north-eastern Netherlands, is also regionally specific (table 7.2). Possibly, future research will also show the dominance of multi-phased house-sites in the (near-)coastal areas to be an equally regionally specific pattern (*ibid.*). In such regional variations of what proper house-site use-life was (*e.g.* single phased, houses extended or rebuilt), cultural traditions are reflected. House-site processes such as relocation or rebuilding may have been valued cultural (community) traits, rather than compulsory reactions to technical limitations posed (*e.g.* soil depletion, wood decay). This may serve as a warning against overly (mis)interpreting the river area (and West-Friesland), where rebuilding of houses was frequent, as a 'Garden of Eden' whilst characterizing the Pleistocene regions as areas where only single-phased experiments in marginal locations took place. For example, the rebuilt houses of Sittard-Hoogveld (Tol & Schabbink 2004, 23 fig. 13), Venray (fig. 5.19, D) or Colmschate house 8 (Verlinde 1991, 34 fig. 3) show that outside the Holocene areas, particular locations were also used for sufficient time and/or with sufficient success to warrant the rebuilding of the farmhouses.

Having discussed in somewhat more detail the regional differences in the use-life and spatial proximity of house-sites above, let us now return to another fundamental question: can Bronze Age farmsteads be identified and if so, what was their essence? I have already made clear above that, as far as the physical aspects of Middle Bronze Age

8 For which little direct evidence on, for instance, livestock spectra is known, *cf.* Arnoldussen & Fontijn 2006, 308.

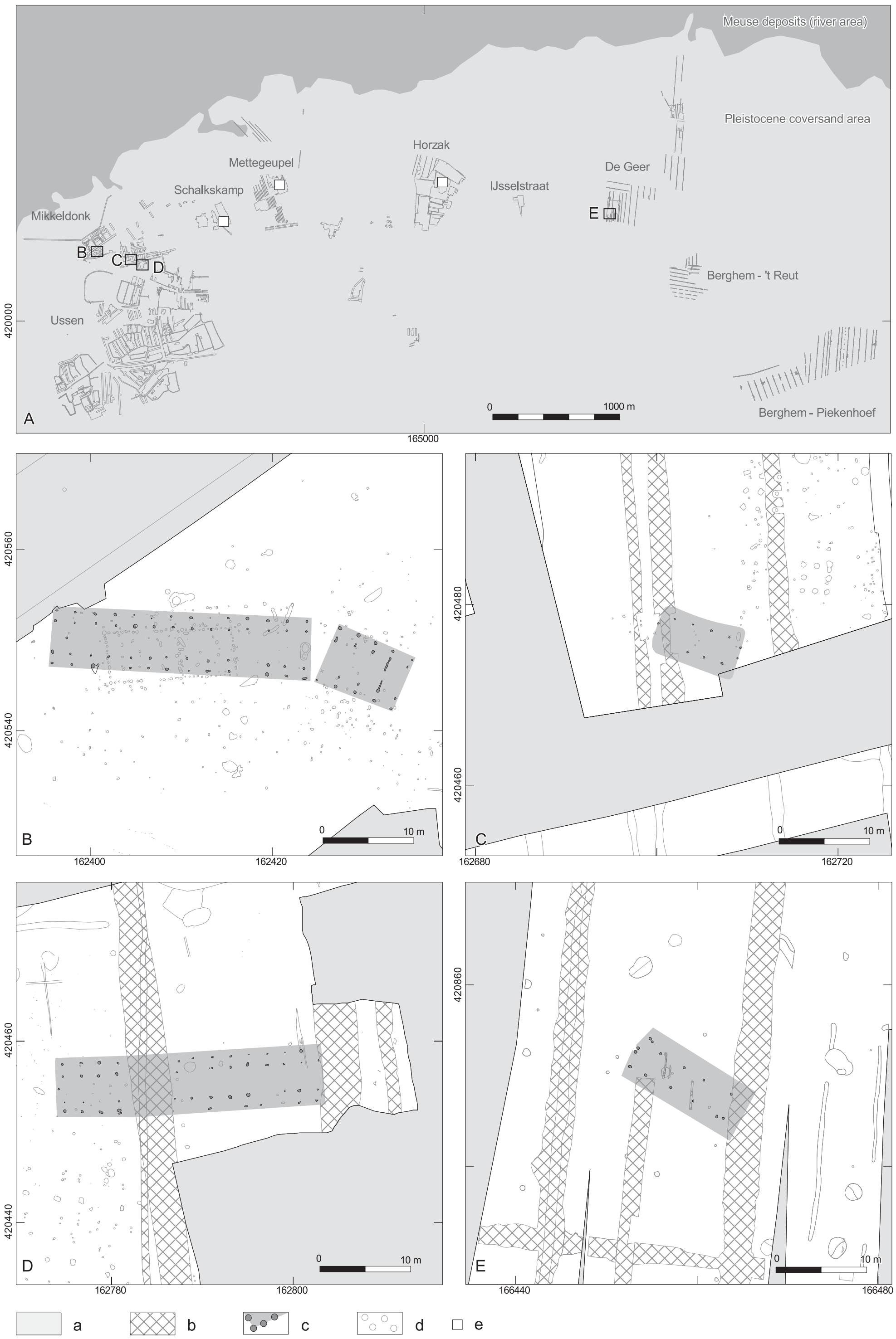

Fig. 8.2 Overview (A) of the location of Middle Bronze Age house-sites to the north of Oss in relation to the physical landscape and detailed views of the house-sites (B-E), after Jansen & Arnoldussen 2007, 31 fig 7.

a: not excavated, b: recent disturbances, c: Bronze Age structures, d: other features, e: concentrations of Bronze Age features and/or finds.

house-sites are concerned, delimiting features were presumably not a constituent part of them. Under the scrutiny of VASO, disappointingly few typical elements of Middle Bronze Age house-sites in the Dutch river area could be outlined. I have shown that besides their defining houses, only the granary-type outbuildings can be understood as being constituent parts of the house-site (section 6.4.2). Such outbuildings are generally found at short distances from the houses (fig. 6.20), conform to them in orientation (fig. 6.37-6.56) and retain their type of ground plan, placement and orientation in relation to the house if rebuilt (fig. 6.17). There is sometimes correspondence in placement of outbuildings in relation to houses between different house-sites within a settlement site (fig. 6.12), but the variation is considerable. If compared for all house-sites between different settlement sites, this variation remains. Yet still, it is far from arbitrary: granary-type outbuildings were commonly placed next to the long sides of farmhouses and somewhat distant from the farmhouse's 'corners' (fig. 6.14; outbuildings). Whereas the exact placement of outbuildings may have initially (*i.e.* upon house-site construction) been open to individual (*i.e.* household) choice, this was no longer the case when rebuilding, nor was it considered appropriate to place them at large (> 35 m; fig. 6.22) distances from the farmhouses. This latter norm was apparently shared between settlement sites (in the river area), whereas the rules of exact placement on the house-site, were open to manipulation at settlement site and household level.

No other settlement site elements are as strongly associated with Middle Bronze Age farmhouses in the river area as are the granary-type outbuildings. The presence of larger (barn/shed) types of outbuildings is infrequent, and they show much internal variation and no evident structural or spatial relations to the houses (section 5.3). Pits, which are frequently claimed to have been used (secondarily) for the disposal of rubbish near the houses, generally contain few finds (sections 5.7 and 6.4.4). Moreover, their distribution is generally bound to settlement site space rather than to individual house-sites (*ibid.*, *cf.* fig. 6.10). Within this broad distribution, the density of pits appears somewhat higher on the highest parts of the micro-topographic landscape (*e.g.* section 6.3.9; figs. 6.31-6.32), which may have resulted from an initial use that required dryer soil conditions (*e.g.* storage, processing of organic materials?). Only in incidental cases, do pits occur in a spatial association to farmhouses that allows us to postulate that they were once part of the house-site (*e.g.* fig. 4.24). Wells too did not prove to be principle Middle Bronze Age house-site elements. While some evidently did occur on house-sites, wells are also frequently found in clusters beyond them.[9] As such clusters can span from the Late Neolithic to the Bronze Age in date, either oral traditions or above-ground phenomena (such as visible depressions of the surface and – more probably – vegetation) must have given clues to the occupants as to where good accessible aquifers were located. Such recurrent placement of wells in particular parts of the landscape illustrates that Bronze Age communities did not simply force mental templates of 'proper' house-site or settlement site structuring onto blank landscape canvasses, but rather that landscapes were 'read' by knowledgeable readers.

Some other examples of possible landscape reading and referencing have been brought to the fore in this study, such as the corresponding orientation of fences (and houses) at Zijderveld and Enspijk to nearby residual gullies (figs. 7.13-7.14) or the trajectory of the possible Middle Bronze Age ditch south of Wijk bij Duurstede - De Horden (fig. 5.55). Here too, the options for manipulation of placement are specific for different elements: pits and wells may have been more bound to (different) specific landscape locations, and this relation (largely for practical reasons?) overruled any benefits or preferences of having such features on every house-site. Yet, by contrast, similar 'reading' of the micro-topographic landscape *could* have been used to place houses along landscape gradients or aligned to the shape of the highest parts of the micro-topographic landscape, but this was almost never the case (section 6.4.1). Clearly, in general, house orientation was bound by rules that outweighed 'practical' or landscape (morphology) conforming placement, and the conformity of the dominant axes of fence-systems to those of the houses at some sites suggests that this set of rules applied (by cross-referencing?) to both. One can assume that the construction of the first 'correctly' orientated fence-line or house on a settlement site would have been a highly conspicuous event, presumably involving specialists, rituals and criteria beyond the reach of direct archaeological observation.

9 Wells on house-sites; *e.g.* fig. 6.38, B; D; fig. 6.40, D; fig. 6.44, D, wells beyond house-sites; *e.g.* fig. 4.16, F-G and at Tiel - Medel 8; De Leeuwe & Van Hoof 2007.

By arguing that fences, barns, pits and wells were presumably *not* constituent elements of house-sites,[10] have we perhaps reduced the contents of Bronze Age farmsteads to something which bears little meaning? To put it more simply: should we not speak of 'house and granary' interrelations, rather than of 'farmsteads'? I feel that the former may be too analytical and not in line with Bronze Age notions, but direct evidence is limited. Yet, the correspondences between the distributions of outbuildings (fig. 6.22), that of finds in cases of adequate preservation (fig. 6.36) and the distances between farmhouses (table 6.3), suggest that a zone of 10 to 40 m around the farmhouses was used differently from other areas within the settlement site (section 6.5). But does this zone classify as a farmstead?

For analytical purposes, I have forwarded a definition of farmsteads as an interpretative label for structured farmhouse environments.[11] While Middle Bronze Age house-sites were placed *within* a structured environment (section 8.1), the placement of granary-type outbuildings on house-sites seem to be the single ubiquitous structuring *on* house-sites detectable archaeologically. It is for archaeologists among themselves to debate whether such structuring is enough to legitimize the use of interpretative labels such as 'farmsteads'.

Moreover, to what extent are prehistoric structured house-sites comparable to (sub)modern farmsteads? The literature on historical and modern farmsteads is extensive, diverse and regionally specific (Chapter 6, note 3). Much attention is devoted to (the regional specifics of) construction histories and types of buildings, the (changes in) garden usages and the spatial distribution of gender-specific activities and functionalities (*ibid*.). These are aspects that can only be studied from an archaeological perspective with great difficulty. Nonetheless, they all relate to the essence of historic and (sub-)modern farmsteads as activity areas for domestic and agricultural tasks. This is one of the key problems with the 'farmstead' as an archaeological term. Archaeology has taken a concept that not only derived from a domain of knowledge which is based on observative and historic research, but moreover a concept that *within* that domain is concerned with relations between architecture and the spatial distribution of human behavior, both of which are topics rather than data sets in archaeological research. Therefore, the functional logic that steered the placement and functions of buildings, vegetation and open areas on historic farmsteads (*cf.* section 6.3.1) can only be used as a tentative analogy for prehistoric farmsteads. The premises underlying, and the specific applicability of, such analogies warrant caution and more detailed study. Agricultural strategies, household composition (*cf.* section 3.4.1) and domestic tasks may have differed significantly.

In particular the farmstead boundaries typical to (sub-)modern farmsteads must be understood within a modern system of inheritance and land ownership, which I have argued above is unlikely to apply to prehistoric notions of tenure.[12] It is no coincidence that the word 'farmstead' and its Dutch counterpart *erf*, both have an etymology referring to legislative aspects of property taxation or transmission.[13] Archaeology is perhaps better off using concepts that tie-in with and spring from the data sets available, such as the house-site concept (section 3.2.2), instead of cross-disciplinary cherry-picking of a concept that differs so much in research methodology, research aims and connotations. For archaeologists the question should not be: 'Were Bronze Age house-sites like (sub-)modern farmsteads?', but 'What were Bronze Age house-sites like?'.

In this review of the nature and distribution of Middle Bronze Age house-sites, one final point needs (again) to be emphasized. The patterns of house-site structuring have nearly exclusively been investigated for the Middle Bronze Age-B. To argue that this is a consequence of the more difficult recognition of houses during preceding and ensuing periods (sections 5.2.1, 5.2.2 and 5.2.4) – while true – would be to miss the point. Although for the preceding Early Bronze Age and Middle Bronze Age-A the number of known settlement sites is indeed low, they nonetheless show a different form of settlement site structuring. Standardization of house construction seems not to have mattered, human and animal burials on settlement sites were more common and the extensive bi-axial fence-systems, regular houses and associated outbuildings typical to the Middle Bronze Age-B, are absent (*cf.* Arnoldussen & Fontijn 2006). The role of settlement sites within the cultural landscape will have been different (*e.g.* more nodal,

10 Which is not the same as stating that they were never house-site elements, but rather that these were not *constituent* elements (*i.e.* a *condicio sine qua non*).

11 *Cf.* section 3.2.2, see section 6.2 for a comment on the concepts of 'structure' and 'order' in this context.

12 See also Johnston (2001, esp. 100-103) for an anthropologically informed view on tenure in Bronze Age contexts.

13 Oxford English Dictionary Online 2007, 'farm'; Philippa, Debrabandere & Quak 2003, '*erf*', *cf.* Kotchemidova 2003; Huijbers 2007, 89-91.

Fig. 8.3 Overview of the barrow, houses and outbuildings at Elp (after Waterbolk 1964, pl. 1; 1987).
a: not excavated, b: recent disturbances, c: postholes associated to houses, d: pits associated to houses, e: other features, f: graves.

i.e. a stronger spatial contraction of agricultural and domestic tasks) but the timing and sequences of how this changed into the later Middle Bronze Age-B cultural landscape (*infra*) is ill-understood and deserves further study.

For the Late Bronze Age period as well, some changes in the nature of the house-sites can be observed, despite the comparatively poor data set. The discovery of a settlement site used in both the Middle Bronze Age-B and the Late Bronze Age at Tiel - Medel 8 (Van Hoof & Jongste 2007), offered the rare opportunity to compare house-site structuring between these periods, without the problems of comparison otherwise posed by geographic differences and distances, a different excavation methodology or different preservation conditions. Essentially, the *elements* of Late Bronze Age house-sites are from an archaeological perspective comparable to those of preceding periods. The observed reasonably long, mostly three-aisled houses, granary-type outbuildings, pits and wells all compare well to those of the Middle Bronze Age-B. Their *interrelations*, however, are markedly different.

The formerly relatively strict spatial proximity and conformity in orientation between farmhouses and nearby outbuildings is lost (*cf.* fig. 6.55 versus fig. 6.58). In addition, a much larger number of outbuildings in relation to the number of houses can be observed, which are more widely distributed across settlement site space (*e.g.* fig. 7.15, *cf.* section 6.4.2). Moreover, the orientation of houses and rules of spatial avoidance within a single settlement site were possibly more open to manipulation (*cf.* fig. 7.15). While comparable type-1a fences (and palisades) are still found, they are no longer part of extensive, bi-axial systems comprising comparatively straight fence-lines. Type-2 fences do no longer occur (section 5.5). When (and why) exactly these aspects changed is again ill-understood, but data from sites where similar patterns occur,[14] such as at Elp (fig. 8.3), may lead to speculations whether these changes may have already started during the last (two?) centuries of the Middle Bronze Age-B.

8.2.3 Separate domains? Categorization in the Middle Bronze Age cultural landscape

In the sections above, much attention has been paid to the structure of Middle Bronze Age-B settlement sites and the house-sites within them. At this point, the role of settlements within the wider cultural landscape is addressed. Such a discussion must first deal with a fundamental problem: where to situate the boundaries of Bronze Age settlement sites.

8.2.3.1 Settlements; their boundaries and occupants

While I have argued in favour of the contemporaneity of a number of Middle Bronze Age-B houses at settlement sites in the river area (*supra*), I have also shown that the fence-systems within which they are placed, extend over hundreds of meters (figs. 4.19, 7.12 and 8.1). As the areas more distant from the houses have generally not been excavated in full, it remains unclear whether any house-sites are present there. Therefore, two scenarios can be forwarded. Either extensive fence-systems are present, within which (in some parts) house-sites were accommodated (fig. 8.4, A), or alternatively, the presence of fence-systems is bound by the distribution of house-sites (fig. 8.4, B).

The current data on this topic, because of the limited spatial scale of most excavation, is inconclusive. On the one hand, the absence of house(-site)s in the western- and easternmost parts of the Zijderveld excavations suggests the former scenario (fig. 8.1), while on the other hand, the high density of house(-site)s and extensive fence-systems at De Bogen (fig. 4.19) possibly ties in better with the latter scenario. The continued in-filling (*i.e.* compartmentalization), extending and adaptation of the initial (long?) axes of orientation of the reaves at Dartmoor, may provide an analogy for the former scenario.[15] In any case, the boundaries of fence-systems around Middle Bronze Age houses need not to be found within several hundreds of meters from the farmhouses. Arbitrary choices where exactly ‘the settlement’ ended may be made by distance from the houses, by the presence, absence or densities of features or structures (*e.g.* no more outbuildings), but such approaches perhaps bear little relevance to past behaviour, or are prone to error in palimpsest situations.

Particularly fields, livestock enclosures and pastures may have been perceived as ambiguous areas. There, human impact – as far as archaeologically visible (*i.e.* the subsoil penetrating activities) – may have been limited, save

14 *E.g.* more and spatially less strictly related outbuildings, overbuilding of houses.

15 Johnston 2005 and references therein; *cf.* Harding (2000, 153) who states that ‘…there is little indication that Bronze Age fields were ever laid out with any kind of master plan in mind.’. He also (*loc. cit.*) states that strip-cultivation is a logical mode for oxen-ploughed fields (yet see *op. cit*, 156; 158).

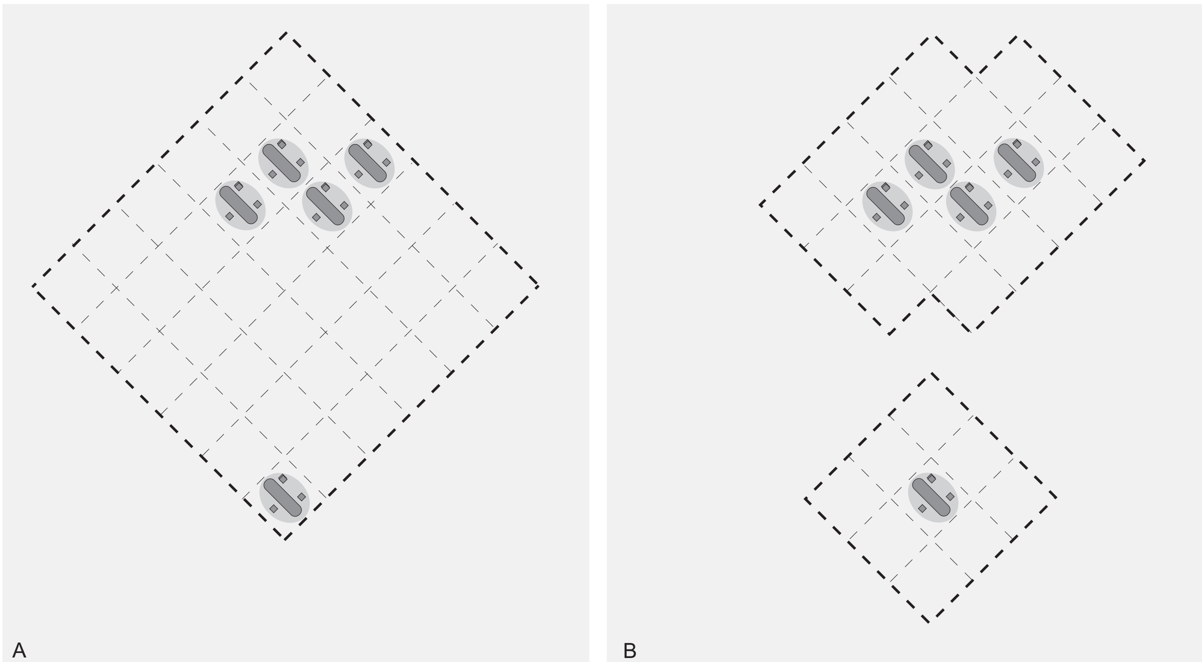

Fig. 8.4 Schematic interpretation of the possible causal relations between the distributions of house-sites and fence-systems during the Middle Bronze Age-B in the Dutch central river area. The houses may be situated within a singe encompassing fence-system (A, limits set by fences) or the distribution of fences may be steered by that of the houses (B).

for fence-lines and ard marks in places with adequate preservation. Were these locations conceived as a separate zone in the cultural landscape, set apart from settlement sites and uncultivated and relatively unaltered lands? Presumably this was indeed the case, but direct evidence is absent. However it seems probable that the different uses of these plots merited a different classification in the minds of the Bronze Age dwellers.[16] The functions and perceptions of different plots may moreover have been fluid and convertible. Perhaps the extensive fence-systems were instrumental in maintaining or facilitating such fluidity and changeability. While in one sense a classificatory problem (*i.e.* where to draw a boundary?), I have argued that it is exactly this integrative nature of the built-up part of settlements, and the fluidity of boundaries that it implies, that characterizes Middle Bronze Age settlement sites in the river area. However, even such extensive systems will have had limits, and possibly ditches served as community boundaries at the scale of several hundreds of meters (*supra*; figs. 5.54-5.55; fig. 7.8). But how was such communality expressed?

Although I have argued that co-existing Middle Bronze Age-B farmsteads may have been present in the Dutch river area, the joint participation in social and agricultural tasks that frequently underlie definitions of ‘villages’ (section 3.2.1) or ‘local communities’ (section 3.3.3), is hard to substantiate archaeologically. Nonetheless, the fact that five different axes were involved in the woodworking of a single nine-post granary-type outbuilding at Zijderveld (Knippenberg & Jongste 2005, 123) may suggest the involvement of more than a single household.[17] Again, I have already suggested earlier that cooperation may have been one of the pillars of fully autarkic small-scale agricultural communities (section 3.4.1). One might even suspect that socio-economic inequalities may be evened-out or suppressed in such communities with high degrees of interdependency.

16 *Cf.* Field 2001, 60. In addition to purely practical usage, one may wonder whether these locations were also considered to be different from house-sites or settlement sites in cosmological frames of references, for example due to the presence of (other?) entities or deities affecting cycles of fertility and regeneration. Considering that cattle skulls may have carried particular ritual significance (*infra*; section 8.2.3.10; fig. 8.10; table 8.2), it is at least valid to consider whether the locations in the landscape where the livestock was brought to (*e.g.* pens, fields, pastures) may also have held a ritual significance considered to be different from other locations.
17 The uncertainty of household composition (section 3.4.1, *cf.* Huijbers 2007, 249-257) and the possibility that a single person could possess five different axes, need of course to be taken into account.

Bronze Age societal structure

It is therefore remarkable, that for the southern Scandinavian Bronze Age settlement sites – which are comparable in nature, dynamics as well as in the scale and methodology of their archaeological investigation to those of the Low Countries[18] – a distinctly hierarchical structure is thought to be reflected in settlement sites.[19] There, a framework of interpretation centered on the presence of chiefly elites has been elaborated on since the nineteen-eighties, particularly by Kristiansen and Earle.[20] For instance, from such a perspective, size differences in farms are interpreted as directly reflecting a hierarchical society (Earle 1997, 29; 2001, 114; Kristiansen & Larsson 2005, 279). For example, Earle states that: 'We can assume that the larger houses were warrior and chiefly farms and smaller ones were commoner or perhaps cottager farms.' (Earle 2002, 305). Considering the similarities in Bronze Age settlement site data, does this mean that Dutch archaeology has failed to recognize clues for social stratification, or might it be that approaches to settlement site data and social structures are fundamentally different for both regions? I will argue below that the latter scenario is the more probable of the two.

8.2.3.2 Chiefs, farmers or farming chiefs?

In order to explore the potential of the Dutch Bronze Age settlement site data for information on social stratification, the arguments (and data sets) underlying the conclusions for the – particularly Danish – data must be understood. To start, several interpretations are seen as being in support of the interpretative framework of "chiefly warriors", or in more general terms, Bronze Age social stratification. The first is the observation by Kristiansen (1984) that the associations and use-wear patterns on flange-hilted and solid-hilted swords in funerary contexts may reflect two social categories; that of chiefs (whose solid-hilted swords were more fragile, lavishly decorated and hardly used) and warriors (whose flange-hilted swords appear more battered and sturdy; Kristiansen 1984). Second, the large farmhouses uncovered at Bjerre in the context of the Thy project, at Bdrd. Gram and Legård are – because of their larger than normal size and the presence of stalls – interpreted as chiefly halls.[21] Third, it is assumed that by intensifying livestock rearing – which created surplus available for bartering – chiefs could rise to power and extend access to, and control, the import and skillful production of bronzes (especially swords), the redistribution of which sustained warrior retinues.[22] Fourth, this social stratification is reflected in mortuary rituals, in which (warrior)chiefs have more, and more lavish grave gifts (which are, or reference, supra-regional symbols of elite rulership) than warriors, yet both were entitled to interment in (larger) barrows.[23] I shall now discuss some of these points in somewhat more detail and consider whether they also apply to Dutch Bronze Age societies.

Considering the different contextual associations and artefactual evidence such as resharpening traces, it may very well be that full- and flange-hilted swords underwent different life-trajectories. The lavish decoration of full-hilted examples suggests that they figured more prominently as items of display and may have been prestigious possessions, although they too often show traces of more bellicose use (Kristiansen 1984, 195; 198). The crucial distinction is whether this difference should be interpreted as reflecting two distinct social *rôles* of chiefs and warriors, as Kristiansen (*op. cit.*, 198) proposes. Starting from the archaeological dictum that the dead do not bury themselves, grave good assemblages reflect a culmination of actions by the bereaved that illustrate, or are determined by, their relations to the deceased as well as by actions intended to reflect or communicate a (real, ascribed or fictitious) identity of the deceased (*e.g.* Parker Pearson 1999, 83-94). Consequently, caution is warranted in interpreting grave goods, like swords, as invariably and directly reflecting personal ownership and social categories. Even *if* certain grave goods may hint at distinct social roles such as that of warriors, it does not inform us on whether this role was indeed fulfilled by the deceased during life, or whether this role was desirably stressed or ascribed to that individual

18 *E.g.* Jensen 1993; 2002, 104-124; Bertelsen *et al.* 1996; Fabech & Ringtved 1999; Borna-Ahlkvist 2002; Gröhn 2004; Streiffert 2005; Lagerås & Strömberg 2005; Arturrson 2005a-b.

19 *E.g.* Earle 1997, 29-32; 2001; 114; Kristiansen & Larsson 2005, 225; 277-279.

20 Earle 1997; 2002; 2004; Kristiansen 1984; 1998b; 2001; Kristiansen & Larson 2005. The concept of 'chiefs' originates from a description of southern Amazon (*Mbayá/Guaná*) groups (Heckenberger 2005, 349; references to Oberg 1949; 1955).

21 Earle 1997, 30 fig. 2.5; 2001, 114; 2002, 305; Kristiansen & Larsson 2005, 226. For Bjerre see Earle *et al.* 1998; Bech 1997, for Bdrd. Gram see Ethelberg 1995 and see Mikkelsen & Kristiansen 1997 on Legård.

22 Earle 1997, 14; 21; 32; 100; 102; 2002, 365; Kristiansen 1984, 203; Kristiansen & Larsson 2005, 10; 41.

23 Earle 1997, 32; 101; 157; 2002, 363; Kristiansen 1984, 198-202; Kristiansen & Larsson 2005, 212-213; 226.

during funerary rituals. For instance, the traditionality in grave good assemblages observed by Kristiansen, or in the case of graves of the Sögel-Wohlde types also found in the Netherlands,[24] may have been part of a long-term tradition – starting in the Beaker period – of graves with restrictive, traditional grave-good sets in which specific (supra-regional) identities were stressed (*e.g.* Fontijn 2003, 80-82; Van der Beek 2004). It should not be overlooked that, as an alternative to grave goods invariably reflecting social roles in life, certain deceased member of society were chosen to represent specific social roles, such as those interpreted in archaeology as 'smiths', 'chiefs' or 'warriors'. For reasons that escape us, it may have been appropriate, necessary or desired, for local communities to create 'specific' types of ancestors, who possibly fulfilled specific roles or duties in the afterlife. Grave good assemblages in which martial attitudes are stressed, therefore can – but need not – correspond to actual behavioral modes while alive. Thus, to interpret all those buried with swords as '(chiefly) warriors', who were part of a ruling elite (Earle 1997, 122; Kristiansen 1984, 201) may be overstating their martial importance during life. Aspects of partibility and complementarity of social roles may thus be understated.[25]

In short, there are no solid archaeological arguments why, for this period, martial values should be a full-time concern for certain persons (Kristiansen & Larsson 2005, 266), although it is claimed that "…the professional warrior, well trained and organized, was introduced." (*op. cit.*, 213) and that – by analogy to historically known chiefdoms – this "…involved a rather high proportion of the male population...' (*op. cit.*, 248). The duty, privilege and responsibility part of martial social roles may just as well have been part-time, [26] and have affected or have applied to a very restricted (age?) set of people within a local community.[27] Indeed, Fontijn (2003, 226-236; *in prep.*) has argued a convincing case that for the Netherlands, Bronze Age warriorhood is best considered to be an ambiguous, temporary identity. Possibly, in addition to membership of other communities (Gerritsen 2003), membership of martial communities was a property restricted by descent, age, sex or (most likely) a combination of these factors. The display of arms during life may have been a signal of the bearer's *potential* to fulfill a martial role – which, however, may have been infrequent to never – and was presumably rule-bound by social and ideological aspects. Phenomena such as mass-graves (*e.g.* Louwe Kooijmans 1993c) and blade notches in any case suggest that weapons such as swords were not for display only. It is therefore not the martial association or values expressed in weapon graves that should be nuanced, but rather the interpretation that this reflects full-time warriorhood for the specific person with whom such objects are interred.

For the Dutch situation, the overall number of Bronze Age weapon graves is low and they occur most prominent in the northern Netherlands (note 59). The number of known swords is significantly higher, yet they originate mostly from the main rivers (*cf.* fig. 8.7).[28] They are interpreted by Fontijn as deposits made at important transitions of social roles for those who used them, which could be related to age of the bearer (*e.g.* upon being considered an elder), or to use (*e.g.* after specific raids or battles) of the weapons proper (Fontijn 2003, 230). In his words:

> *'(...) we could think of situations in which warrior identities required only a temporary shift in identity, adopted by a group by means of a collective ritual, involving special dress and bodily adornment, before a raid took place. The special fighting regalia and weapons were then laid down (deposited) after the battle was over, transforming warriors back into ordinary men. The latter option is particularly known from ethnographies on tribal warfare in the Sepik region in Papua New Guinea (...).'* (Fontijn 2003, 230).[29]

24 Butler 1990; Treherne 1995; Vandkilde 1996, 152-56. Traditionality in this context is mainly about the consistency in selections and associations of types of grave goods.

25 See the references in Chapter 3, note 39.

26 *Cf.* Kristiansen & Larsson 2005, 266.

27 Possibly, the use of early historic documents such as Beowulf (Earle 1997, 21; 2002, 287; Kristiansen & Larsson 2005, 20-24; 249) has provided unreliable analogies. This is al the more salient as the latter two authors start their study by scolding traditional archaeology for having been misled by false analogies presented by historical farming communities in viewing Bronze Age societies as fixed, immobile, communities (*op. cit.*, 23; 367).

28 Fontijn 2003, 213; 228 fig. 11.2.

29 Reference to Harrison 1995, 85-87, *cf.* Bloch 1999, 176.

Now, let us consider the evidence for 'chiefly halls'. The 'chiefly house' of Bjerre I measures 21 by 7.8 m (Earle 1997, 31), of which only the width forms an extreme of the normal Dansih size distribution (*cf.* Mikkelsen 1996, 40 fig. 5). The houses of Gram (50 by 10.6 m) and Legård (34.8 by 8.5; Nielsen 1999, 162 fig. 11) are clearly beyond the normal size distributions, yet in their composition present physically up-scaled versions of modal houses, with living areas and byre-sections. Both houses may reflect a compartmentalized construction, as the house from Gram may have been extended in both directions,[30] and the skewed placement of easternmost section of the Legård house could also represent an addition. The extremely long house of Bruatorp (*c.* 54.7 by 7.6 m) also shows differences in spacing and span of the roof-bearing posts that may indicate a compartmentalized construction history.[31] While the extreme length of such houses may thus in part be related to extension, or compartmentalized construction of the farmhouses (*cf.* figs 5.22; 5.23), their width may still indicate that they were perhaps intended to be different from other houses. They are however, not without parallels. In Artursson's 2005 overview of southern Swedish settlement sites several examples of similarly wide Bronze Age houses are listed.[32] The presence of pits, hearths and stalls like those commonly found in other houses, suggests that their function need not have differed significantly from less wide examples. Thus, while it is evident that the farmhouses of Gram and Legård present physically up-scaled versions of modal houses, it is undecided whether they are simply the extremes of a more continuous distribution, or whether they are best considered a wholly different class.

More importantly, there is no conclusive evidence for why the occupant(s) of these larger houses should have been of higher (chiefly, chiefly warrior) social rank. Size can, but need not be, a reflection of social hierarchy.[33] While they were presumably *special* houses, their larger size may be a consequence of a plethora of reasons and the outcome of desires by groups much larger than solely the (chiefly?) household head.[34] An analogy may be the consolidation and beautification of ancestral houses as seen among the Zafimaniry of Madagascar, where descendents of the original founding couple continue to elaborate their ancestral 'holy' house long after this couple has died (Bloch 1995, *cf.* Gerritsen 2003, 37). In such ways, structural properties of houses may change without the prestige or influence of resident household heads (or chiefs) being involved.

With the Dutch settlements, there is considerable variation in house-size, yet – like in the Danish case – these differences are gradual rather than categorical. For seven Middle Bronze Age settlement sites in the Dutch river area, there is reasonable variation in house-sizes *within* settlement sites, yet they still form a continuum,[35] and compare well to that of other sites (fig. 8.5). From a comparison with a larger data set of Bronze Age houses from other areas of The Netherlands (fig. 5.26), it is clear that a continuum rather than bimodal distribution is represented, and I have argued that houses above 30-35 m are unlikely to represent single house-phases. Additionally, there is little variation in (reconstructed) width (fig. 5.26, B; fig. 5.27), indicating that farmhouse length is a good proxy for available surface area. To me, this suggests that variations in house size attributable to distinct social stratification cannot be indicated in the Dutch data set (*contra* Earle 2002, 305).[36] While differences in house-size may reflect social *differentiation*, the causes, effects, ranking and duration of such differentiation remains unknown and should therefore not be interpreted as social *stratification*.

Additionally, there are no acceptable clues available to suggest that occupants of longer houses had in any way more status,[37] nor is it evident that larger household or livestock sizes were in play (although both may have

30 As is suggested by the former rounded short sides and off-set posthole placement in the eastern part (Nielsen 1999, 162 fig. 11).

31 Artursson 2005b, 73 fig. 27; Kristiansen & Larsson 2005, 279 fig. 125.

32 *E.g.* Västra Karaby, house 10 (16.1 by 8.2 m; Artursson 2005, 61 fig. 11), Köpinge B26, house 1 (16 by 8 m; Artursson 200b5, 67 fig. 20), Hunneberget, house 6 (46 by 9.6 m; Artursson 2005b, 70 fig. 23), Grødbygård, house S (35 by 8.2 m; Artursson 2005b, 61 fig. 11).

33 *Contra* Early 1997, 29; 2002, 290; 305; Larson & Kristiansen 2005, 279.

34 See Chapter 6, notes 49 and 50 for a discussion and references to anthropological examples.

35 The single outlier with Meteren - De Bogen (house 28-1AH) has been extended at least once (section 4.4.3; Hielkema, Brokke & Meijlink 2002, 251; Appendix III, fig. III.22).

36 In other words: no bi-modal distribution of farmhouse surface area can be outlined for Middle Bronze Age(-B) farms in the Dutch river area (or beyond, for that matter), which suggests that it is unlikely that social classes such as wealthier ('chiefly') and poorer ('cottager') farming households may be inferred from house-lengths or surface areas.

37 Although there may be some association between house-size and numbers of granary-type outbuildings (Chapter 6, section 6.4.2 note 48). This association is however difficult to interpret.

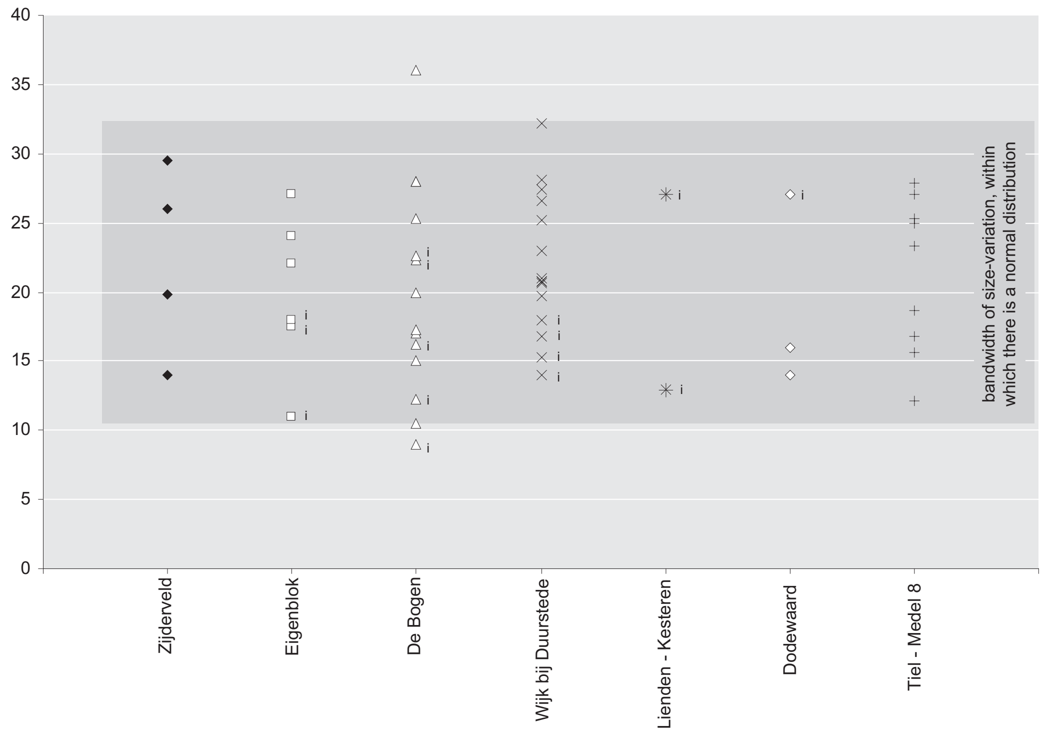

Fig. 8.5 Diagram showing the (minimal) house length (y-axis, in meters) for the Middle Bronze Age houses at seven settlement sites. An 'i' signals an incompletely excavated house-plan and the recorded length is thus a minimum length.

been the case). As I have argued earlier that archaeologically visible stalls may have been an element confined to the Nordic sphere of influence during the Bronze Age (section 5.2.3.3, *cf.* fig. 5.17), traces of stalls are generally absent beyond the north(east)ernmost regions of The Netherlands. In discussions of farmhouse usage (*i.e.* byre sections versus living areas), this scarcity of visible stalls becomes crucial. The fact that stalls can only be identified with *c.* 3(-11)% of the Dutch Middle Bronze Age houses, indicates that for the majority of the houses, we can not estimate how much space was used for the living area and the byre sections respectively.[38] For the 29 B2b-type farmhouses from the Northern Netherlands that are dated to the Middle Bronze Age/Late Bronze Age transition (*cf.* fig. 5.24) and that *do* have identifiably byre sections, the ratio of the living area to total length (*i.e* living area and byre sections) is very variable (*c.* 58-25 %, *cf.* fig. 5.23).[39] Moreover, the particularly late Middle Bronze Age-B age and confined regional distribution of farms of this type, indicates that these ratios are best not carelessly extrapolated to other regions.

As the livestock composition appears to be relatively uniform for Bronze Age settlements within the Dutch river area (fig. 7.11) as well as beyond (Arnoldussen & Fontijn 2006, 299 fig. 8), there appear to be no grounds to identify an intensification of livestock breeding, which Earle (2002, 100; 102) reconstructs to have facilitated the obtaining of 'foreign metal wealth'. Therefore, while cattle may have been of key importance in a number of fields (*e.g.* agricultural gain as draught animals and producers of manure, ideological (*cf.* section 8.2.4.5) or exchange items),[40] their numerical presence is difficult to reconstruct. Consequently, (estimated) byre-sizes cannot be used

38 See Chapter 5, note 96 (n = 8) versus table 7.2 (n = 308/350, 11 % if 29 B2b-type farmhouses are included).

39 The ratio of reconstructed living area to total length is 0.44 mean, with a 0.09 standard deviation, based on a quantification of the assumed byre sections versus complete length of the house for 11 B2b (Elp-type) houses where such a distinction could be made (Waterbolk 1964; Huijts 1992; Kooi & De Wit 2005; Kooi 2008). Living areas range between 6.5 and 16 m (mean 11.5 m, 3.2 m standard deviation), byre sections range from 9 to 19 m (mean 14.7 m, standard deviation 3 m). Quantification is rendered difficult by the fact that many farms show rebuilding phases (section 5.2.3.3; Kooi 2005).

40 Kristiansen & Larsson (2005, 277) denote cattle as '…the most costly prestige good…', *cf.* Roymans 1999; Barker 1999; Rasmussen 1999; Zimmermann 1999; Fokkens 2003).

as a proxy for potential exchange capacity as Earle suggests, and on more fundamental grounds, there are no direct indications why such exchanges should have predominantly or solely focused on acquiring metalwork.

In short, while it is probable that house properties (like dimensions, but also decoration, wood species used *et cetera*) communicated important messages on the social status of its founders as well as on that of (later) occupying household(s), a direct relation between farm size (*i.e.* length or surface area) and social hierarchy (*e.g.* chiefly farms) is in my view untenable for the Dutch situation. A similar stance may in the future also be shown to apply to (part of) the southern Scandinavian data, as Kristiansen and Larsson (2005, 279) themselves state that "The social and economic structure of society was truly hierarchical, although dominated by well-built medium-sized farms." Rather than interpreting this as the 'normal' size variation present with self-sufficient agricultural societies and settlements, they opt for the explanation that: "This suggests a large and wealthy class of medium-ranked members of the chiefly lineages." (*loc. cit.*). For the Dutch situation, such an interpretation cannot meaningfully be upheld. No probable bimodal or otherwise discontinuous distribution can be indicated within the house-sizes, nor can it be argued in an archaeological context that size variation should be correlated to social status.

To conclude, I must stress that by no means I intend to downplay the importance of (metalwork) exchange systems during the Bronze Age, nor that I fundamentally disagree with ideas on social stratification for this period as such. However, I strongly disagree with the idea that social classes such as 'chiefs' or 'warriors',[41] can be indicated archaeologically for this period. This is by no means a romantic plea for idyllic, peaceful autarkic communities. Violence and the martial tools, ornaments and techniques this entailed, may very well have been a common aspect of life of Bronze Age communities. However, I argue that this is only a (minor, possibly brief and) complementary aspect of Bronze Age personae, whose other constituent *rôles* like those of being a farmer, artisan, parent and community member will have outweighed in importance the more belligerent activities during most days and years of their life(-cycle)s.[42] Bronze Age people did revert to armed violence, just as much as leadership may have taken on characteristics in retrospect best described as 'chiefly'. It may even have been the case that (control) over metalwork procurement or production and livestock exchange were crucial elements in Bronze Age strategies to acquire and/or maintain such leadership. However, I strongly feel that archaeologists should not overly entwine the interpretations of available data sets within a single interpretative framework, without persistent and detailed attention to establishing whether they indeed were linked. In short, the person in control of the metalwork distribution need not have had anything to say on livestock breeding, need not have lived in the biggest house, need not have supported retinues of warriors and need not be buried in a larger barrow with his or her weaponry. If the Bronze Age was indeed "… a world of chiefdoms." as Earle (2002, 363) would have it, the interrelations between agricultural production, architecture, exchange systems and (the basis, duration and intra-personal exclusivity of) social *rôles* should form the topics of studies, rather than be considered as given.

8.2.3.3 The living and the dead

After having dealt with the problems of defining the spatial and conceptual limits of settlement sites and the social structure of those living in it, I now turn my attention to the dead. While the details of mortuary rituals during the Bronze Age are idiosyncratic and changing,[43] the construction of inhumation graves, as a rule of thumb, did not take place within Middle Bronze Age-B settlement sites. Even if settlement sites dated to this period in The Netherlands beyond the present study area are included, there is only one single clear-cut (double) inhumation known of two teenagers in a ditch at Bovenkarpel (IJzereef 1981, 209-211). Considering the number of people that may have lived (and died) at Middle Bronze Age settlement sites in the river area (*cf.* table 8.4), we may wonder where their bodies are. Barrowless graves among settlement features, which was an option practised during the Late Neolithic,[44] were evidently considered inappropriate during the Middle Bronze Age-B.

41 *I.e.* carrying connotations of (full-time) *rôles* with some degree of permanency of office.
42 *Cf.* Brück (2001, 654-655; 2006, 306-309) on the dividual, complementary and contextual nature of social roles and concepts of personhood.
43 For an introduction see Lohof 1991a-b; Theunissen 1999, 35-108; Drenth & Lohof 2005; Bourgeois *in prep.*
44 Possibly during the Early Bronze Age as well; Louwe Kooijmans 1974, 239-260; 312; Wassink 1981, 82; Van der Beek 2004, 167-175.

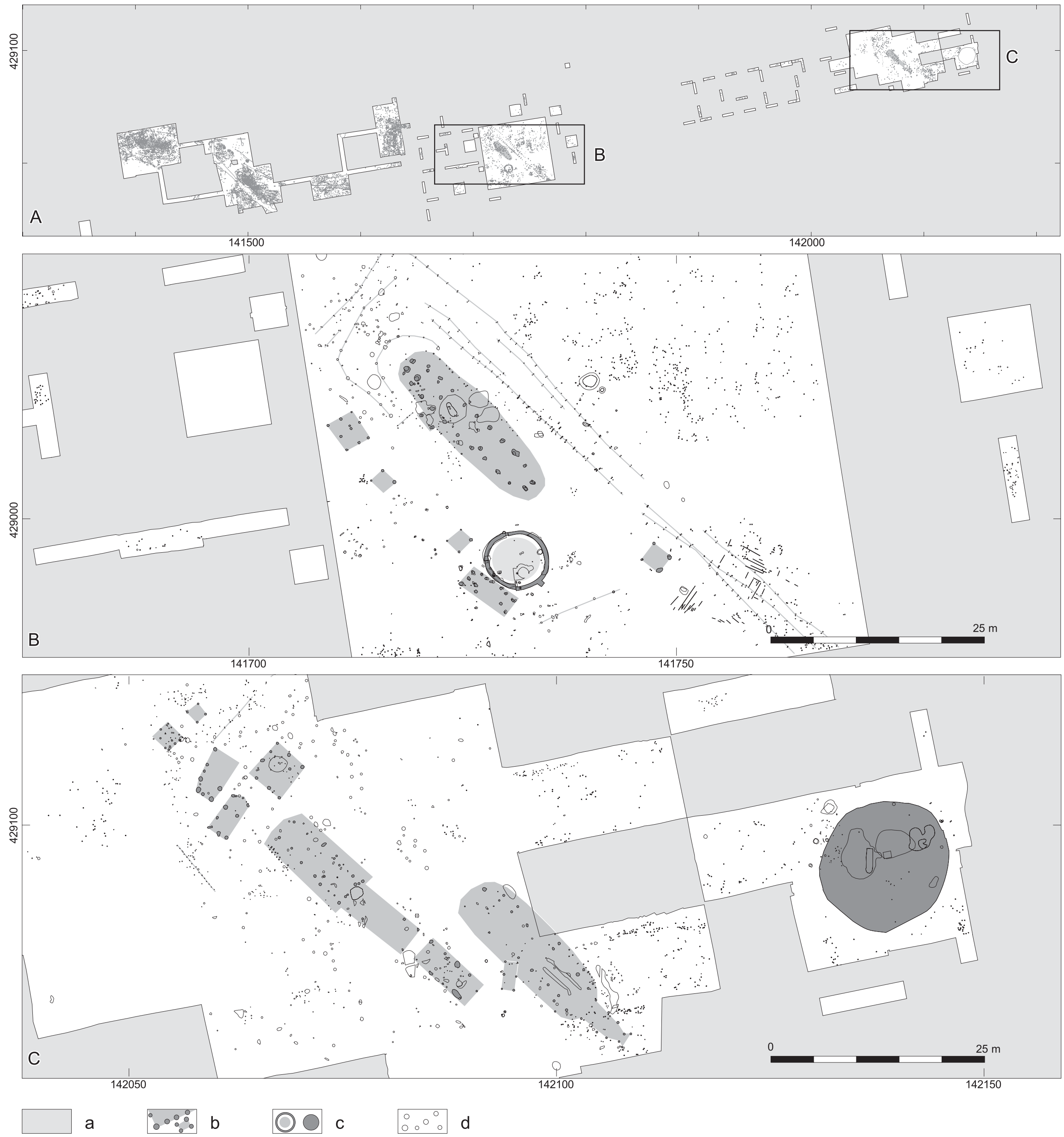

Fig. 8.6 Overview (A) and locations of the possible barrow at Eigenblok site 5 (B) and the barrow at site 6 (C).
a: not excavated, b: features associated with houses or structures, c: barrow ring-ditch or mound body, d: other features.

The established view is that formal burial in monumental barrows was the dominant mode of interment during the Middle Bronze Age.[45] Barrow ring-ditches have indeed been discovered at three sites in the river area (fig. 6.14, graves). For the barrow at Wijk bij Duurstede - De Horden (fig. 4.28) no direct dating evidence is available and those

45 *E.g.* Lohof 1991a; 1994, Theunissen 1999; Drenth & Lohof 2005.

of Eigenblok sites 5 and 6 appear to pre-date the Middle Bronze Age-B occupation phase (fig. 8.6).[46] At De Bogen, the initial use of the barrow at site 45 may have started during the Middle Bronze Age-A (fig. 4.13, C).[47] This renders it unlikely that these barrows were constructed by the occupants of Middle Bronze Age-B house-sites, into which they may nonetheless have been incorporated.

This pattern of barrows pre-dating nearby Middle Bronze Age-B house(-site)s is not unique to the river area, and has been documented for a larger number of settlements beyond it (Bourgeois & Arnoldussen 2006; Bourgeois & Fontijn 2008). Based on a critical evaluation of dating criteria and available absolute dates by Bourgeois (*in prep.*), it is now clear that the majority of initial Bronze Age barrow construction phases must be dated to the Middle Bronze Age-A. Thus, the Middle Bronze Age sees a remarkable reversal from the Middle Bronze Age-A, with numerous barrows and no recognizable houses, to the Middle Bronze Age-B, when fewer new barrows are constructed yet many houses are known. This observation also has severe implications for some models of settlement dynamics, in which barrows accompany Middle Bronze Age(-B) houses (section 3.3.3-3.3.4).

Following others, I have argued that older barrows (but also other older remains), may have been important sources of (claimed) ancestral legitimacy, fertility and societal well-being, and that it may have seemed favourable to Middle Bronze Age-B households to settle next to them.[48] This indicates that, under certain circumstances, it was appropriate to bring the domain of the living into that of the dead. In future cases, re-use of such older barrows on house-sites may illustrate that the reverse situation (leaving the dead near the living) was also an, albeit rarely used, option. A possible example of the latter domain intercalation is offered by the complex construction sequences at the barrow of De Bogen site 45 (figs. 4.13; 4.15; 4.21).

At the barrow of De Bogen, funerary and domestic domains seem almost intentionally to have been entwined. Overlapping with the location of a barrow insecurely dated to the Middle Bronze Age-A, two inhumations took place between the 16th and 14th century BC (fig. 4.21, D; Meijlink 2008; Bourgeois & Fontijn 2008). A large ring-ditch was possibly constructed for one of these graves. During the Middle Bronze Age-B a house was built that overlapped with the reconstructed location of the mound body (figs. 4.13; 4.15). As no intersection with the large ring-ditch could be documented, the exact phasing of this house and the large ring-ditch remains unclear (*ibid.*; Appendix III). At the very end of the Middle Bronze Age-B or at the start of the Late Bronze Age, another interment of an adult with a bronze rapier occurred (fig. 4.21, E). It is also possible that the large ring-ditch belonged to this phase. Nonetheless, presumably for this burial a structure was erected that – unlike other mortuary houses known[49] – mimicked 'real' Middle Bronze Age-B houses in post-placement and dimensioning (fig. 4.15). I have already argued earlier that the differences between a house for the dead and one for the living could hardly have been smaller (section 6.3.7) and this will not have been coincidental. Presumably, it may have been this highly unusual sequence of interments mixed with occupation traces that either allowed, or necessitated, the creation of tangible links between otherwise separated domains. In this case, the adequate means for such linkage was provided by using the constructional scheme normally reserved to houses, for a mortuary structure.

Nonetheless, during the Middle Bronze Age-B the norm seems to have been to spatially separate the living from the formal interments of the dead in barrows. Whereas this study has dealt extensively with the location in the landscape of the living (section 7.3), what can be said on the location of the dead? In a cogent article on barrow and settlement site interrelations, Bourgeois and Fontijn (2008) have argued that the Middle Bronze Age tradition of barrow construction may have been about the creation of deliberate links to earlier (possibly perceived as ancestral) acts of barrow construction by striving for spatial proximity to older barrows and by re-using older barrows (Bourgeois & Fontijn 2008, esp. 48 fig. 5). This behavior may explain why, at locations quite distant from the settlement sites, clusters of barrows – sometimes in linear alignments – could evolve. However, the internal chronology of such barrow clusters is largely poorly understood and the choice for their respective locations speculative. Such clusters and alignments of barrows are frequently situated on the highest parts of the micro-topographic landscape, but often somewhat inland of slope edges. This suggests that it may have been the commanding vistas *from* them, rather than

46 Hielkema, Prangsma & Jongste 2002, 137; 157-159; Appendix II.
47 Meijlink 2008; Appendix III; Bourgeois & Fontijn 2008.
48 See section 7.3.2, *cf.* Field 2001, 59.
49 See Chapter 4, note 101 for references.


417000
A
B
C
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167900
168100
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50 m
167400
167600
a
b
c
d
e
f
g
h

the (inter)visibility *of* these barrows, that were important parameters in their topographic placement (Fontijn 2007). The data from the river area relate to these broader patterns. The barrows at De Bogen and Wijk bij Duurstede - De Horden were both constructed at the highest parts of their micro-topographic landscapes, and I have speculated whether the 'barrow-shaped' local morphology may not have led people to (mis- or re-)interpret these natural heights as older barrows (section 5.9).

The preferential avoidance of monumental burials and settlement sites can also be illustrated with the result of some excavated barrow clusters. To the southeast of the town of Oss, an extensive (*c.* 65 ha) area has been test-trenched and partly excavated. There, a barrow landscape was uncovered that has its roots in the Middle Bronze Age, but it is primarily known for the presence of two rich Hallstatt-period graves (fig. 8.7).[50] To the north of the westernmost part of this barrow landscape (known as Oss - Vorstengraf) a surface area of *c.* 56 ha has been test-trenched without yielding traces of Bronze- or Iron Age habitation, although a possible deposition site was found.[51] The easternmost part of the barrow cluster, known as Oss - Zevenbergen, was also test-trenched and partly excavated (Fokkens, Jansen & Van Wijk *in prep.*). Here too, no traces of Bronze Age occupation were encountered. That this cannot be explained by inadequate feature preservation is suggested by the post-alignments that are found in both parts. A similar situation was encountered at the excavation of a Middle Bronze Age to Early Iron Age barrow cluster at Uden - Slabroek (Van Wijk & Jansen *in prep.*). There, an area of *c.* 4.3 ha was test-trenched and partly excavated, only to reveal traces of barrows and post-alignments (*ibid.*). Although theoretically Middle Bronze Age house(-site)s may have been situated just outside the excavation extents, both examples convey the notion that for Middle Bronze Age communities, living among barrows was not common to say the least (Bourgeois & Fontijn 2008).

Analyses of Bronze Age barrow clusters have furthermore shown that it was presumably only a limited, yet varied, selection of the population that was buried in barrows. The percentage of 10-15 % quoted by Theunissen (1999, 105, *cf.* Lohof 1991a, 254-255) may be somewhat low, yet it seems improbable that the majority of the people received a barrow burial.[52] So where are the remainder? I have argued that some deceased may have been present, even if fragmentary, on or near settlement sites (section 5.9). Burials of cremated remains, sometimes in urns, are known in very small numbers from Bronze Age settlement sites and unburned human remains have also been found at some sites.[53] Therefore, while the majority of the deceased may have been disposed of in archaeologically invisible ways (*e.g.* river 'burials' or surface exposure), I have argued that some (parts of) selected departed may have figured above-ground in settlements as items in meaningful social, magical or ritual acts (section 5.9).[54] Such retention of human remains for ceremonial or ideological purposes also occurred in the United Kingdom during the Bronze Age, for example as the token cremation deposits discussed by Brück or the composite Bronze Age mummy of Cladh Hallan.[55] To conclude, it should be stressed that while there are several ways in which (parts of) the dead may have continued to reside in settlement site space (*e.g.* cremations, stray remains; *supra*, possibly even flat graves (*cf.* Van den Broeke 2006)), the majority will have been brought elsewhere and only a part of them were entitled to monumental burial in or under barrows. Presumably, the ideological as well the physical shifts of bodies between realms of the living and the dead were extremely conspicuous events, in which proper execution of rituals were vital to the proper transformation of deceased into (mythical) ancestors. As in, and directly around, such barrow clusters generally no evident habitation took place, it is confirmed that the living and the dead were indeed intended to occupy different domains.

Fig. 8.7 (overleaf) Overview of the excavated areas (A) and details of the barrow clusters at Oss- Zevenbergen (B) and Oss- Vorstengraf (C).

a: not excavated, b: trenches on topographic map, c: post alignments and possible mortuary structures, d: post-circles and ring-ditches, e: reconstructed locations of barrows, f: location of axe deposition, g: 'princely' grave of Oss (Ha. C-D), h: grave of the 'princess' of Oss (Ha. D?).

50 Fokkens & Jansen 2004; Fokkens, Jansen & Van Wijk *in prep.,* Fontijn & Jansen, *in prep.*

51 Jansen & Fokkens 2007, for the deposition site (of a type Oldendorf high-flanged bronze axe; Fontijn 2003, 88-91), see Fontijn, Jansen & Fokkens 2004.

52 *Cf.* Bourgeois & Fontijn 2008, esp. 43; Bourgeois *in prep.*, chapter 4.

53 See examples in section 5.9.

54 See for some anthropological examples Chapter 5, note 330.

55 Brück 1995; 2004, 31-311; 2006, 309. For Cladh Hallan see Parker Pearson 2007. See also Nowakowski 2001, 143.

8.2.3.4 Where good objects go to die? Patterns of object deposition

I have argued above that the spatial separation of the formal barrow burials and the settlements suggests a strong case of landscape compartmentalization. It is clear that landscape zones which had a funerary or domestic purpose, were preferably not to overlap during the Middle Bronze Age-B. A similar attitude of landscape categorization can be identified by the patterns of object deposition in the landscape.

Object deposition is one of the most studied aspects of Bronze Age societies. While traditionally the focus has been on deposition of bronze items,[56] now also more attention is drawn to the deposition of organic goods.[57] This is not the place to put object deposition in proper long-term perspective,[58] or to do justice to the intricacies and regional variation in the specific objects and zones selected for deposition (*e.g.* Fontijn 2003). Consequently, only some key elements will be discussed here.

Metal object depositions at Bronze Age settlement sites

The first salient feature is the observation by Fontijn (2003) that the deposition of bronze items is steered by a system of selective deposition; the deposition of specific types of tools or ornaments in specific contexts (Fontijn 2003, 210-220). For the southern Netherlands, for example, bronze weaponry was absent in graves and non-local ornaments were deposited in major rivers and never near settlement sites (fig. 8.8; Fontijn 2003, 262 fig. 14.2). Within settlements, only local ornaments and sickles appear to have been deposited on settlement sites (Fontijn 2003, 144-147). How do the data from the river area compare to this?

First, it should be stressed that the intentionality of bronze deposition on Bronze Age settlement sites in the river area is hard to ascertain. While bronze objects have been found at several sites (section 5.9, esp. note 321) they are frequently recovered from finds-layers where they occur mixed with settlement debris. For example, a Late Bronze Age socketed axe was recovered from the find-layer at Tiel - Medel 8, which – while found close to Late Bronze Age structures (fig. 7.15, e) – cannot be proven to represent a deliberate deposit. Lack of detailed contextual information renders it difficult to assign an *a priori* intentionality to the presence of such objects. This problem was already recognized by Fontijn, who – save for incidental finds from pits – had to start from the premise that their mere presence on a site indicates that they were spared the melting pot and as such most probably reflect

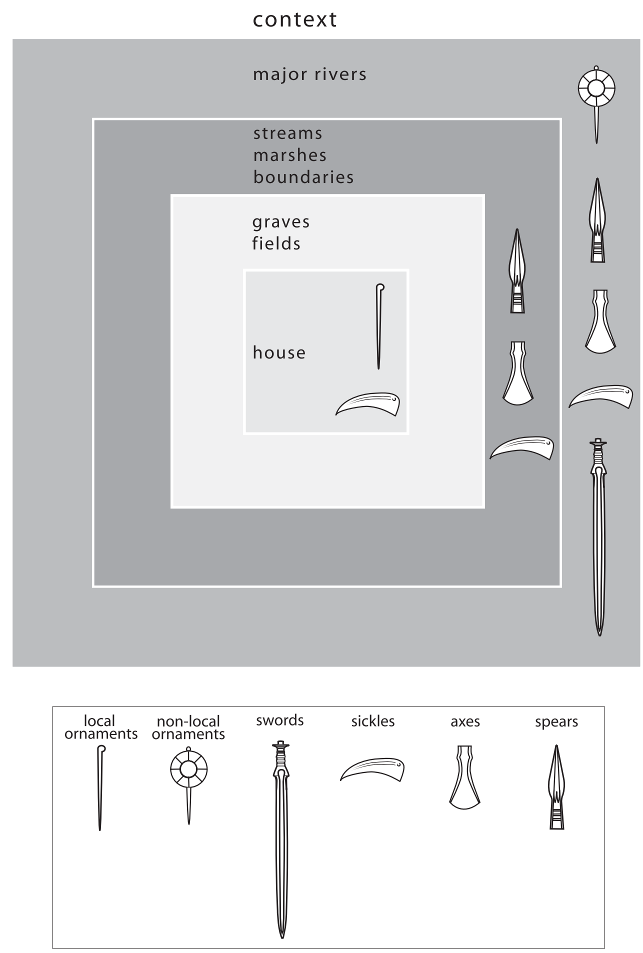

Fig. 8.8 Schematic interpretation of bronze object deposition in the southern Netherlands by type and origin of objects and their context of deposition (adapted from Fontijn 2003, 262 fig. 14.2).

56 *E.g.* Bradley 1990; Butler 1963; 1990; 1995-96; Butler & Steegstra 1997-98; Verlaeckt 1995; Essink & Hielkema 1997-98; Needham 1989; 1996; Fontijn 2003.

57 Verlinde 1979; Van der Sanden, 1990; 1992a; 1995a-b; 1997; 1998; Prummel & Van der Sanden 1995; Hielkema, Brokke & Meijlink 2002, 225-226; Therkorn 2008; Kok *in press*, esp. sections 3.5.1; 4.2.1.3.

58 *Cf.* Ter Wal 1995-96; Koch 1998; Fontijn 2003, 59; Wentink 2006.

intentional acts (Fontijn 2003, 144-147). Allowing for chance losses, such argumentation can only be upheld for larger bronze objects (*e.g.* sickles, axes, spearheads).

Metal-detecting during the excavations of Bronze Age settlement sites in the river area has yielded smaller (*e.g.* strips, ornaments, arrowheads) as well as bigger bronze objects (*e.g.* daggers, a sickle, spearhead and a socketed axe; see section 5.9 for references). The presence of weapons is striking, as they are generally absent from Middle Bronze Age settlements from the southern Netherlands. The wear on the dagger and sickle from Eigenblok (Hielkema 2002a, 327-328; Jongste 2002c, 102), suggests that they had seen a long use-life, prior to entering the ground. By contrast, the dagger found at Dodewaard - site 20, was in pristine condition (Jongste 1997, 14; Fontijn 2003, 146), suggesting that it had not seen a similar long use-life. At the location of this find, no more extensive excavations took place, so that its interpretation is limited to 'presumably located within a possible settlement site' (Appendix VI). For the various bronze objects from Eigenblok, an interpretation as representing abandonment deposits has been forwarded (Jongste 2002c), but this remains contestable. Neither in the spatial distribution of the items, nor in their contextual associations, are there any clues to substantiate deliberate deposition during the abandonment of the site, be it as single items or combinedly (Hielkema 2002a). The claim that they were 'generally situated on top of the former surface and have not been trampled down' (Jongste 2002c, 104, my translation), which could support the fact that they were part of the 'closing ritual' of a house- or settlement site, is not backed-up by detailed stratigraphic analyses. Moreover, possible dislocation by subsequent ploughing that occurred on sites 5 and 6 (Hielkema, Prangsma & Jongste 2002, 142; 156), may not have been given due consideration. Chance loss and intentional deposition must therefore remain equally speculative interpretations for the Eigenblok bronzes.

The metal objects from the De Bogen excavation also merit separate discussion. In addition to a small number of tin and bronze strips, wire fragments and non-identifiable (presumably ornament) fragments found in the finds-layer and a number of features (Butler & Hielkema 2002, 542-543), several graves from the barrow at De Bogen site 45 contained metalwork (*op. cit.*). The finds associated with grave 3 (fig. 4.21, E) stand out. In and near this grave, two bronze arrowheads, a rapier, a bronze pellet and a wire fragment were recovered (Butler & Hielkema 2002, 539-542) for which combined a Hallstatt-A1 date has been suggested (Bourgeois & Fontijn 2008). The presence of weapons in funerary context is very infrequent to almost absent in the southern Netherlands (Roymans & Kortlang 1999, 56; Fontijn 2003, 148; 172), but is documented in some numbers for the Middle Bronze Age in the Netherlands north of the river area.[59]

At Wijk bij Duurstede - De Horden, a slag droplet, a bronze sheet arrowhead and spearhead were found while at the nearby site De Geer another spearhead, a knobbed sickle and a chisel were found.[60] Here as well, bronze items and weaponry were left at settlement sites. Possibly, the more prominent presence of weaponry on sites as well as their incorporation into graves reflects that – as far as these traditions are concerned – the river area was more related to the areas to the north, than to the south of it. It is therefore no surprise that at Rhenen, as close-by as several kilometers north of the river area proper, a spearhead may have been intentionally deposited in a posthole of a house (fig. 3.11, B). Again, the river area appears to have been a boundary zone between these two culture areas (*cf.* sections 1.6; 7.2.1).

After having discussed the types and context of the metalwork on Middle Bronze Age sites from the Dutch river area in somewhat more detail, we must now return to the main point. Have any of these sites provided indisputable evidence of metalwork deposition? At present, the answer must be negative. The amount of uncertainty on the original context of the metalwork discovered (outside graves), does not allow to interpret them as deliberate depositions.[61]

This should not be taken to indicate that metalwork deposition did not occur in the river area. Quite the opposite may have been the case. Assuming that the general pattern of objects to be placed in wet zones in the

59 *E.g.* Garderen (Van Giffen 1937), Laren (Modderman 1954, 16), Hilversum (*ibid.*), Schuilingsoord (Butler, Lanting & Van der Waals 1972); Eext (Modderman 1954, 16), Hijken (Butler 1995-96, 64-68), Drouwen (Butler 1995-96, 71-73), Zeijen (Van Giffen 1920, 124-34, Butler 1969, 42), Zwaagdijk (Modderman 1964b; Butler 1995-96, 102-103), Velsen (Bosman & Soonius 1990; Butler & Steegstra 1997-98, 102-103).

60 Letterlé 1985, 342; Drenth 1996, 33; Appendix IV.

61 The two bronze sickles found in the Dodewaard macro-region (Modderman & Montforts 1991, 149; Appendix VI) may (through their association; *cf.* Brunsting 1962) be the best candidates, but here again contextual information is limited.

landscape, such as marshes, streams and rivers (fig. 8.8; Fontijn 2003, 264-268) also applied to the river area, the highly compartmentalized and gradient-rich landscapes of the river area,[62] may have offered various suitable locations. The study by Fontijn (2003) shows that indeed several metalwork depositions are known from the Dutch river area, and that they include very special objects such as the aggrandized 'Ploughrescant-Ommerschans'-type dirk from Jutphaas (Fontijn 2001). It is not bronze deposition *as such* that is absent, but bronze deposition in the places used for habitation cannot be proven yet (although it may have been present). Once more, a separation of domains within the physical landscape seems to have been important to Middle Bronze Age communities: there were various places suitable and utilized for the deposition of bronze metalwork, but settlements do not seem to have prominently figured among them. Parallel to the situation described above where settlement site traces proved absent from barrow sites, the few excavations presently carried out at depositional sites outside (Fontijn, Jansen & Fokkens 2004) or within the river area (Theunissen, Müller & Van Bergeijk *in prep.*) have shown that they too were not settled. Rather, these were zones of the landscape presumably marked only by depressions and vegetation types indicative of relatively wetter locations.

To conclude, the inconclusive stance on metalwork deposition at Bronze Age sites in the river area should not be taken to mean that no depositions occurred at settlement sites at all. Quite the contrary may have been the case. After acknowledging the observation that in many non-industrial societies depositional acts frequently involve organic and immaterial components,[63] several examples of presumably intentional deposition of (non-metallic) objects at Bronze Age settlement sites can be discussed.

8.2.3.5 Settlement sites as locations for non-metal object deposition

I have argued above that there is insufficient evidence to reliably assume the intentional deposition of metalwork on Bronze Age settlement sites in the river area. However, metalwork was certainly not the only category of material culture available, preferred, or selected for intentional deposition, and I will argue below that – albeit not for metalwork – settlement sites may very well have been important locations for object deposition.

Intentional deposition of objects on Bronze Age settlement sites in The Netherlands may have involved a wide range of items, yet three categories stand out. These are ceramic vessels, animal bones and querns. Possible depositional acts on settlement sites involving these categories have taken place both within the river area, as in other areas.

Pottery deposition

Intentional deposition is often assumed for vessels which are recovered intact or nearly intact.[64] Few examples of intact Bronze Age vessels outside funerary contexts are known from the Netherlands, but the Hilversum-style decorated pot from Hapert (Beex 1954) and two examples from a pit at Boekel (Arts & De Jong 2004) show that intact vessels were left or buried incidentally. More frequently, deposits of (intentionally?) fragmented pottery are found in small pits or postholes (table 8.1). In such cases, the fact that the sherds belong to a single vessel and that the features are relatively small renders it unlikely that their association is coincidental. The deposition of several sherds of a Hilversum-style decorated pot at Cuijk - De Nielt presents a remarkable case (fig. 8.9; Ball, Arnoldussen & Van Hoof 2001, 18-19). There, from a small pit (40 cm diameter, remaining depth 15 cm) over 3 kg of Bronze Age pottery was recovered. While a handful of pots may be identified by fabric or rim morphology, the majority of the sherds originated from a single, 25 cm diameter pot decorated in Hilversum-style (fig. 8.9, B). This pot was deliberately fragmented and the largest sherds were stacked lying horizontally in the pit. The intentionality of fragmentation is clear from two observations. First, the position of the rim sherds underneath wall sherds, indicates that the rim sherds were placed in first and wall sherds directly on top (fig. 8.9, A). Second, a hæmatite (or maghemite)-rich fluid or paste had been poured over the fragmented sherds, as drops and stains of this fluid were found on both the outer surfaces and on the breaks of the sherds (Ball & Eimermann 2002, 29). While it is unclear whether this fluid was applied

62 Chapter 2; fig. 7.12; Appendices I-VI.

63 See section 3.4.3, esp. note 87.

64 There is some evidence that from the (Middle Bronze Age-B to) Late Bronze Age (transition) onwards, vessels may have been buried intact to serve as storage containers (*e.g.* Slofstra 1991a, 144; Berkvens 2004, 102; Van Hoof & Meurkens 2007, 59 fig. 5.9).

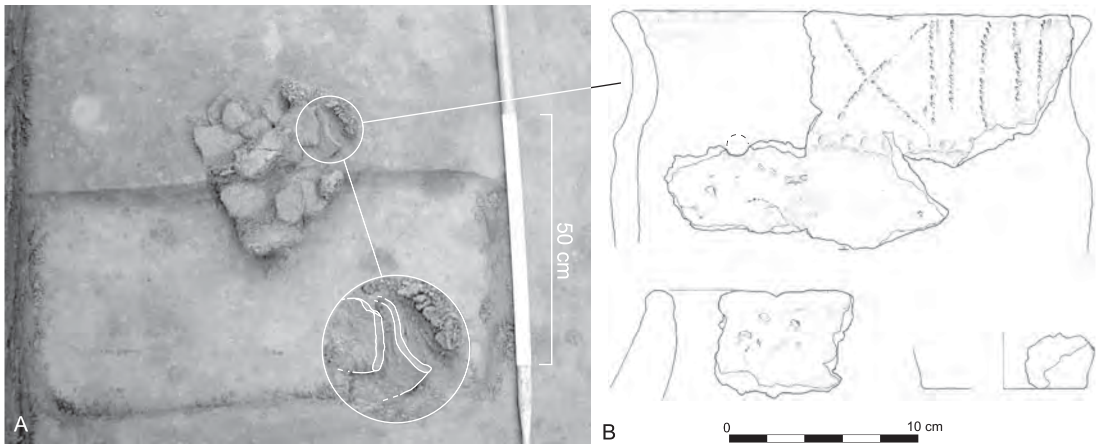

Fig. 8.9 Excavation in progress of the pit at Cuijk - De Nielt with the stacked sherds (A; top view), note the position of the rim. A selection of the pottery recovered is shown to the right (B, after Ball & Arnoldussen 2002, 8 fig. 2).

prior to, or after placing the sherds in the pit, this assemblage seems a clear example of a depositional act, and not the incidental discard of domestic refuse. As this was found during a campaign of test-trenching, it is not clear whether this pit was situated within a settlement site (Ball, Arnoldussen & Van Hoof 2001),[65] but as the ceramics date to the Middle Bronze Age-A, the chances of recognizing settlement sites for this period in the first place are notably poor (*cf.* sections 5.2.2; 7.2.4).

Several other examples of possible Bronze Age pottery depositions are listed in table 8.1.[66] It is frequently difficult to decide whether such complexes do indeed represent intentional depositions. Cracked or broken pots may have been discarded and can present themselves as tight clusters of sherds (further fragmented by soil compaction and weathering). Additional arguments, such as the ochre-like fluid on the Cuijk sherds (fig. 8.9), are necessary to postulate intentional deposition instead of discard. For example, the find-circumstances of sherds may indicate that they were not fragmented and deposited like this by accident or by natural causes. The stacked sherds of Cuijk, the vertically placed sherds of Oldenzaal and especially inverted pots like those of Boekel, Nistelrode, Harderberg and Breda - Steenakker all suggest intentional deposition (table 8.1). In other cases, it is the sheer quantity of ceramics representing a limited number of pots or a single vessel, and absence of other settlement debris that suggests deliberate selection and deposition.[67] It is striking that frequently such pots bear decoration. While most depositions are found in larger and smaller pits that cannot be interpreted as belonging to structures, some pottery deposits are associated with possible outbuildings (*e.g.* Enspijk, Well-Aaijen) and houses (*e.g.* Apeldoorn, De Bogen; table 8.1). Fragmented loom weights may also be part of normal domestic debris, but when they occur as the only finds from pits (*e.g.* Molenaarsgraaf) or with possible deposited pottery (*e.g.* Oss-Horzak, Lienden), in post-pipes or in great numbers (Tubbergen; De Bogen; table 8.1) the option of intentional deposition should be seriously considered.

Depositions of animal bones

Animals or parts of animals may also have figured in Bronze Age depositional acts. In addition to the cattle horns (Prummel & Van der Sanden 1995, 113) and antler fragments (Verlinde 1979; Ufkes 1997, 164) that may have been deposited during the Bronze Age in ‘wet parts of the landscape’, deposition of animal bones may also have taken place at settlement sites.[68] Distinguishing between intentional deposition and the discard of (butchering) waste

65 During 2007 more extensive exactions were carried out at this site, but the results await final publication.

66 For completeness and comparability, some possible pottery depositions from funerary contexts are also added to table 8.1.

67 *E.g.* Tiel - Medel 5, Cuijk - Heeswijkse Kampen, Rhenen - Remmerden, Breda - Bierensweg; table 8.1, possibly also Mooren & Van Nuenen 2008, 26; 37 (331 sherds of a single vessel from a pit).

68 Here as well, some possible depositions within funerary contexts are added to table 8.2 for sake of completeness and comparability.

Site	Content	Context	References
De Bogen	279 g of sherds of one pot with fingertip decoration (LNEO or EBA), also a cattle horn core	Pit at De Bogen site 30, 50 cm deep, 60 cm diameter	Hielkema, Brokke & Meijlink 2002, 159
Tiel - Medel 5	924 sherds (*c.* 2.7 kg) of a single pot with fingertip impressions, cordons and pierced rim (EBA *riesenbecher*) Also 219 g bones of different animals	Pit, 70 cm diam., unknown depth	Ufkes 2005, 23; 44
Rolde	Large part of an incomplete Barbed Wire-stamp decorated pot; 31 cm high	In possible refuse pit	Van der Sanden 1992b, 71
Herike	Large part of a fragmented Barbed Wire -stamp decorated pot, *c.* 37 cm high	In shallow pit, sherds lined bottom of pit	Verlinde pers. comm. Aug. 2004; Verlinde 1978b, 89
Oosterhout - Van Boetzelaestraat	Large part of a fragmented Barbed Wire stamp decorated pot, all parts of pot (rim to bottom) present	In pit with some charcoal and possibly stone. In relative isolation.	Van den Broeke 2002a, 12; pers. comm. June 2007
Oldenzaal-Schipleidelaan	Sherds of very incomplete Barbed Wire stamp decorated pot (*c.* 24 cm high) sherds placed vertically in tight cluster	In small pit, within LNEO or EBA flint scatter	Verlinde pers. comm. Aug. 2004; Verlinde 1999, 163-164
Colmschate - 't Bramelt	Sherds of ¾ complete Barbed Wire-stamp decorated pot, presumably placed upright in pit	In small pit, within EBA posthole cluster in EIA urnfield	Verlinde pers. comm. Aug. 2004; Verlinde & Buisman 1989, 50
Oss - Horzak	Large part (bottom to rim) of fingertip decorated small vessel with pierced rim (*c.* 12 high), also fragments of two loom-weights and BWB sherd (EBA).	In pit (65 cm diam., 35 cm deep), lying on its side in middle fill	Jansen & Arnoldussen 2007, 24-25
Cuijk - Heeswijkse Kampen	*C.* 2.8 kg of pottery, mostly of a single pot decorated with 'maggots' (*i.e.* short rope stamps (EBA or MBA-A))	In small and shallow pit in test-trench	Ball & Heirbaut 2005, 71-73
Rhenen - Remmerden	58 sherds (2.1 kg) of large (27 cm; diam. 29 cm) pot with hollow round impressions, cord impressions and lug handles (EBA or MBA-A)	Large (1.1 m diam., 40 cm deep) pit at BA settlement site. Sherds stacked at the bottom of the pit	Jongste 2001, 12; 43-44 Jongste & Bloo 2002
Hapert - Castersche Dijk	Complete intact Hilversum-style pot 15 cm high.	Unknown, stray find	Beex 1954, 66-67
Cuijk - De Nielt	*C.* 3 kg of pottery, mostly of a single HVS-style pot. Sherds covered with hæmatite paste after fragmentation. Also a few (44 g) stones found	In small pit in test-trench, possibly former settlement site. Context unclear	Ball, Arnoldusssen & Van Hoof 2001, 18-19; Ball & Eimermann 2002, 27-30
Nistelrode	A Hilversum-style decorated vessel standing on its rim, top part destroyed	Large and shallow pit, some other possible MBA features nearby	Jansen *in prep.*
Boekel (1)	A Hilversum-style decorated vessel standing on its rim, top part destroyed	Posthole at possible MBA -A settlement site? 20 m from pit with two more HVS pots	Arts & De Jong 2004, 3
Boekel (2)	Two Hilversum-style decorated pots, One upright, one on its side (deposition or storage pit?)	Excavation, large pit at possible MBA-A settlement site, 20 m from posthole with inverted HVS pot	Arts & De Jong 2004, 3
De Bogen	613 g of sherds of mainly one BA pot with hollow round impressions	Large (1 m diameter, 30 cm deep) pit at De Bogen site 28-1	Hielkema, Brokke & Meijlink 2002, 245; Ufkes & Bloo 2002, 350 fig. 4.73
Enspijk - A2	Upper part of barrel-shaped BA pot (radiocarbon dated MBA-B)	In posthole of four-post granary-type outbuilding	Ter Wal 2005b, 32
Well-Aijen	> 100 sherds, presumably of single cylindrical pot (upper part only?)	In posthole of irregular structure, possibly four-post outbuilding	Williams & Tichelman 2005, 89

Table 8.1 Possible pottery depositions.

Site	Content	Context	References
Cuijk - De Beijerd (1)	66 sherds of mostly one Bronze Age pot, parts of rim, wall and bottom preserved, pos. standing upright?	In very large (*c.* 2 by 1.3 m, 40 cm deep pit)	Heirbaut 2006, 35
Cuijk - De Beijerd (2)	7 sherds (*c.* 1.3 kg) of top half barrel-shaped Bronze Age pot,	In large (*c.* 1.5 m diam, 17 cm deep pit)	Arnoldussen 2005, 76 fig. 6.2; 77
Lienden (Kesteren - De Woerd)	15 sherds (289 g) of top part of single pot, decorated with finger-tip impressions 4 cm under rim	In deep (1.6 m) and wide (2 m) deep possible refuse pit; context, date and other contents unclear	Ufkes 2002a, 109
Gennep - De Smele	331 sherds of all parts of BA pot decorated with row of finger-tip impressions 6 cm below rim	In large pit near possible BA structure	Mooren & Van Nuenen *in prep*.
Breda - Bierensweg	Near-complete barrel shaped pot with pierced lug handle, (*c.* 2 kg, 28 cm high) also 34 sherds of same pot (MBA-B, radiocarbon dated)	Oval pit (1.3 by 0.7 m, 36 cm deep), pot in fragments in middle fill	Meijlink 2006, 197-198
Breda - Vinkenburg	Near-complete low (8 cm high) cup or bowl, fragmented into 18 sherds no decoration (BA?)	Rectangular pit (1.6 by 0.8 m, 32 cm deep). Shape may indicate funerary function?	Meijlink 2006, 199
Rosmalen - Site 8	26 sherds of an undecorated BA pot	Clustered in large (*c.* 2 m diam., 1 m deep) pit (or (drinking pool/well?) on (BA to?) EIA settlement site	De Koning & Vaars 2003, 24; 33
Apeldoorn	320 sherds, mostly of a single undecorated pot. High (*c.* 30 cm) vessel of (final MBA-B or) LBA date	In large (75 cm diam.) pit possibly associated with house plan	Bloo 2007, 29
Harderberg-Marienberg	Inverted (MBA-B or LBA) pot placed on bottom of pit	Rectangular (1 m) pit in LBA urnfield (cenotaph?)	Verlinde 1978a, 124
Tubbergen - Mander III (1)	Four LBA accessory vessels on bottom of pit	Rectangular (0.9 by 0.45 m, 34 cm deep pit in LBA urn-field (cenotaph?)	Verlinde 2001, 171
Tubbergen - Mander III (2)	Near-complete LBA accessory vessels (*c.* 7-21 cm high)	Three postholes of four-post 2.5 by 1.5 m structure, mid-way in feature fill. 9 m from pit described above	Verlinde 2001, 171
Breda - Steenakker (1)	Parts of two barrel-shaped pots, one decorated with cordon and fingertips on rim, MBA (or LBA *Grobkeramik?*)	In pit in isolated position on extensively excavated area (dimensions pit unclear)	Berkvens, Brandenburgh & Koot 2004, 60; 76; 82
Breda - Steenakker (2)	32 sherds of 1 inverted placed BA pot (interpreted as grave, yet no crem.)	In pit in isolated position on extensively excavated area (pit 1 by 0.6 m, 6 cm deep)	Berkvens, Brandenburgh & Koot 2004, 73-75
Breda - Steenakker (3)	46 sherds of 1 BA pot, chamotte temper (interpreted as grave, yet no crem., LBA (?))	In pit in isolated position on extensively excavated area (40 cm diam., 15 cm deep)	Berkvens, Brandenburgh & Koot 2004, 73-75
Molenaarsgraaf	Fragments of large (14 cm diam) loom-weight with two vertical perforations also lump of potting clay, nothing else	In pit on LNEO-EBA settlement site	Louwe Kooijmans 1974, 228-229
De Bogen	54 pieces (4.9 kg) of over 10 loom-weights (pre-dating MBA house)	Pit (*c.* 55 cm diam, 8 cm deep), cross-cut by house 28-1AH	Hielkema, Brokke & Meijlink 2002, 264
De Bogen	Pieces (132 g) of loom-weight (dating house MBA-B?)	Post-pipe of posthole house 45AH	Hielkema, Brokke & Meijlink 2002, 179
Lienden	Fragment (*c.* 600 g) of a large (16 cm diam.) loom-weight, with 1 kg of pottery	In posthole (30 cm diam., 20 cm deep), possibly of structure?	Ufkes 2002a, 106

Table 8.1 (continued) Possible pottery depositions.

is sometimes difficult.[69] Here as well, articulation of skeletal elements (such as the lower limbs of De Bogen or Zwaagdijk, the half piglet of Lienden or rump of Velsen; table 8.2) and exclusivity (what else is present?) may be important criteria. I propose that during the Bronze Age, especially skulls (of cattle) and animal horns of a number of species, may have been of special importance and may have figured more prominently in depositions. Several examples of (near-)complete cattle skulls placed in pits are known from De Bogen, Lienden and Velsen (table 8.2).

At Tiel - Medel 8, skulls are present in three wells. For example, over 2.4 kg of a (nearly) complete horned cattle skull was found together with smaller quantities of wood, Bronze Age pottery and an antler fragment midway up the shaft of a possibly lined well (Van Hoof & Jongste 2007, 66 fig. 5.7.1). The contents (almost exclusively cranial fragments) and the high position within the well's fill indicates that this is: (a) no arbitrary selection of settlement debris and (b) that this must have been deposited at a (the?) time when the well was taken out of function. Possibly, a partial cattle skull from another Middle Bronze Age well should be interpreted along similar lines (table 8.2). That cattle skulls were of special significance to the Bronze Age occupant of Tiel - Medel 8 is suggested by yet another skull originating from the lowermost part of another well (De Leeuwe & Van Hoof 2007, 63). This presumable bull skull had two holes punched in it, to allow two straps to be passed through (Cavallo & Van Groenesteijn 2007, 139 fig. 6.19). The polishing caused by these straps suggests that this skull was once suspended from some construction that still allowed for some lateral motion (fig. 8.10). Possibly, it was suspended from a well-covering structure, a granary or a house.[70]

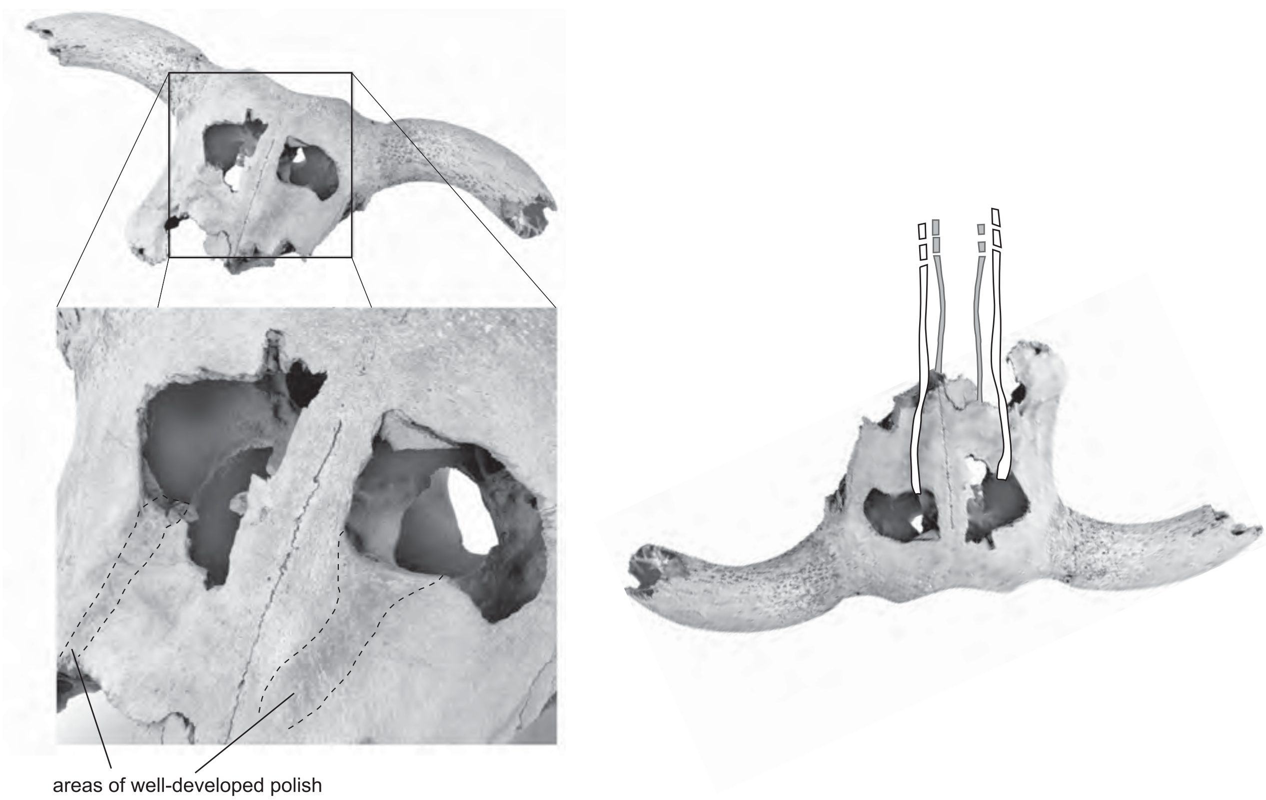

Fig. 8.10 Cattle skull with added holes through which straps have been passed. From the bottom of a Middle- or Late Bronze Age well at Tiel - Medel 8 (after Cavallo & Van Groenesteijn 2007, 139 fig. 6.19).

69 In addition, animal graves may be present on (Early) Bronze Age sites (*cf.* Louwe Kooijmans 1974, 264-267; Yates 2007, 41). While these (in the strictest sense) are intentional depositions, I will not concern myself with animal interments here.
70 *Cf.* Peeters 2007, 202.

Site	Content	Context	References
Eigenblok	Cattle horn core	In small posthole (s3.227) at house-site 5	Original fieldwork documentation
De Bogen	Cattle horn cores in two postholes and bone fragments in two others	Postholes of four-post granary type outbuilding at De Bogen site 30	Hielkema, Brokke & Meijlink 2002, 155-156
De Bogen	Skull fragments of one, possibly two young bulls (*c.* 1 kg), mixed with other cattle bones and a sheep/ goat's tooth (total weight 2.5 kg)	Pit (70 cm diameter, 30 cm deep) at 3 m from granary type outbuilding with horn cores at site 30.	Hielkema, Brokke & Meijlink 2002, 159
De Bogen	Two complete right sheep horn cores and three BA sherds	Three-post row next to palisade at site 29	Hielkema, Brokke & Meijlink 2002, 178
De Bogen	Aurochs skull in pit with other bone fragments (tot. 4.2 kg), a few stones dating unclear (LNEO-BA?)	Large (1.3 m diam.) and deep (1 m) pit west of house 29B2/3H	Hielkema, Brokke & Meijlink 2002, 186
Velsen - Velserbroek	Bull skull with a bark-and-willow basket (dated EBA-MBA-A) or container placed on right horn, also other bones recovered	Large pit in pit cluster at 30 m from possible contemporary barrow	Therkorn 2008, 150-151
Velsen - Velserbroek	Cattle skeleton, without the skull and limbs	Large pit in pit cluster at 30 m from barrow	Therkorn 2008, 150; 2003, 18
Velsen - Velserbroek	Two cattle skulls and complete calf	Rectangular pit in BA house at extension or partition wall	Bloemers & Therkorn 2003, 18; fig. 3.11, C
Lienden	Near complete cattle skull with horn(s), *c.* 500 g, two small stones	In 30 cm deep large (70 cm diameter pit	Buitenhuis 2002, 219
Lienden	1.2 kg of bones: 7 *astragali* 28 cattle teeth and 3 swine teeth also 300 g pottery and 100 g stones	In 20 cm deep large (1 m diam.) pit near four-post outbuilding	Buitenhuis 2002, 219
Tiel - Medel 8	Cattle skull with horn(s?), together with some BA sherds, wood and antler fragments midway in infill	MBA well, possibly lined	De Leeuwe & Van Hoof 2007, 65-66
Tiel - Medel 8	Part of a cattle skull with horn(s?), *c.* 1 kg, with some BA sherds, and some stones and pig bones	MBA-B well, with dated notched log ladder, possible LBA intrusion by overlying LBA house plan	De Leeuwe & Van Hoof 2007, 66
Tiel - Medel 8	Near-complete cattle skull with horns, two holes punched with traces of suspension straps.	MBA or LBA well, from lowermost fill, near cluster of LBA structures	De Leeuwe & Van Hoof 2007, 66; Cavallo & Van Groenesteijn 2007, 139
Hoogkarspel - Bullenland	Complete cattle skull and two horn cores	Skull in third, cores in second period barrow (MBA-A?) ditch	Modderman 1974, 257
Wervershoof - De Ark / XIII	Complete cow skull and fragments of other skulls	From ring-ditch of multi-phased (MBA?) barrow	Van der Waals 1961, 101
De Bogen	Cattle lower limb (articulated) in pit with other (mostly cattle) bones (*c.* 2 kg, a.o. horn core and cranial fragments) also barbed wire-stamp decorated sherd, some burned clay and few other stones and flints	Pit (1 m diam., 34 cm deep), west of house 28-1AH (EBA *t.p.q.*)	Hielkema, Brokke & Meijlink 2002, 263-264
Zwaagdijk - Oost	Lower limbs of cattle (articulated) in bone-rich (refuse?) pit	Pit (1.7 by 1.15 m diam., 38, cm deep), on MBA-B-LBA settlement site	Ufkes & Veldhuis 2003, 76
De Bogen	Remains (10 g) of burnt neonate piglet, different body parts	Posthole of house 28-1AH, possible entrance portal	Hielkema, Brokke & Meijlink 2002, 252
Lienden	Back half of 3 months old piglet, different body parts	Pit (60 cm diam., 30 cm deep) next to outbuilding	Buitenhuis 2002, 219

Table 8.2 Possible depositions of animal bones.

It is plausible that (cattle) horns too had special significance to Bronze Age communities. This may be assumed based on the horn-like protrusions of the Bargeroosterveld cult building,[71] the deposition of cattle horns in the peat,[72] and – outside the Netherlands – the presence of horned helmets in metalwork and iconography and enigmatic horn-shaped clay objects.[73] Horns may also have figured in depositional acts within settlements. The presence of cattle horn cores in a stray posthole at Eigenblok and from two postholes of a granary-type outbuilding at De Bogen may be examples of this. At 3 m to the south of the latter outbuilding, in a pit with other livestock bones, remains of one or two skulls of young bulls were found (Hielkema, Brokke & Meijlink 2002, 159) and one may speculate whether the two deposits were related. Two right horn cores of sheep from a small posthole at De Bogen may also have been an intentional deposit. Additionally, some assemblages of animal bones are so distinct in composition that an interpretation as refuse can be refuted. Examples are the pit with *astragali* and teeth at Lienden or the two skulls interred with a young calf at Velsen (table 8.2).[74]

Quern and other stone depositions

Worked stone, and querns in particular, form a third category of material culture that may have been a focus of intentional deposition during the Bronze Age. Quern depositions are known from funerary contexts (*e.g.* Hoogkarspel, Exloo, Angelslo, Lent),[75] as well as from the 'wet parts of the landscape' (*e.g.* Exlooërmond, Oosterhout; table 8.3),[76] but querns are also frequently found at settlement sites. Arguing for ritual rather than pragmatic backgrounds to their incorporation into the archaeological record at settlements, is again difficult. Grinding stones may have been discarded if broken (when re-roughening or dropped) or eroded to a point beyond that which was considered acceptable.[77] Nonetheless, in cases when both handstone (runner) and grinding slab (quern) have been interred,[78] simple discard may be excluded. In some other cases, the context of the querns recovered (such as in the well at Tiel - Medel 8) or the fact that they have been (deliberately?) fragmented such as at Rhenen - Remmerden (table 8.3) suggests intentional deposition. In cases where querns are found mixed with other finds (*e.g.* Zwolle, Elp, Boxmeer; table 8.3) or only quern fragments are recovered, such an interpretation is difficult to substantiate.

For example, at Eigenblok site 5, an amphibolite anvil may have been deliberately fragmented and spread across the house-site (Jongste 2002b, 595). While the distribution of these fragments is interpreted as clustering near the house entrance (Van Gijssel *et al.* 2002, 288), this 'cluster' weighs only 10 g (with a reconstructed anvil weight of over 280 g) and the distribution of amphibolite fragments appears to be much wider and – more importantly – is similar in shape and size to that of the other settlement debris, such as the pottery.[79] This indicates that the fragments need not have been deliberately spread across the house-site as part of abandonment rituals (*contra* Jongste 2002b, 625). Nonetheless, the observable fine fragmentation of such durable worked stone did not occur naturally, indicating that here intentional fragmentation, rather than intentional deposition may be at play.

In addition, there are examples of stones other than querns being deposited. The two depositions at Heiloo and Buren involving flint sickles are good examples (table 8.3). Collections of unworked stones may also have been buried intentionally. At Molenaarsgraaf, a concentration of 79 quartz and quartzite stones may have been deposited

71 Van Zeist & Waterbolk 1960; Van der Sanden 2000.

72 Prummel & Van der Sanden 1995, 113.

73 *E.g.* Briard, 1987, 100, 124; Osgood, Monks & Toms 2001, 28; Kristiansen & Larsson 2005, 330-334. For examples of the horn-shaped clay objects see Briard 1987, 26-27.

74 Additional examples of the possible special or ritual importance of cattle teeth are the deposit of a (Late Neolithic to Early Bronze Age) porphyry axe and cattle teeth at Uitgeest - Achterloet (Kok *in press.*, section 4.2.1.1) or the teeth in the hand of the teenager buried in the De Bogen barrow during the (Middle) Iron Age (Hielkema, Brokke & Meijlink 2002, 211).

75 See Lohof 1991b, nos. 071-1/2 (Bronnegerstraat - II), 086-0 (Emmerdennen - I), 123-1/2 (Koningskamp - II), 172-0 (Noordseveld - 34) and 256-1/2 (Drouwenerstraat - VII) for other examples of possible quern (fragment) depositions in barrows.

76 See also Kok (*in press*, section 4.2.1.2) for a possible Late Neolithic/Early Bronze Age quern deposit from the beach barrier near Limmen.

77 In more mobile modes of subsistence, such as that of the Australian aboriginals, querns may be buried for future use and are thus protected from the elements (Holmberg 1998, 134). See Holmberg (1998, 133-134) for some other ethnographic examples of grinding stone production and use.

78 *E.g.* Rosmalen, Helden, Angelslo, Apeldoorn, Hoogkarspel; table 8.3.

79 Compare Van Gijssel *et al.* 2002, 298 fig. 5.11 versus Chapter 6, fig. 6.36.

Site	Content	Context	References
Tiel - Medel 8	Diorite quern of 1.7 kg, possibly used on two sides	In topmost fill of LBA well	Van Hoof & Jongste 2007, 124 fig. 6.12e
Rolde	Saddle quern and fossil urchin (BA date based on ceramics)	In possible refuse pit	Van der Sanden 1992b, 71
Zwolle - Ittersumerbroek	Granite quern and 63 bronze age sherds, also some stones and flint	Pit, overlaps with older pit, in EBA-LBA possible settlement site	Van Beek & Wevers 1994 , 54-57
Rosmalen - Site 8	Complete saddle quern and runner stone. Quern inverted over runner stone	In pit (70 cm diam., 35 cm deep) at intersection of Fence lines at (BA to?) EIA settlement site	De Koning & Vaars 2003, 32; 35
Helden-Panningen	Complete quartzite saddle quern and runner stone (normal positions)	Surface level, no feature visible, possible BA site?	Kenemans & Goosens 2002, 14 fig. 9
Angelslo	Complete saddle quern and runner stone.	Precise context unclear, at MBA-LBA settlement site	Harsema 1979a, 15-16
Elp	(near-) Complete quern and other stone (quern?) fragments	Pits north of house 12, settlement site datable to the MBA-B/LBA transition	Waterbolk 1964, 110; 128, fig. 22
Boxmeer	Complete quartzite quern (possibly with few MBA sherds)	In pit of pit-cluster at 10 m from a MBA-B house	Van der Velde 1998, 32 Hiddink 2000
Oosterhout - Rustwat	Complete quartzite saddle quern	In residual gully. Traces of burning and ditch structures and bronze dagger on levee (possible deposition site)	Van den Broeke 2002a, 20
1e Exlooërmond - Markiezenveen	Complete saddle quern and runner stone.	Precise context unclear, found during peat-cutting	Harsema 1979a, 15-16 Van der Sanden 1998, 115
Apeldoorn	Complete granite saddle quern and runner stone.	Precise context unclear, near Uddelermeer, stray find (ploughed up)	Hulst 1990, 187; 189
Apeldoorn - Solsche Berg	Complete granite quern (unpublished inventory list Bursch)	Found during barrow excavations (tum. VI)	Bursch 1933, 75-76; Q. Bourgeois, pers. comm. June 2007
Hoogkarspel - Bullenland	Complete quern and runner stone, quern inverted (work face down)	Just outside ring-ditch of third barrow (MBA-A?) phase	Modderman 1974, 255-258
Exloo-Paasberg	Complete saddle quern	In stone lining in EBA barrow	Harsema 1979a, 15; Harsema & Ruiter 1966
Angelslo - Emmerhout - Tum. II	Complete saddle quern	In stone packing in or on top of (MBA-A?) barrow	Van der Waals 1963b, 251-252
Lent - Smitjesland A	Complete quern	In cluster of urned cremation graves dated to the final two centuries of the MBA-B	Van den Broeke 2002a, 21
Eigenblok	Fragmented amphibolite anvil, deliberately smashed?	Spread across surface area of house-site 5	Jongste 2002b, 595
Rhenen - Remmerden	Three fragments of complete granite quern (7.2 kg), (burned and broken) Fragment (3.9 kg) of second granite quern. Also some (443 g) BA sherds	In pit (86 cm diam., 16 cm deep) in pit cluster of EBA to (M?)BA date	Jongste 2001, 43; 44 Kars 2001, 44-45
Buren	Surface finds of several fragments of five flint sickles (LBA-EIA)	Unclear, stray finds (possibly deposition)	Hulst 1987, 207-208

Table 8.3 Possible quern and stone depositions.

Site	Content	Context	References
Heiloo	Four flint sickles and a bronze sickle planted straight up, bronze one in the middle	Unclear, stray find	Brunsting 1962
Molenaarsgraaf	Concentration of 79 quarts and quartzite pebbles, one clay-stone	At Bell Beaker to EBA settlement site (pit not visible?)	Louwe Kooijmans 1974, 236
Meerlo - Meerloërheide	Concentration of 40-60 quarts pebbles	At LNEO to MBA-A possible settlement site? (pit not visible?)	Verlinde 1971, 44
Zwolle - Ittersumerbroek	White quartz pebbles, nothing else	In a few (possible storage) pits on EBA-LBA possible settlement site	Verlinde 1993, 46
Den Haag - Bronovo	Pit with many fire cracked stones and pit with ring of stone	At possible MBA-A settlement site: pits or postholes?	Waasdorp 1991, 229-230; Bulten *in prep.*

Table 8.3 (continued) Possible quern and stone depositions.

(Louwe Kooijmans 1974, 236).[80] From Meerlo and Zwolle, similar depositions of quartzite pebbles are known (table 8.3). It is important to realize that these collections of pebbles are the raw material with which, after fragmentation, pottery was commonly tempered. Such pebble clusters may have been collections of tempering materials, or may have been perceived as being representative thereof.[81] Generally, however, clusters of stones are not commonly found on Bronze Age settlement sites. For a collection of fire-cracked (cooking?) stones at Den Haag - Bronovo, it is not clear whether these stones once served as post packing, or whether they were intentionally deposited in a posthole or small pit (Waasdorp 1991, 329).

Non-metal object depositions at Bronze Age settlement sites: a conclusion

The examples discussed above indicate that while depositional acts can only seldomly be associated with structures such as houses or outbuildings,[82] object deposition *per se* was not uncommon at (possible) settlement sites. The object categories involved in such depositional acts can be characterized as domestic, transitory or transformative, and the process of fragmentation may have been one of the key elements. To start, all object categories are strongly connected to food production or food processing. Pottery served to store and prepare foodstuffs, livestock may have provided dairy products as well as meat, and querns were presumably also related to the daily task of the preparation of cereals and possibly other foodstuffs. Querns may have actually been used by the household for food preparation prior to deposition, or may have symbolized such activities.

Nonetheless, while outspokenly domestic, in the spatial patterning of such deposits no evident structural proximity to houses can be argued for. Rather, settlement sites as a whole appear to be suitable arenas for such depositions. For instance, while pottery deposition may have been more dominant on (possible) settlement sites, it is not altogether absent in other domains of the cultural landscape.[83] For example, pottery that cannot evidently be interpreted as grave goods may have been deliberately fragmented and placed in Early Bronze Age barrows.[84] Moreover, the presence of both grinding stones and skulls in barrow ring-ditches has been documented (tables 8.2-8.3). Similarly, the quern from the residual channel at Oosterhout (Van den Broeke 2002a, 20) and a radiocarbon dated cattle horn from a peat bog (Prummel & Van der Sanden 1995, 133), indicate that 'domestic' items were part of the depositional traditions that, in 'wetter' locations, seem otherwise to be predominantly focused on metalwork

80 A comparable find was discovered at Meerlo - Meerloërheide, but there the dating of the pit with pebbles is indeterminate, but presumably Late Neolithic to Early Bronze Age (Verlinde 1971, 44). See also the Iron Age pot with 586 pebbles placed in the posthole of a possible structure at Boekel (Arts & De Jong 2004, 4).
81 See also Darvill (2002, esp. 76-84) on the use and possible significances of white quartz in Neolithic societies.
82 They thus do not represent foundation deposits or abandonment deposits related to structures, *cf.* section 3.4.3.
83 See examples in tables 8.1-8.3.
84 *E.g.* Lanting 1973, 224; 226; Bourgeois & Fontijn 2007, 9.

deposition. I should stress the use of the word ‘seem’, as for organic materials such as horns, antlers, hair or wool, chances of preservation and recovery (during former peat-cutting campaigns or dredging) are lower, and their age can only be assessed by expensive absolute dating techniques, which means that their presence is presumably underrepresented. Having said this, settlement sites may remain more prominent arenas for the deposition of items related to domestic tasks.

Second, the presence of such items – rich in domestic connotations – in domains otherwise kept more discretely separate is remarkable.[85] For some reason, these items were part of wider conceptual schemes that allowed them to be transferred meaningfully between the different domains. Possibly, their associated meanings and even practical functions changed significantly upon such shifts of domain. For example, Brück (2005, 152; 2006, 302; 305) has suggested that querns and grinders which are found in Bronze Age funerary contexts in the United Kingdom, may have been used to further fragment cremated human remains. Such interpretations are plausible and it is, for instance, debatable whether a deposition of an animal skull in a pit on a settlement site carried similar connotations, or served similar purposes, to the deposition of a skull in a funerary ring-ditch. In any case, for domestic elements such as pottery, grinding tools and animal parts it was considered appropriate to transgress domain boundaries. I have argued earlier that for other domain constituents, such as metalwork deposition and monumental burials, segregation may have been much stronger. Why these items figured in comparable ways in depositional acts in the different domains is unknown, but some suggestions may be made.

Livestock, herded and grazed in locations distant from the houses, need not have been perceived as being conceptually bound to settlement sites. To use their skulls, feet and horns in other parts of the landscape rather than only those with domestic uses, may therefore have been considered unproblematic.[86] As for pottery, it is possible that the range of associations was much wider than expressing solely domestic affinities.[87] During the Bronze Age, a transition took place from ceramic vessels being interred as grave goods, to being used as cremation containers. This suggests that their functions and connotations depended on type, contents and context. In any case, the Early Bronze Age tradition of depositing sherds in, or under, barrows rather than using vessels as grave gifts (or urns), indicates that a long tradition of pottery use in funerary contexts changed radically at the start of the Bronze Age.[88] Nonetheless, most pottery depositions appear to take place on, or near, possible settlements.

The querns are the most outspoken example of domain crossing depositions. Whilst found mostly on possible settlement sites, they are also found at funerary sites and in ‘wet’ depositional locations. Although the presence of grinding stones in a stone barrow capping may be unintentional re-use of (previously) discarded stones, the examples from Lent and Hoogkarspel show that in most cases it may have been their (potential) grinding (*i.e.* fragmentation) capacities rather than basic material properties that mattered. While the querns at funerary sites could have been discarded after being tabooed by specific funerary acts (*e.g.* food-preparation or even the crushing of human bones), the presence of querns in residual gullies or other peaty environments remains enigmatic. It seems improbable that they served any functional purpose in these locations prior to being deposited there. Rather, these are cases of placing a domestic element *par excellence*, the quern, in locations that were perceived as suitable for object depositions but in which generally other categories of items (predominantly metalwork and particularly weapons) were placed (*cf.* Fontijn 2007). Therefore, although the intentions and emotions behind such individual depositional acts cannot be retraced, it seems improbable that Bronze Age communities were not aware of the domain-crossing aspect of such acts. Querns were not simply left behind in – or near – houses, but ended their life-paths in bogs, residual gullies or incidentally near barrows, and most frequently buried in pits. Similarly, in specific circumstances pots (frequently decorated) were broken and placed in small pits. The fact that some are inverted or that sherds are carefully stacked or placed vertically, excludes the possibility of casual discard. These were deliberate acts in which the use-life of specific pots was put to an end by fragmenting them and placing (part of) the fragments into the ground.

85 For example, there is no clear-cut tradition of metalwork deposition or the construction of monumental graves on settlement sites.
86 Like the role of the fences, which I have argued integrated wider areas into settlement site space, the movements of livestock may be perceived as integrating domestic (*i.e.* literally domesticated) elements and connotations into the wider environment.
87 *Cf.* Yates 2007, 39, who discusses a deposit in a disused well dated to the Late Bronze Age (*c.* 1050-780 cal BC) at Radley (UK), in which all three main categories of non-metallic depositions (pottery, skulls and stone) figure combinedly (an inverted cattle skull placed on a tripartite bowl and a horse tibia, with a large piece of quartz and quartzite pebbles nearby.
88 Sometimes complete beakers may have been interred; *e.g.* Modderman 1959b.

It may be that this deliberate fragmentation (pots into sherds, live animals into skulls, horns and feet) and the tools of fragmentation (querns) were related to notions of regeneration and fertility. For the English Bronze Age, Brück has cogently argued that such fragmentation may have been perceived as being analogous to the processing of cereals, ore-processing or the use of stone tempering, in which generative forces of raw materials are activated through fragmentation (Brück 2001b, 153-155; 2006). As such, depositional acts involving the three categories described above may have been related to, or may have been perceived of, as directly ensuring or affecting, the fertility and well-being of the associated households.

8.2.3.6 Everything in its right place: the essence of the Middle Bronze Age(-B) cultural landscape

At the start of the Middle Bronze Age-B, a period of significant categorization of landscape use became manifest. Separate domains for monumental burials, (metalwork) deposition in 'wet locations' and domestic and agricultural activities were created and maintained over long times in different parts of the landscape: everything had its right place. In particular, the extensive manner in which the environment around the houses was structured in the river area, presents a clear-cut break with preceding periods. Bi-axial fence-systems (and in some regions ditch-systems) compartmentalized and integrated large areas into settlement space. Above-ground constructions left a human mark on the landscape at an unprecedented scale.[89] Next to practical functions (*e.g.* setting apart plots for crop cultivation or grazing, the accommodation of house-sites or livestock management) such fence-systems may have served as boundary markers both *within* and *between* communities. Within such fence-systems, areas around the Middle Bronze Age-B houses can be identified that were chiefly used for domestic activities, as is indicated by the distributions of finds and outbuildings, which are both centered on the houses. Areas of hundreds of meters around Middle Bronze Age-B houses may have been fenced, but fences were generally not constructed with the intent to gird house-sites. Within this built-up part of the cultural landscape, the majority of domestic and some of the agricultural tasks of Bronze Age households were undertaken.

The processing of foodstuffs, hide and textile production and various other tasks may have been undertaken near houses, although probably not exclusively near houses. There are almost no indications that artisanal activities which required larger open or controlled fires, such as pottery production or metalworking, took place at close distances to the houses. While much of the time of the household occupants will have been determined and occupied by tasks related to crop-cultivation and livestock breeding, households and communities were invariably parts of wider social networks, to which also time and resources were devoted. At the level of the neighbourhood, close contacts ensured that help was offered when agricultural tasks (harvesting, exchange of breeding stock), illnesses or threats of violence –such as raids – called for it. At the level of wider (local and regional) communities, contacts were maintained that allowed special goods to be acquired and (relationship) partners to be found. In such more large-scale networks, the dissemination of both practical (*e.g.* house building) and esoteric (*e.g.* cosmological) knowledge presumable took place as well.

With respect to burial customs, we must conclude that settlement sites were not the places for disposal of most of the dead. There are a few cremations known at Bronze Age settlement sites, but unmarked (*i.e.* 'flat' or inhumation) graves and barrows were as a rule not constructed there. It seems that the majority of the dead from this period have disappeared without a trace. Excarnation, surface level graves, or riverine disposal may all be valid, albeit unproven, explanations. Of the segment that *was* archaeologically visibly interred in the monumental barrows, it is difficult to ascertain what percentage of the living population they represent. Such barrows were mostly constructed during the Middle Bronze Age-A, which is a period during which the archaeological visibility of houses is very low. Consequently, it remains unclear how domestic sites and monumental funerary sites interrelated directly prior to the Middle Bronze Age-B. In any case, during the Middle Bronze Age-B the distribution of barrows – which were by then less frequently constructed and tended to cluster near and on top of older barrows – is more or less exclusive to that of the now clearly recognizable houses. Barrows cluster in the higher or highest parts of the micro-topographic landscape, possibly because of the commanding views from them, or due to other cultural preferences for an elevated

89 For an example of an approximation of the scale of landscape usage by single households in the northern Netherlands see Fokkens (1998, section 9.4), who argues that a 5 to 15 person household (assuming 1:10 crop yield factor) would use between 2 to 5.6 ha of arable, while for the house-site only 0.5-1 ha was used (*ibid.*, esp. 142 table 25).

position. Extensively excavated barrow clusters do not yield contemporary habitation traces, indicating that the living had no place in the realm of the dead. From their elevated locations, deceased turned into – or appropriated as (mythical) – ancestors may have been considered to overlook, legitimize or steer the locations of the domestic sites and the agricultural use of the lands around such monumental burials.

Object deposition took place in all parts of the (cultural) landscape, but the types of objects involved and the contexts within which such depositions were placed, again reflect a strong categorization of (cultural) landscape zones. Within and around the settlement sites, depositions of fragmented (decorated) pottery, skulls and sometimes querns in pits occurred. Metalwork is generally scarce on settlement sites, but there are slight indications that weaponry may have been intentionally left at Bronze Age settlement (and funerary) sites in the river area and in the regions to the north of it. Nonetheless, to the south of the river area this is no common pattern, as there most bronze items (including weaponry) have been recovered from streams, marshes and other 'wet zones' in the landscape. These 'wet zones' are the opposite of the Middle Bronze Age-B settlement sites, in the sense that no built structures are present there and that human impact on the appearance of the natural environment may have been minimal. The fact that some such locations have nonetheless yielded significant numbers of deposited items that date from different periods, suggests that the system of classification or landscape 'reading' that determined the 'proper' locations for object depositions in the unaltered wetter zones of the landscape, was similar over long periods.

To sum up, for several centuries after the start of the Middle Bronze Age-B, a cultural landscape was maintained in which properties of regularity and categorization appear to have been of chief importance. Settlements were foci for the interactions of people with each other. They were situated in gradient-rich locations near active river courses or streams. Thus, areas for crop-cultivation, livestock grazing and active river channels (used for riparian resources and contacts) could all be easily accessed from the settlements. The absence of monumental burials may indicate that those deceased for which such a funerary ritual was appropriate (*e.g.* those ceremonially converted into – specific – ancestors?) had no place amongst the living. Instead, isolated barrows and barrow clusters were constructed in slightly higher locations (which could comprise the highest parts of fluvial deposits, coversand ridges or the ice-pushed hill deposits). Thus, the proper location for ceremonial interactions of people with the ancestors, may have been one that was distant from the settlement, and preferably situated at an elevated location. While older monumental graves may have been incorporated into settlements, it appears that new ones were only very rarely constructed on or near house-sites during the Middle Bronze Age-B. Depositions seem to have occupied a distinct spatial domain within the wider (cultural) landscape as well. While some categories of items, such as querns, pottery and cattle skulls – which may all have carried domestic connotations – were deposited in a wide range of locations (settlements, funerary sites, natural wet areas), deposition of metalwork is again concentrated in specific landscape zones. Confluences of rivers, streams and marshy locations in particular were places where metalwork was repeatedly deposited. Weaponry seems to have been preferably placed in larger rivers, as this category of metalwork is rare (but not completely absent) from graves and settlements. A schematic representation of the different geographical distribution of such depositional, funerary and domestic domains in the physical landscape of the Dutch (eastern) central river area is offered by figure 8.11.

Settlements with some numbers of houses are found on levee and crevasse deposits of inactive fluvial systems as well as on crevasse splay deposits of inactive rivers of different types. Around such occupation clusters, extensive systems of landscape structuring executed in fences were present, which may have linked-up, or may have deviated purposely in orientation between settlements. Within and around such fence-systems, the higher sandy to silty parts of the landscape could be used as crop-fields, while the grazing of livestock could take place in the lower-lying areas near and in the floodbasins. The main rivers around such habitation clusters were used for contacts, fishing and (metalwork) deposition. Residual gullies and areas of (floodbasin) peat were presumably considered favoured locations for object deposition.

Possibly, parts of this strict categorization started to deteriorate during the last two centuries of the Middle Bronze Age-B. Rules of post-placement that had dictated the construction of houses for two to three centuries seem no longer to have (been) applied as strictly. Additionally, the outbuildings that were (particularly in the river area) closely bound to houses and shared the orientation of them, seem no longer to have been strictly placed in close proximity and with corresponding orientations. The concept of a structured house-site like that current in the river area during the Middle Bronze Age-B seems to have waned. Extensive fence- or ditch-systems, from which an integrative attitude to landscape structuring of the settlement site environment may be inferred, were no longer present. For reasons yet ill-understood, rules of regularity and categorization that were more rigidly applied during the Middle Bronze Age-B, were more open to manipulation at smaller spatial scales during the Late Bronze Age. This signaled the end of the typical Middle Bronze Age-B structuring of the wider (cultural) landscape, and that of the agricultural habitation clusters situated within it.

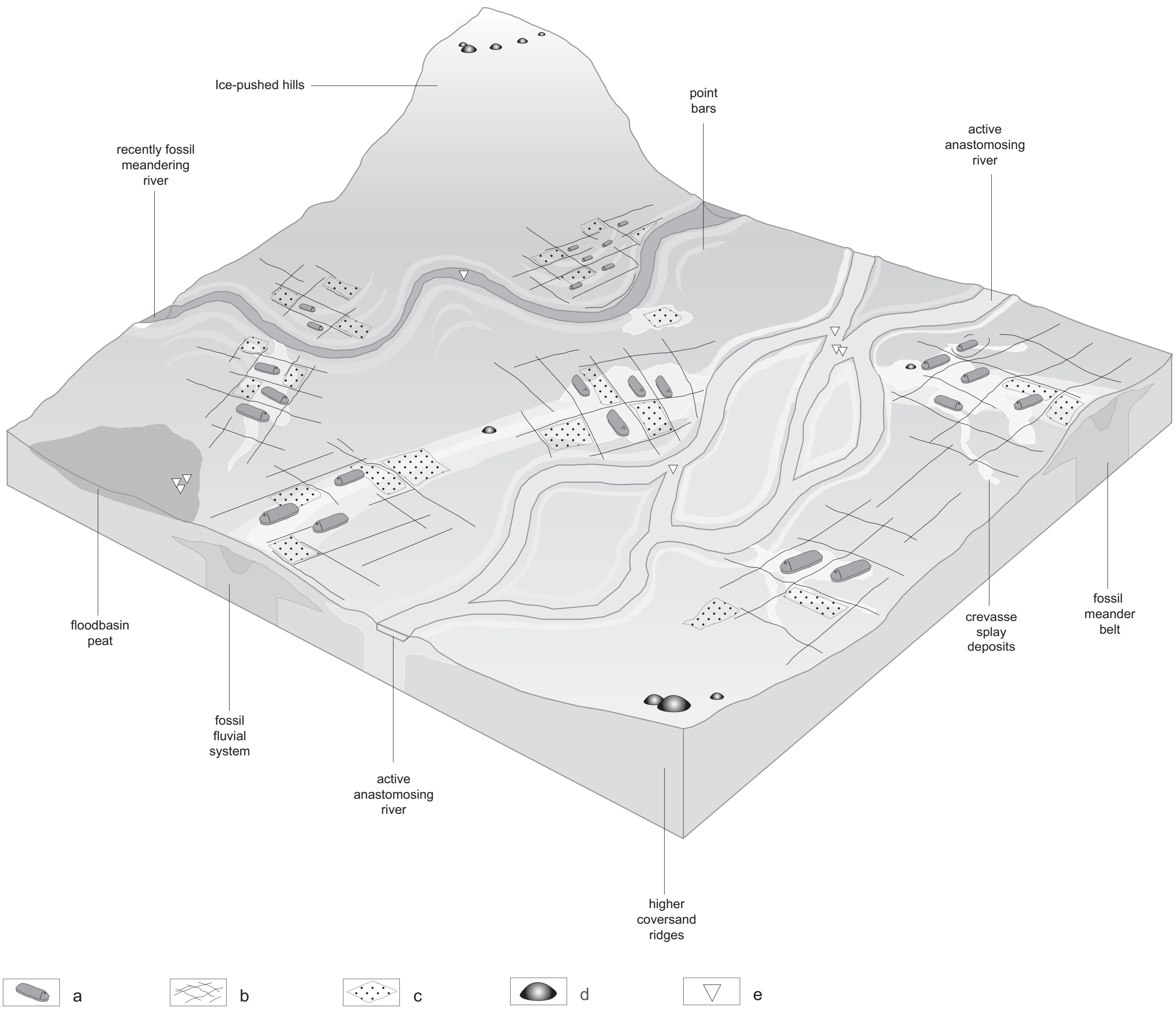

Fig. 8.11 Schematic simplefied representation of the Middle Bronze Age-B cultural landscape elements and their distribution in relation to simplified geogenetical units in the Dutch (eastern) central river area.

a: house-sites, b: fence systems, c: crop fields, d: barrows (mostly pre-MBA-B), e: metalwork deposition.

8.3 A living landscape: epilogue and ways forward

In the previous sections of this chapter, I have tried to characterize the essence of the Middle Bronze Age(-B) cultural landscape and the communities present within it. Although several of the examples presented originated from the Dutch river area, the sections above did not focus on the river area in particular. However, I have argued throughout this study that the Dutch river area deservedly can be studied as a region on its own for its particular cultural and landscape dynamics. Therefore, in the section below I will summarize and combine the results from the previous chapters and the discussions above into a narrative that deals with the Dutch river area in particular. Here, it will be clarified why above all, the Dutch river area during the Middle Bronze Age was a 'Living Landscape', as the title of this study suggests.

8.3.1 Living landscapes and landscapes for living

In this study, I have shown that Bronze Age occupation in the Dutch (eastern) central river area was widespread, clustered and possibly dense, even in locations where nearby active fluvial systems may have affected occupation. This is a period of successful agricultural living in a landscape very much alive. Most probably, Bronze Age communities in the Dutch river area were intricately acquainted with the effects and periodicities of fluvial dynamics. They monitored the rising and lowering of river and floodbasin water tables and tailored the locations, types and planting seasons of crops, and execution of other agricultural tasks accordingly. They were fully aware of the possibility that floodbasins which in one year were extensive and excellent pastures, could be fully submerged for months in the next.

The proximity of all sites to active main water courses (within an hour walking distance, but frequently shorter) confirms that settlements were preferably situated not too distant from active rivers. Conversely, the present absence of Middle Bronze Age-B habitation on the levees proper of active systems indicates that (prolonged) annual flooding was not reconcilable with a truly home-based (if they were indeed byre-houses) mixed-farming strategy. Most likely, the increased risks of crop-failure and general health hazards to animals and people alike posed by stagnant water, rendered the levees of active anastomosing fluvial systems unfavorable habitation locations. With rivers of the meandering type, the swale and point-bar landscapes in the concave meanders may have been inhabited, although there too, flooding will have posed risks to crop-cultivation and health. However, near the end of a river's life-time – which may last for a mean of eight centuries, but often much longer – the process of avulsion could lead to a period of reduced fluvial activity in the last two to three centuries of its existence. This suggests that in these final centuries, flooding may have been much less frequent and that levee deposits may have been settled. At present, however, there is no conclusive proof of such swift occupation. Rather, it seems that mainly crevasse splay deposits originating from, or situated near, meandering as well as anastomosing active fluvial systems were occupied. Crevasse formation may have occurred somewhat more frequently at the end of an anastomosing river's life. After initial formation (which could take anywhere between a single season to several centuries) crevasse splay inlet channels may have become blocked. This means that sedimentation by such crevasses ended and that an (frequently extensive) area of sandy to silty deposits, nutrient-rich and well drained, became available for human occupation. If crevasse splay formation had occurred relatively quick, these were mostly treeless areas which did not needed to be cleared but could be used for occupation and crop-cultivation instantly.

Living on a crevasse splay deposit near an active fluvial system implies that incidental severe flooding may have occurred and that annual flooding of the lowermost areas of the surrounding floodbasins continued annually. Such continued floodbasin sedimentation was a consequence of rivers keeping up with sea-level rise and the superelevation of rivers relative to their floodplains by vertical (levee) aggradation. Because of the graded morphology in locations where levees and crevasse splay deposits merge into floodbasins, continued sedimentation and water table rise will have led to lateral spatial shifts of vegetation zones and spatial shifts of the (potential) usage of areas in the vicinity of the house-sites. Presumably, such shifts were perceptible on a human time-scale and Bronze Age children may have been told by their (grand)parents how much wider pastures were in the past. This gradual 'drowning', or more aptly, shrinkage or contraction of micro-topographic landscapes is documented at Eigenblok and De Bogen, but need not (solely) have been a reason for such sites to be abandoned.

Here, it should be stressed again that normal floodbasin inundation was not the only factor determining the net effect of sedimentation for Bronze Age occupants. Local subsidence will also have played an important part. When crevasse splay deposits form, taking sediment from the levees into the floodbasin, the energy level drops with distance from the main watercourse. This means that most of the crevasse splay deposits did not scour the underlying Pleistocene base. Therefore, such crevasse splays are prone to subsidence through compaction and oxidation of their underlying deposits. Consequently, save for locations where crevasse splay deposits overlie older levee or crevasse deposits that *have* a compaction-free (sandy) connection to the Pleistocene base, crevasse splays are more prone to subsidence and are therefore relatively more severely affected by subsidence and sedimentation than well-founded levee deposits. In locations where crevasse splay deposits from different phases (and/or systems) overlap, a locally very varied mosaic and compartmentalized landscape can develop in which the severity of processes of subsidence and sedimentation was locally distinctly different at short distances.

The observed strong correlation between the height of the micro-topographic landscape and feature density, such as for example at Eigenblok and De Bogen, indicates that such crevasse splay locations were not simply abandoned when processes of subsidence and sedimentation induced lateral shifts of landscape zones. Rather, they seem to have been used to the fullest, although possibly structures other than houses may have replaced farmhouses at the end. This suggests an exploitative or expansionist system of habitation, wherein all available locations were put to their best use. Where possible, house-sites seem to have been placed at *c.* 55 m mean intervals. This is a considerably smaller distance than can be observed for some sites in the Pleistocene regions of The Netherlands (Theunissen 1999, 113; 212-213; Fokkens 2003, 19). This could indicate that in the Dutch river area, the density of occupation may have been much higher than in some areas to the south and north of it (*cf.* table 8.4). Moreover, from the rebuilding of houses (up to three times) on the same house-sites, as well as from the available direct dates, the point is clear that once established, Middle Bronze Age-B house-sites were 'there to stay'. Individual houses may have sequentially sheltered multi-generational households over a time period of at least two to three human generations. Evidently, chosen locations were not given up easily. Consequently, it was presumably not just such gradual landscape 'drowning' that ended occupation, but rather the start of (renewed) more frequent on-site sedimentation. Such sedimentation could result from two fluvial processes, that frequently occurred combinedly.

The first process is the reactivation of residual gullies. Upstream of the inhabited areas, crevasse splay propagation or other processes may have resulted in the incorporation of previously inactive (and partly silted-in) residual gullies back into active fluvial networks. For example, the Eigenblok fluvial system's residual gully was reactivated at the end of the Middle Bronze Age-B, which resulted in the on-site sedimentation that presumably ended occupation there. At Zijderveld as well, the Zijderveld fluvial system's residual gully may have been reactivated as many as three times, of which the final one – at the end of the Middle Bronze Age-B – introduced a period of renewed sedimentation, that may also have necessitated the cessation of Middle Bronze Age-B occupation here.

The second process that could, through increased sedimentation, have complicated or ended occupation is new crevasse splay formation. For example, at the sites of Wijk bij Duurstede - De Horden and De Bogen, new crevasse splay deposits overlie the Middle Bronze Age occupation remains. Indirect arguments at both sites suggest that this period of crevasse splay formation should be dated to the Late Bronze Age and may therefore have ended previously established habitation.

It is striking that at nearly all sites, habitation seems to have ceased around or at the Late Bronze Age. I have indicated that at that time, a period of major restructuring of the fluvial architecture of the Rhine-Meuse delta as a whole took place (Stouthamer 2001). This involved an increased rate of avulsion and presumably increased crevasse splay formation. To put it more simply: more channels were formed in areas that had previously not seen nearby active sedimentation, while simultaneously new crevasse splays more frequently formed from existing systems. It is tempting to use this increased fluvial dynamics at (and after) the end of the Middle Bronze Age-B as an explanation for why only so few Late Bronze Age settlement sites are known, but this is only half the story.

I have argued that during the Late Bronze Age, the strict regularities that applied to houses and house-sites in the preceding (Middle Bronze Age-B) period no longer seem to apply. Neither do extensive fence-systems like those of earlier periods seem to be present.[90] In addition, the visibility of such sites may furthermore be hampered by: (a) an (initially, *c.* 12-11th century BC) low diagnostic character of the pottery in this region, (b) the fact that various settlement site elements (excluding the houses) are comparable in nature to those of preceding and ensuing periods and generally yield few datable finds, and (c) the fact that these sites are stratigraphically situated higher and are therefore more prone to disturbance by (sub)recent (agricultural) activities such as ploughing.

Nonetheless, the excavations at Tiel - Medel 8 have shown that in locations where no significant change in the fluvial depositional regime occurred, occupation may have spanned both the Middle Bronze Age-B and the

90 The available evidence on the subsistence strategies during the Late Bronze Age is limited, but suggests that the true mixed-farming system – although with a possibly somewhat decreased importance of cattle – continued (*cf.* Fokkens 1997, 366 and references; Brinkkemper & Van Wijngaarden-Bakker 2005; Arnoldussen & Fontijn 2006, 299 fig. 8).

Late Bronze Age.[91] At this site, the loss of several settlement site properties that characterize Middle Bronze Age-B occupation can be observed. For unknown reasons, the internal placement of the roof-bearing posts of houses was no longer as strictly rule-bound. Outbuildings were no longer placed in the direct vicinity of houses, nor did outbuildings conform to nearby houses in orientation. Additionally, much wider ranges of orientation for settlement site elements (comprising houses, outbuildings and fences) were allowed. It is unclear whether such wider ranges of orientation should be interpreted as reflecting a larger time-depth (*i.e.* consecutive habitation, not conforming in orientation) or whether they were (partly) contemporary and it was simply their orientation that was much less important. The communality that may be reflected in the uniform bi-axial orientation of houses and fence-systems in the Middle Bronze Age-B, cannot be recognized for the settlement sites from the Late Bronze Age in the river area. Possibly, urnfields rather than the settlement sites became the foci for expression of such feelings of communal belonging.[92] There, in locations that were often linked to older funerary monuments, a now much larger segment of the population may have been buried. The contents of the funerary rituals also changed significantly, as urned cremations become dominant and sets of grave-goods explicitly referring to social personae are rare to absent.

While essentially individual graves, the construction of urnfield graves was possibly still a task undertaken or witnessed by a local community above the level of the individual households. Participation and offers of support may have cemented bonds which I have argued to be crucial in self-sufficient small-scale agricultural communities. Possibly, such ties were created through communal involvement in the construction of fence-systems, settlement site boundaries,[93] and presumably the construction of houses in the preceding Middle Bronze Age-B. The long, regular, three-aisled Middle Bronze Age-B houses are (from an etic archaeological perspective) indeed the most ubiquitous, visible and durable monumental elements of the cultural landscape constructed by these communities.[94]

Larger work-forces than minimally necessary may have been involved in erecting the timber house skeletons and in providing them with wattle and thatch skins. The communal labour of house-construction, and the festivities that may have accompanied it, created and solved reciprocal debts and provided arenas for social contacts and shows of (household and/or community) prowess. Houses were built with the aid of those who – in the near future – would call for help whenever needed, for instance at harvesting. In such situations of frequent, and vital, inter-household interaction, it can be understood that information – such as the proper ceremonial and technological means to place the roof-bearing posts of houses – was quickly and widely spread amongst different communities. For some reason, the body of information on the proper placements of farmhouse posts was less open to manipulation during the Middle Bronze Age-B. I have suggested that house construction may have been placed in cosmological schemes of reference in which analogies between the house structure and ancestral anatomy or genealogy were applied. In non-industrial agricultural societies, ancestral approval and blessings are often considered vital to the fertility of animal and human household members and that of the lands they work and use. Whatever the exact cosmological backgrounds to house-construction in the Middle Bronze Age-B were, they were not open to alteration for several centuries.

Perhaps during the Bronze Age, shifts in the preferred domain for architecturally elaborate (or monumental) timber constructions can be outlined. In the Middle Bronze Age-A, the barrows with elaborate and multiple post-circles upstage (in any case in archaeological terms) the (visibility of the) houses. During the Middle Bronze Age-B, a reversed situation occurred, when long, regular, and architecturally elaborate houses dotted the landscape and barrows less frequently had timber structures. Around the 12th century again a reversal took place, when long elongated (first oval, later rectangular) barrows with post-settings were built that may have metaphorically referred to houses in their shapes and post-placements (*e.g.* Roymans & Kortlang 1999, 49). At this time, the normal houses were constructed in a much less rule-bound manner (*i.e.* open to more local and regional variation). Unfortunately, the number of extensively excavated Late Bronze Age settlement sites is low, which means that comparisons between

91 Van Hoof & Jongste 2007; Van Zijverden 2007; Van Zijverden, Jongste & Zuidhof *in prep.*

92 Gerritsen 2003, *cf.* Lovell 1998.

93 See also Yates 2007, 129 on the possibilities of communal construction of the Dartmoor reaves (*cf. op. cit.*, 135).

94 The extensive fence-systems may with equal validity be regarded as 'monumental', but their use-life seems to have been much shorter. Houses may have 'outlived' several phases of landscape structuring with bi-axial fence-systems. Barrows and barrow clusters can rightly be called visible and monumental elements in the landscape as well, but the available evidence suggests that these often pre-date the Middle Bronze Age-B. Barrows from this period are thus presumably not as common and not as widespread.

regions are difficult to make. The typical urnfields of the Late Bronze Age are consequently known in much larger numbers than the settlements of those who constructed them. However, despite these changes, the differences in categorisation between the Late Bronze Age and the Middle Bronze Age-B cultural landscapes are presumably more gradual, than categorical in nature. In the Late Bronze Age, the construction of funerary monuments (now smaller and in larger numbers) was as a rule still undertaken away from settlement sites. The deposition of metalwork in specific (wet) zones of the landscape not only continues, but intensifies (Fontijn 2003; *cf.* fig. 8.13). The special significance previously assigned to regularity of the house, the house-site and the systems of fences within which they were placed, are now however lost.[95]

To sum it up, this study has shown that the Dutch central river area may have been a favourable region for occupation throughout the entire Bronze Age (*cf.* fig. 7.10). The nature of the occupation differed however markedly between the sub-phases of the Bronze Age. For the Early Bronze Age and Middle Bronze Age-A, settlement sites have been shown to be difficult to recognize. The different settlement site elements are not standardised and frequently human presence can only be traced archaeologically by radiocarbon dates and typologically dated pottery. A more varied residential mobility and broader range of site types is generally seen as causing the poor recognizability of settlement sites in these periods. I have argued that this need not have been the case. Special activity sites have been shown to be a category of sites that is archaeologically difficult to identify, while for the few excavated sites no evident indications of discontinuous (seasonal, intermittent) use could be outlined. These sites could have been just as permanently settled as those from later periods. They differ however in several other aspects. Only with the start of Middle Bronze Age-B does an extensive and compartmentalized landscape emerge around the location of the now much more standardized houses. These houses may have lasted for several generations and presumably formed the conceptual and spatially central nodes for the execution and distribution of both agricultural and domestic tasks and outbuildings. Between and beyond the houses, extensive fence-systems were constructed. Away from the land parcelled for domestic and agricultural use, deposition sites and funerary landscapes developed. While some of this categorisation of the wider cultural landscape may have lasted into the Late Bronze Age, houses and house-sites then no longer reflect the concepts of regularity and consistent placement innate to the cultural landscape of the Middle Bronze Age-B.

Moreover, I have shown that the river area was by no means a marginal, risky or unfavourable landscape to settle. Quite to the contrary, I have argued that the mosaic, graded character of the various very fertile deposits provided important benefits to Bronze Age occupants. While there were evidently risks of catastrophic fluvial events occurring, such events were rare and furthermore may have had only very local effects. I have argued that Bronze Age farmers were adequate landscape 'readers', who were aware of the fluvial dynamics at hand and how they (both positively and negatively) affected local agriculture. Moreover, any risks present were further reduced by living close to one's neighbours, who could be counted upon in times of need. Under normal conditions, both livestock breeding and crop-cultivation was prolific in the river area. To Bronze Age farmers, this living landscape was a landscape of good living.

8.3.2 Ways forward: knowledge gaps and potential fields of study

At the close of this study, I feel it is important to specifically identify a number of lines for further research and to briefly comment upon the wider implications of some of the conclusions reached in this study. They concern both purely academic issues, recommendations for archaeology as a fieldwork discipline and some issues related to heritage approaches in archaeology. Frequently they are closely interrelated, as academic research questions spring from what is presently known (affected by heritage and fieldwork strategies), while simultaneously questions raised in academic studies can often only be answered in the field and should steer heritage decisions. Consequently, in the sections below it is generally not possible (nor desirable) to discuss the arguments separately by field of relevance.

Concepts and models

To start, I have argued that the 'farmstead' concept cannot easily be used in the context of prehistoric settlement

95 In any case, this significance cannot be detected archaeologically.

archaeology. The word originated within a historical context of farm taxation (*i.e.* a tenure system of private ownership and inheritance) and the various publications on 'rural farmsteads' (Dutch: *boerenerven*) of the last decade mostly aim at describing (gender-divided) usage and garden structure of the farmhouse vicinity and the (regional specifics of the) vernacular architecture present during the last five to ten decades. Thus, the origin (and original implications), means (historic data, interviews) and end-goal of present-day farmstead studies bear little relevance to archaeological situations. This point is, however, rarely recognized. Archaeological reports are littered with the use of the word 'farmstead' (Dutch: *erf*), carrying a wide range of meanings. Sometimes, a structured house environment is implied, but more often the term stands as shorthand to indicate that the remains uncovered possibly, or presumably, indicate the vicinity of a later prehistoric farmhouse. The latter use is particularly faulty, as it does not aid in understanding or characterizing the remains uncovered and leads to a hollowing-out of the farmstead as an archaeologically applicable concept. Archaeologists should refrain from using the label 'farmstead' (*erf*) in such a manner. With the former usage, some links between the historical and archaeological house-sites studied can be made. Both seek to understand the composition and meaningful interrelations of the different elements present in the vicinity of a farmhouse as part of the wider agricultural and social systems. In archaeological publications, the content of 'farmsteads' presented in this manner should be made explicit: What house-site ordering is suspected to be present and why? Which elements are assumed to be interrelated and on what spatial scales is such interrelation played out (and best studied)? From such a point of departure, specific hypotheses can be put forward and tested. To put it more succinctly; the structuring of prehistoric house-sites should be a topic of research, rather than a framework of interpretation based on (false) analogies.

Second, I hope to have shown that the model most popular in describing the settlement dynamics of later prehistoric communities, the 'wandering farmsteads'-model – which assumes the periodical relocation of house-sites within a wider territory – cannot be uncritically applied to Bronze Age settlements. Foremost, I have shown that the single-phased house-sites predicted by such a model are in reality supplemented by house-sites that are clearly multi-phased. Moreover, I have shown that significant regional variation exists in the ways in which multi-phased house-sites evolved. For example, the repeated extension of houses is a typical property of house-sites in the north(east)ern Netherlands, while rebuilding of houses was more common in West-Friesland and the river area. Equally important, I have demonstrated that the assumed duration between, and motivations behind, such shifts are essentially ill-understood. If house(-site)s were indeed periodically relocated, what is the periodicity of such a system? For nearly all archaeological periods to which the 'wandering farmsteads' model is applied, this duration is in fact unknown. This is partly understandable, as solving this question calls for extensive excavations and detailed means of dating (be it pottery typology or absolute techniques).[96] However, archaeologists have also partly been overly confident in the validity of the commonly assumed motivations for such shifts (*e.g.* soil depletion, limited wood-durability and household dynamics). I have argued that even *if* soil depletion was problematic, this would only need to involve relocation of fields and/or the use of countering strategies (longer fallow, manuring) and need not have forced relocation of the houses *per se* (section 3.4.4). Moreover, there is actually only very limited data on the location, size, usage and depletion of later prehistoric agricultural fields.[97] Consequently, narratives that use soil depletion as a motivation for settlement dynamics or agricultural intensification (for instance the emergence of celtic-field systems), often lack empirical data that substantiates the locally variable susceptibility of soils to depletion, as well as detailed knowledge on the agricultural strategies (*e.g.* crop species, field size, fallow period, type and frequency of manuring) applied to them.[98] This gap in the archaeological knowledge of later prehistoric communities merits detailed attention to the study of prehistoric fields. As for the limited durability of timber constructions, the frequently quoted figures of 25-30 years may be a severe underestimation. I have indicated that based on field-tests, analyses of historic earthfast wooden constructions and direct radiocarbon dates for Bronze Age construction wood, life-spans of 50 to 100 years may have been common for Bronze Age house(-site)s (section 3.4.2). As this 25-30 year life-span estimate is also frequently used for domestic structures from the periods preceding and

96 I would argue that wherever possible, such extensive and high-resolution dating campaigns should be undertaken at future excavations of later prehistoric settlements.
97 This calls for future additional detailed studies on the properties of prehistoric fields and field systems.
98 *E.g.* Gerritsen 2003, 172-178; 226-231.

following the Bronze Age, archaeologists of those periods as well should invest considerable energy in determining directly the use-life of structures for their period and the relevance those observations have for settlement dynamics. This presumable life-span of five to ten decades also complicates the frequently assumed relation between house and household life-histories (*e.g.* houses being built for new couples and being abandoned upon the household head's death). Rather, it seems that houses may have sheltered various generations of households, rather than a multi-generational household (*i.e.* an extended family) only once. In addition, I have argued that the societal and biological composition of Bronze Age households is essentially unknown. Consequently, the claimed shift from extended-families in the Middle Bronze Age to nuclear families in the Later Bronze Age is essentially based on house length.[99] Establishing more refined estimates for household composition(al changes) in the Bronze Age and preceding and ensuing periods will be a daunting, but much needed challenge.[100]

The scientific potential of the Dutch river area

The long-term approach to the occupation histories of the six macro-regions (Appendices I-VI) allows for some important observations and new lines of research. To start, nearly all macro-regions have yielded evidence for human activities on levee or crevasse splay deposits during the Middle Neolithic (*c.* 4200-2900 cal BC). However, typological identifications of flint artefacts and sherds were often uncertain because of the low diagnostic nature of most of the material culture from this period, if fragmented. Only at Dodewaard, the interpretation was unambiguous, as pottery and cereals could be recovered from a Middle Neolithic feature (Bulten 1998b; Appendix VI). Combined, the observations from the different macro-regions suggest that there is an enormous unexplored potential of information on Middle Neolithic societies preserved in the central river area. For this period, most of the excavated sites are situated on the coastal and river dunes in the western peat district and the river area.[101] Clearly, the central river area holds the potential to add important information to the existing data sets. What activities were undertaken by these communities in the river area at the locations more distant from the river dunes? Presumably, the river area will yield site types complementary to those known from the coastal barriers and river dunes, but comparable domestic sites may also very well be present (*cf.* Janssen 1989). It is important that this potential is realised and exploited (*i.e.* excavated) as well as preserved (*i.e.* heritage status).

A similar plea for additional research and heritage protection can be put forward for the Late Neolithic period, which is represented in several macro-regions by finds of ceramics. For the Late Neolithic-A (*i.e.* the Single Grave Culture period; 2900-2500 cal BC) find-spots are not yet known from the macro-regions.[102] I have argued that this is partly a problem of typology and taphonomy (complete pot-profiles are necessary for identification), but this may also be partly the result of real boundaries for the distributions of cultural traits. It is not improbable that the typical Single Grave Culture period traditions of decoration were not current in the river area at the same time.[103] With the Late Neolithic-B period (*i.e.* the Bell Beaker period, *c.* 2500-2000 cal BC), the river area is part of the west-European Bell Beaker sphere of influence and many Bell Beaker period find-spots are known. The Bell Beaker period thus presents (both within and outside the river area) a remarkable paradox. Despite the multitudes of find-spots that *have* yielded finds datable to this period, single-phased settlement sites datable to the Bell Beaker period *exclusively* are not known. While several excavations in the western part of the river area have unearthed settlement

99 *E.g.* Fokkens 1997, 73; 2005f, 468, *cf.* Roymans & Fokkens 1991, 10; Roymans 1991, 15.

100 There are however, few direct archaeological data sets that apply. While 'pompeian' situations can be present in the archaeological record (see Chapter 5, note 231, *cf.* Albore Levadie 2002a-b; *et al.* 2005) it may take decades for one to be discovered. Until that time, we must contend ourselves with refining previous lines of research (*i.e.* (1) more detailed attention to the size, lay-out and possible usage of prehistoric farmhouse(-section)s in diachronic perspective, (2) establishing more specifically tailored cross-cultural comparisons of households dynamics for societies with comparable subsistence strategies and (3) approximations of household sizes through study of the size of local communities in large scale excavations in which such data may be inferred from more precise extrapolation of funerary data. Quite realistically, this matter is likely to remain unsolved.

101 *E.g.* Louwe Kooijmans 1974; 1976a; 1993b; 2001a; b; 2005; 2006, 487-516; Van Beek 1990; Van Gijn & Bakker 2005; Diependaele *in prep.*; Goossens *in prep.*

102 Hopefully the excavations at Hazerswoude - Spookverlaat undertaken in 2007, will when published provide some insight into the nature of Late Neolithic-A sites more distant from the (near-)coastal areas (Diependaele *in prep.*).

103 A detailed supra-regional study of technological and iconographic properties of Dutch Late Neolithic-A pottery, may indicate whether such regional differences indeed existed or whether these are archaeological constructs caused by different research intensities.

sites presumably datable to the Late Neolithic-B,[104] they have all seen later Bronze Age occupation. Meteren - De Bogen presents a similar situation, as here remains from the Bell Beaker period have been found in such quantities and diversity that the interpretation as one or more settlement site(s) datable to the Late Neolithic-B is plausible, but where all structures may have been masked by later Bronze Age occupation. In short, 'clean' Bell Beaker period sites are unknown, although they in particular may offer vital clues to the nature and dynamics of settlement sites for this period. Moreover, I have argued that targeted archaeological campaigns can indicate the locations of such short-lived and well-preserved sites in parts of the central Dutch river area. It is vital that the presence of such sites is – in the not too distant future – confirmed by fieldwork and that they are partly excavated and partly preserved for their enormous scientific potential.

It is necessary to assign a similar role to the river area as a treasury for the ensuing periods; the Early Bronze Age (*c.* 2000-1800 cal BC) and the Middle Bronze Age-A (*c.* 1800-1500 cal BC). For these periods too, I have argued that only very few (possible) settlement sites are known in the Netherlands, mainly because of the poor recognizability of their houses (sections 5.2.1-5.2.2). Yet for these periods too, well-preserved domestic sites dated to either period may be preserved in the river area. Campaigns of archaeological coring and test-pitting specifically targeted at fluvial systems that may have hosted habitation from these periods can yield the locations and preservation conditions for such sites. Because of the scarcity of 'clean' (*i.e.* short term occupancy) sites known for both the Early Bronze Age and the Middle Bronze Age-A, they are – whether uncovered by accident or through targeted research – of major scientific importance. Excavations at specifically targeted sites may uncover immensely valuable keys to understanding settlement site nature and dynamics for these two periods.

For the Middle Bronze Age-B (*c.* 1500-1000 cal BC), the data set on settlements is comparatively extensive and more specific research questions can be brought to the fore. On the level of the individual houses, I have shown that plans adequately preserved to gain insight into the functional usage(s) *within* the house are very rare. The former surface level has invariably been eroded or disturbed, which means that no surface level finds-distribution can be studied and that the location of structural features such as stalls, hearths or ovens is mostly unknown. Therefore, fieldwork campaigns must anticipate and accommodate the detailed (*e.g.* grid collecting, sifting, geochemical) analysis of possible well-preserved ground plans. An intact finds-distribution (detectable by intensive coring campaigns) suggesting the presence of a house-site (*cf.* fig. 6.36) and low feature density in nearby (test-)trenches may help to identify such locations of well-preserved houses. At the level of the house-site, I have shown that aspects of internal (house-site) chronology are particularly ill-understood. Wherever possible, intensive campaigns of absolute dating of the various possible house-site elements in relation to the farmhouse should be undertaken. Such dates will be crucial prerequisites for the compilation of house-site biographies. Whereas the present study has focussed on the final (palimpsest) appearance (Chapter 6) of house-sites, the study of their respective life-histories will be much more informative on inhabitant behaviour. Moreover, the method of 'Visual Analysis of Spatial Overlays' (VASO) may be used to investigate the nature of house-sites from a range of periods besides that of the Bronze Age. For the level above that of individual house-sites, several important gaps in our knowledge must now be briefly addressed.

First, the contemporaneity of close-by house-sites assumed on the basis of similar house type and orientation is in need of supporting direct dating evidence. Second, it remains very poorly understood why in some regions the distances between Middle Bronze Age house-sites – whether contemporary or not – are larger or smaller than in other areas. This is essentially a question into the validity, preconditions and consequences of Middle Bronze Age house-site nucleation. Under what conditions was it possible, considered appropriate or necessary to live close to neighbouring households? Third, how can possible differences in the balance between isolated house-sites and nucleated house-site grouping within and between different regions be explained? As a fourth and final point, it should be emphasized that both 'settlements' as an archaeological concept and settlement boundaries are very ill-understood. What (archaeologically operationalizable) criteria can be used to detect the feelings of belonging, communality or the joint participation in tasks which are part of most interpretative (*i.e.* social) definitions of 'settlements'? Was it considered important for (all) Bronze Age co-resident households to physically mark a communal outer limit, and if so, where in the cultural landscape are such structures situated? The present excavations in the river area have shown that at several hundreds of meters from the individual house(-site)s, fence-systems continue. I have argued that these

104 *E.g.* Louwe Kooijmans 1974; Wassink 1981; Deunhouwer 1986.

fence-systems may have served practical as well as more ideational functions and that both may have been related to the preparation of land for different (future) uses. It is fully unclear, where and why such systems come to a stop in the landscape, and what significance was attributed to the limits of such systems by Bronze Age communities. Both the spatial characteristics (*e.g.* distribution, landscape conformity, limits) and internal chronology of such fence-systems is in need of further study. Large scale excavation and absolute dating strategies will be essential tools in such studies. The relation of fence-systems to field-systems in other areas and time periods – as part of a wider study into the nature of later prehistoric agricultural field systems – is another promising topic for future research.

The Middle Bronze Age to Late Bronze Age transition

During the final centuries of the Middle Bronze Age-B, important changes affecting the structure of settlement sites and the nature of funerary traditions occurred. It is remarkable that morphological changes in pottery traditions, changes in the structure of houses, house-sites and settlement sites as well as in funerary traditions already seem to occur several centuries prior to the start of the Late Bronze Age, which according to the traditional periodsiation is at *c.* 1100/1050 cal BC (*cf.* fig. 8.13). As the detailed chronologies of these three main developments appear unrelated, no clear-cut decisive point or short trajectory of crucial change can be outlined as an alternative starting point for the Late Bronze Age. This also complicates the interpretation of the backgrounds to these different changes. Why and when exactly did aspects of regularity no longer seem to apply to the built-up structure of houses and their direct vicinity? I have argued that the known overall number of settlement sites datable to the traditional Late Bronze Age period (*c.* 1100/1050-800 cal BC) is very low. In the northern Netherlands, the dating of sites with B2b ('Elp'; fig. 5.14) types of houses may overlap this time-frame, but in other regions no evident Late Bronze Age house-types can be outlined. This suggests that these aspects of settlement sites were (from the 12th century onwards?) open to more regional or even local variation. This possibly implies that the contact networks within which such knowledge was previously shared changed in composition (*i.e.* who were attending), orientation (*i.e.* what supra-local connections were sought for) or both. The backgrounds to such a suggested fragmentation of the cultural traditions of settlement site structuring are in need of much more detailed study. In any case, the two main existing frameworks for interpreting the various changes taking place around the transition to the Late Bronze Age period, do not seem to be adequately based on relevant data sets.

According to one theory, the Late Bronze Age was a period of demographic expansion, which necessitated agricultural intensification such as the 'celtic field'-system.[105] This line of interpretation is complicated by the fact that the demographic trends reconstructed are based primarily on urnfield data and not on that of settlements, which means that the representativeness of the funerary population as reflecting the living population becomes of chief importance and can be an important distorting factor (*cf.* Gerritsen 2003, 139). Additionally, the Late Bronze Age assumed dating for the start of the celtic field systems is far from certain.[106] In any case, a demographic expansion (within landscapes that could sustain denser habitation) need not lead to pressure on land, and Gerritsen has rightly stressed that for the start of the transition to 'urnfield culture' the – direct (*i.e.* settlement) and indirect (*i.e.* funerary) – evidence on demographic trends is limited (Gerritsen 2003, 239). His suggested alternative that "The establishment of fixed burial places and stable local communities at the beginning of the Late Bronze Age can thus be understood as the effect of the progressive mythical ordering of the landscape and the decreasing residential mobility that accompanied this" (Gerritsen 2003, 240-241), however is also problematic. His reconstructed gradual 'in-filling of the landscape' and the 'closer association of social groups with parts of the landscape and the ancestral monuments in it' that underlie his interpretation (*op. cit.*, 240), is as much based on indirect evidence and may also be said to partly apply to the Middle Bronze Age-B. For example, his population densities range between 1.7 and 8 persons/sq km for the urnfield period (Gerritsen 2003, 212; 215-216).

Crude calculations for population densities in the river area, suggest that here population densities may have been much higher. For example, even if we assume that no contemporary farmsteads occurred in the river area and we use arbitrary figures (of 5 and 15 persons; table 3.5) as a possible range for Bronze Age farmhouse occupant numbers, the number of possible occupants divided by the excavated area yields figures of 475 to 1427 persons/km^2

105 Roymans & Kortlang 1999, 36-40; Gerritsen 2003, 167 and references there.
106 Spek *et al.* 2003; Gerritsen 2003, 167-178.

site	area (sq m)	area (sq km)	houses	household min	household max	min pop sq km	max pop sq km	poss. contemp. houses	household min	household max	min pop sq km	max pop sq km
Zijderveld	24000	0.024	1	5	15	208	625	4	5	15	833	2500
Eigenblok	17790	0.01779	1	5	15	281	843	5	5	15	1405	4216
Enspijk	5218	0.005218	1	5	15	958	2875	2	5	15	1916	5749
Bogen	32041	0.032041	1	5	15	156	468	9	5	15	1404	4213
Wijk bij Duurstede	140000	0.14	1	5	15	36	107	10	5	15	357	1071
Tiel - Medel 8	19952	0.019952	1	5	15	250	751	4	5	15	1002	3007
Kesteren	7500	0.0075	1	5	15	667	2000	2	5	15	1333	4000
Dodewaard	4000	0.004	1	5	15	1250	3750	2	5	15	2500	7500
mean	*31312*	*0.031*	*1*	*5*	*15*	*475*	*1427*	*4.75*	*5*	*15*	*1344*	*4032*

Table 8.4 Approximations of possible maximum population densities for Middle Bronze Age settlement sites in the Dutch river area, using arbitrary (5 to 15 persons) figures for household size and assuming single farms (white) or several contemporary farms (grey). These figures still need to be corrected for the unrepresentativeness of the excavated areas and the suitability of the landscape for habitation at larger scales (see body text).

(table 8.4) These are figures comparable to and exceeding the present-day population density of the Netherlands (484 persons/km^2).[107] To explain this, we should take into account that in many of the excavations, mostly house-sites (through their better detectability and through heritage management policies) have been selected for excavation. Therefore, the site of Wijk bij Duurstede may provide the most realistic figures, as here excavation extents were not determined based on the distribution of Bronze Age remains and additionally, for its large excavated surface area. But even then, figures are at least a factor four higher than those used by Gerritsen (*loc. cit.*).[108] Moreover, densities increase again several factors if one assumes (as has been argued in this study) that several house-sites may have been contemporaneous.

Nonetheless, the figures of table 8.4 must also be corrected for the unrepresentativeness of landscape use they reflect.[109] For example, in the river area mainly the levee deposits and crevasse splay deposits will have been used for occupation, and not the floodbasin areas. Assuming that – for the sake of providing an example – only 5 % of the available area was suitable and/or selected for habitation, and assuming single farms, this would result in mean population densities of 23 to 71 persons/km^2.[110] As establishing more reliable population densities is difficult, the examples shown here serve mainly to illustrate that in the river area, population densities may already have been relatively high and that narratives assuming demographic expansion into the Late Bronze Age need not apply. It is clear that during the Middle Bronze Age-B, the population density in parts of the river area may already have been a number of factors higher than those reconstructed for the Late Bronze Age in the southern Netherlands. This weakens the interpretation that demographic expansion was one of the main causes behind the changes occurring around the Middle- to Late Bronze Age transition.

The second line of interpretation sees the Late Bronze Age as a period in which the dissolution of the former extended-family households into nuclear families – identified by their shorter houses – explains the larger number of farmsteads, the increased individual nature of funerary rituals and increased competition in exchange networks (Fokkens 1997; 2003, 23-31). With this argumentation, two important weaknesses should be pointed out. First, the size and composition of the households is ill-understood for both the Middle and the Late Bronze Age (*supra*; section 3.4.1). This means that interpreting decreased house-size as an indication of a decreased household size is

107 Figures taken from http://statline.cbs.nl/, 'bevolking' for the year 2007.

108 Taking Wijk bij Duurstede as the best example and 5 persons for a household, a minimum of 36 persons/km^2 is still a factor 4.5 (36 / 8) higher. Using Gerritsen's 1.7 persons/km^2 would yield a factor of 22.

109 *I.e.* at larger scales, the areas used for habitation are presumably smaller; not all parts of the landscapes could or were used for habitation

110 Based on the mean value for the minimum and maximum population densities for one house only in table 8.4, multiplied by 0.05. Using only the figures for Wijk bij Duurstede, 1.8 to 5.35 persons/km^2 (for single houses) to 17.85 to 35.55 persons/km^2 (assuming ten contemporary houses) are the results of a 5 % correction. Perhaps this lower range (of 1.8 to 5.35) multiplied by the number of houses assumed to be contemporary (*e.g.* 3 to 5) may be the best approximation presently available for the occupation density on the levee and crevasse splay deposits of the Dutch river area during the Middle Bronze Age(-B). This calculation may be refined more realistically by quantifying the percentage of suitable landscapes for habitation at larger spatial scales (which is now for sake of the argument put at 5 %).

speculative. Moreover, some Bronze Age houses of the B2b (Elp-type) like Emmerhout house 8 may have had a living area in only a 6 to 7 m long segment of the house (Huijts 1992, 49). The length of this living area compares well to those presumed with some Early Iron Age houses.[111] This indicates that the size of the living area is a complicated proxy for comparing household sizes between these periods.[112] If these relatively smaller Middle Bronze Age living sections sheltered extended-family households,[113] there is no reason to assume why similar household could not have been sheltered by Late Bronze Age or even Iron Age farmhouses (*cf.* figs. 5.26, A; 5.32, A). If these houses were byre-houses, the fact that stalls generally cannot be recognized beyond the northern Netherlands, further complicates such interpretations (*cf.* Gerritsen 2003, 242). Second, the various changes thought to take place during the urnfield period (*i.e.* emergence of urnfields, shorter houses, increased competition in exchange networks) are considered as being related and contemporary (but see Fokkens 2003, 28). In reality, such changes may have different and possibly unrelated chronologies (fig. 8.13). For example, the start of the urnfields around the so-called 'long bed' barrows may date to the 13th and 12th centuries BC (fig. 8.13; Lanting & Van der Plicht 2003, 222-223). At that time, in the northern Netherlands the Elp (B2b) type of house came into being which had a mean length *above* that of the 'normal' Middle Bronze Age-B house (26.1 m versus 20.6 m). Even for some other regions in the Netherlands, house-length seems not to shorten drastically near or during the Late Bronze Age (*cf.* fig. 8.12; section 5.2.4). This means that even *if* correlations between house size and household size can be legitimately made, no evident correlation to other fields and trajectories of change (during the Late Bronze Age) should be implied. It is not until in, or after, the 9th century BC that houses are mostly shorter than 15 m (fig. 8.12; fig. 5.32).

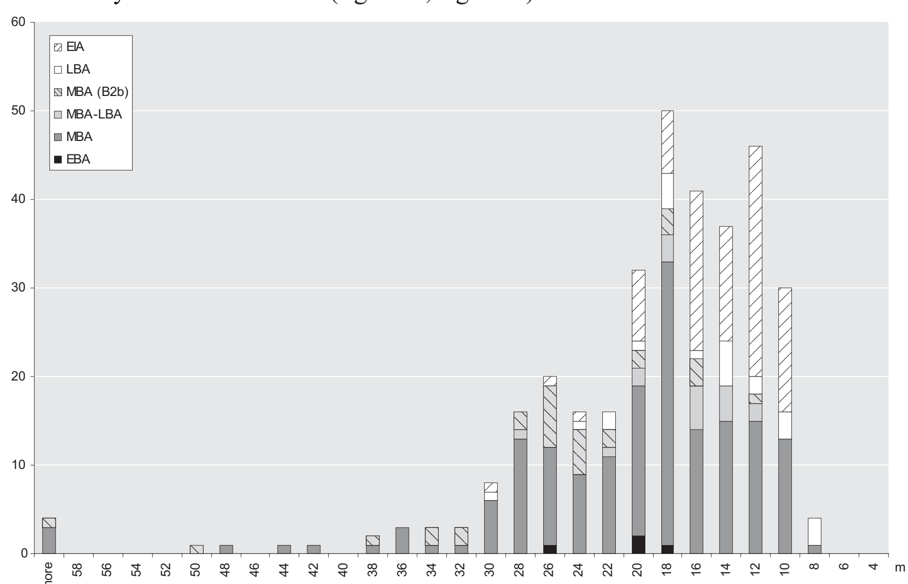

Fig. 8.12 Diagram showing the farmhouse length by 2 m classes for Early Bronze Age, Middle Bronze Age(-B) houses, Middle or Late Bronze Age houses, Elp-type (B2b) houses, Late Bronze Age houses and Early Iron Age houses. The mean farmhouse length for these groups is 21, 20.6, 16.8, 26.1, 15 and 14.5 m respectively (the y-axis lists numbers, the x-axis length in meters in reversed order).

This digression on the current explanations for Late Bronze Age changes serves two purposes. First, it outlines that our understanding of the different fields of cultural change and their interrelations in the Late Bronze Age needs to be expanded. There are serious problems with the two dominant lines of interpretation. New narratives should be based more on the actual direct data and be more cautious in assuming interrelations. Therefore, the changes of the Middle Bronze Age-B to 'urnfield culture' period traditions should be the topic of additional in-depth archaeological research. Such research should be based on detailed chronological studies and take regional particularities into account. It should also stay well clear of interpretations in which one set of archaeological data is used to explain

111 Chapter 5, fig. 5.32, but not the overall length of this farm (*c.* 26.6 m; Huijts 1992, 48).
112 See also Emmerhout house 22 (byre; 15 m, living area; 8.7 m (or 6.2 m and 2.4 m hall segment) in Kooi (2008, 63 fig. 6).
113 Or (multi-generational?) households of other, assumedly larger, composition.

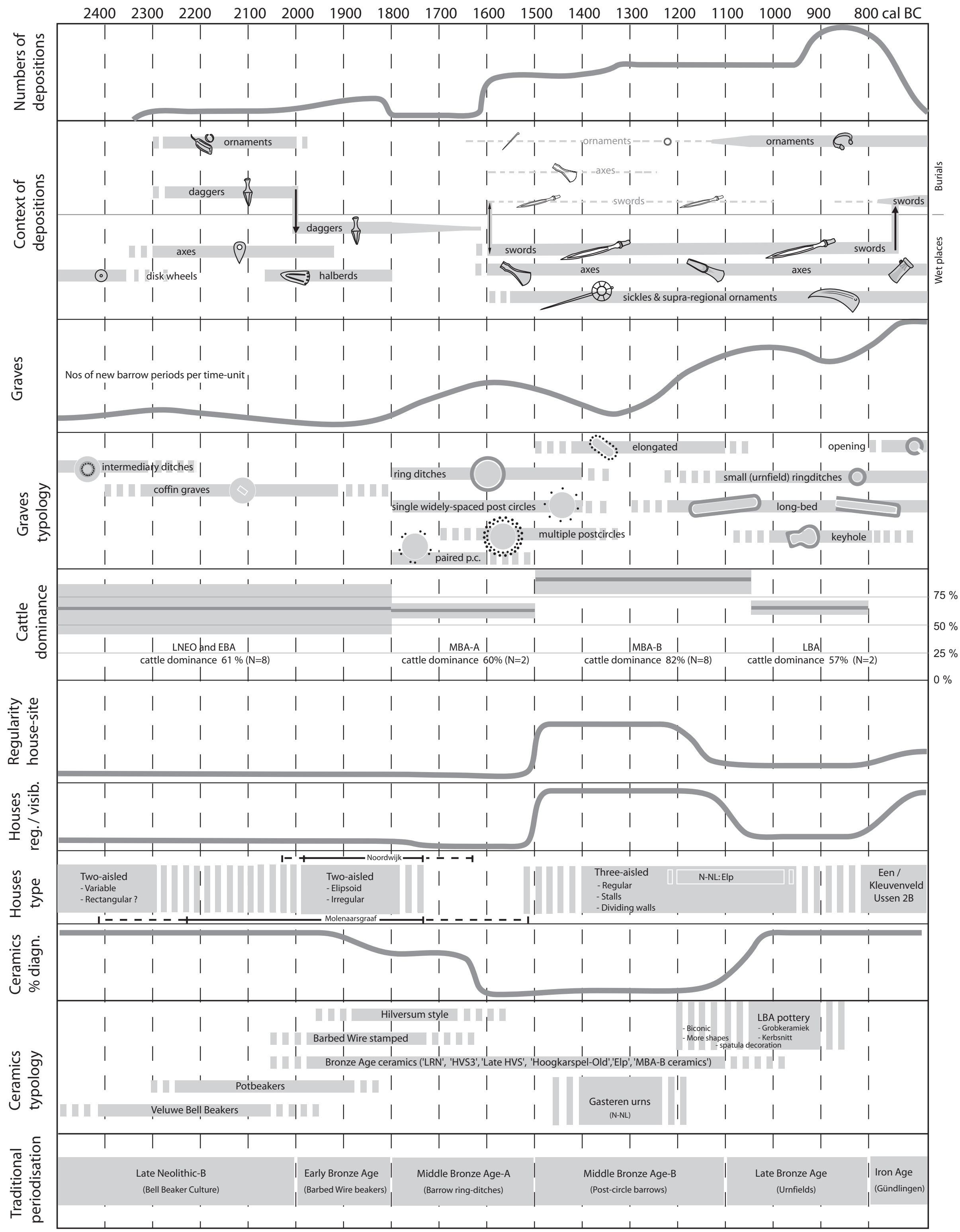

Fig. 8.13 Example of the different chronologies of several prehistoric cultural phenomena (*e.g.* pottery typology, house structure, livestock spectra, funerary traditions and patterns of object deposition) in relation to the traditional Dutch periodisation.

phenomena in possibly unrelated fields (*i.e.* inferring pressure on land from funerary sites, or political competition from house size). Second, more so than in other periods, problems of periodisation affect the study of the Late Bronze Age. The timeframe of *c.* 1100-800 cal BC assigned to the Late Bronze Age in the traditional periodisation seems to bear little relevance to the trajectories of change commented upon above. Does this mean that the periodisation should be changed? And if so, who will determine what defining elements to choose?

Lanting and Van der Plicht have published an important volume on the periodisation of the Bronze Age and the radiocarbon dates supporting it (Lanting & Van der Plicht 2003). They argue in favour of maintaining the defining traits and suggest a shift of the associated dates. For example, the available Swiss and south-German dates for Br. A2 pins, indicating the end of the Early Bronze Age (there), are used to frame the occurrence of Barbed Wire-stamp decorated ceramics in the Netherlands (*op. cit.*, 131; 153). I doubt whether such linkage is an appropriate way forward. Such use of periodisation is inclined to assign primacy to a single element. As another example, in the traditional periodisation, the occurrence of post-circles around barrows is used as the defining trait for the Middle Bronze Age-B (Van den Broeke, Fokkens & Van Gijn 2005, 31), but current research has shown that varied and different ranges of dates apply (fig. 8.13; Bourgeois *in prep.*). Proposals to change the names (*e.g.* Fokkens 2001) or date-ranges (*e.g.* Lanting & Van der Plicht, *op. cit.*) for periods seem only to increase confusion (*e.g.* Jongste 2001, 8; Van Heeringen & Koot 2005, 2) and are prone to overlook the diversities and different chronologies of the multitude trajectories of cultural change. I propose that the traditional chronology, as accepted by the State Service for Archaeological Investigations (now RACM; Brandt *et al.* 1990) and used in the recently published overview on Dutch prehistory (Louwe Kooijmans *et al.* 2005) is maintained. This periodisation clearly also has its flaws, but it remains a valid approximation of the presence of specific cultural phenomenon in the different periods. However, it should only be used as *shorthand* for the association of such phenomena and not as a strict chronological framework predicting (the interrelations of) their presence, absence and exact age-ranges. Rather, such a general periodisation should form the backdrop (and inspiration) for studies on the detailed chronologies of different developments underlying these, of which the works of Lanting and Van der Plicht (2002-2003) are exemplary. Bronze Age archaeology, and perhaps Dutch prehistoric archaeology in wider sense, has reached the point where individual trajectories of change can be – and are best – studied at a centuries time-scale, rather than as part of broader phases in periodisation frameworks. This will make archaeologists ever more aware that cultural changes do not conveniently start and stop (combinedly) at periodisation boundaries and that the various trajectories of change are most promisingly (and deservedly) studied in their own right and as individual chronologies, before entwining them with other cultural phenomena (fig. 8.13).

Out in the field: some comments on fieldwork strategy

As far as the archaeological fieldwork on Bronze Age settlement sites is concerned, I need to stress once more the strong ties between prehistoric occupation and geogentic origin and micro-topographic morphology of fluvial deposits in the river area. I have shown that crevasse splays were favourable settlement site locations, but that they can be characterized by an erratic locally variable morphology. Studies by geologists and physical geographers have indicated that such deposits are hard to detect with large coring grids.[114] In essence, with coring grids of 20 m, more than 40 % of the crevasse deposits are not even mapped at all, assuming full detectability (Chapter 2, note 14). This implies that coring strategies in the river area should be adjusted accordingly to map such deposits (sections 2.7.3-2.7.4). In addition, I feel that there should be increased attention to what the *absence* of archaeological traces during prospective archaeological coring campaigns actually means. Has the option of fluvial erosion been duly considered? Was coring depth sufficient or have corings been ceased halfway through sandy deposits? I have argued that in cases where – based on expert judgment – prehistoric habitation may be suspected,[115] the absence of archaeological indicators during prospective coring campaign should preferably be checked by test-pits or test-trenches that penetrate through these deposits (sections 2.7.3-2.7.4). To put it more succinctly: archaeological prospection in the river area should first and foremost be (palaeo-)landscape based, rather than ‘archaeological indicator’ based.

Such an attitude should permeate with archaeological consultants and legal heritage authorities. For example, decisions such as that *not* to subject (suspected!) floodbasin locations to prospective archaeological coring

114 Weerts 1996; Makaske 1998; Van Dinter & Van Zijverden 2002.

115 *E.g.* on levees, crevasse splay deposits, dunes *et cetera* (*cf.* fig. 7.10).

– as was done with the A2-motorway project (Haarhuis 1998, 11) – are unacceptable from both an academic and a heritage point of view. In addition, those authorized to compile or approve archaeological fieldwork plans (Dutch: *Programma van Eisen*, *Plan van Aanpak*) have the obligation to check whether the strategy suggested (*e.g.* coring types and grids) is tailored to the meet the required detection rates. Some attention must also be paid to the depth to which archaeological prospective corings are executed. While it seems unnecessary to have all corings penetrate the entire Holocene sequence, limiting all coring depths to the depth of the intended disturbances (necessitating research) is equally ill-advisable. Not only is the long-term palaeogeography in such cases ill-understood, but more importantly, sites situated on deeper levels (such as the pre-Middle Bronze Age-B sites which I have argued to be rare and of great scientific potential) will otherwise go unnoticed. Studies on what happens to the quality of sites underneath developed areas are still few in number, but deterioration due to compaction and loss of moisture content are severe risks.[116] As a final point, I want to argue that consultants and heritage authorities should be aware that selecting (often small) locations with the largest densities of archaeological remains (*i.e.* most-archaeology-per-euro) may be counter-effective to archaeological understanding. The excavations at De Bogen are a case in point, as here the finds-layer was – save for the test-trenches – plainly dug away as it concerned a palimpsest of archaeological periods, only to reveal a feature level which was in most parts an equal palimpsest of features, and from which only the (more regular) Middle Bronze Age-B structures could be isolated and understood in more detail. Similarly, the strategy of discontinuous excavation of the (better recognizable) house-sites at Eigenblok, has resulted in mainly high feature density cut-outs of Bronze Age house-sites and has proven not very informative on their embedding within the wider cultural landscape (which presently may be of much more scientific value).[117]

Here I plea for large, continuous excavations of the locations with the best potential for increasing archaeological knowledge. These are rarely the most densely settled locations (which are, however, best discoverable and yield most finds) but are most likely to be the margins of such areas and short-term used locations. While more difficult to find, such locations will hold crucial keys to understanding the nature and dynamics of later prehistoric settlements, which can thereafter be used to better understand the – more frequently encountered – palimpsest situations elsewhere. Moreover, in order for archaeological narratives to address and give information on the scale of the cultural landscape, the extent of excavations should be adjusted accordingly. To give an example for the Middle Bronze Age-B, the scientific gain of understanding a single Middle Bronze Age-B house-site within its wider cultural and physical landscape through extensive excavation, exceeds (with the present state of knowledge) the scientific gain of using that same excavation surface area to (partly) investigate several of its nearby house-sites in a discontinuous fashion.[118]

However, fieldwork is only half the task, and I feel that archaeologists reporting on Bronze Age settlement site excavations have sometimes lacked sufficient self-critique in (allowing for) assessment of the validity of the structures recognized during and after fieldwork. Once published, it is often difficult for a reader to judge the validity of the proposed plans without having to revert to the original documentation. Several simple guidelines to best practice can help overcome this. For example, the descriptions of structures could be supplemented by a brief summary of the approach and methodology of their investigation (*cf.* Hiddink 2005, 286). In addition, a system of classification could be used for structures in which the method(s) of recognition and possible (doubts on) the validity and are synthesized (*e.g.* table 3.3). In particular with the periods for which the comparative data set of settlement site elements is limited to non-existent (*e.g.* the Late Neolithic to Middle Bronze Age-A), it does not suffice to only show the associated features in plan in archaeological reports. In these (and preferably other) cases, some insight should be offered into the remaining feature-depths, explanations of their variation in relation to (recent) disturbances and original constructional functions, as well as – if applicable – insight into why posts that may be expected, are not present. Additionally, parallels drawn to plans and structures uncovered elsewhere should be

116 See Van den Berg & Hatzmann 2005; Louwagie, Noens & Devos 2005, 119; 151-152 for more references and Van Kappel 2004 for a practical case-study.

117 Such strategies are (perhaps deservedly) characterized mockingly as *postzegels verzamelen* (stamp collecting) in Dutch archaeology.

118 Ideally, of course, all such house-sites are uncovered in a continuous excavation surface that extends as widely as possible into the surrounding parts of the (cultural) landscape, such as for instance at Wijk bij Duurstede - De Horden (section 4.5.3).

precise and explicit,[119] and if no parallels are available caution should be taken in forwarding reconstructions as plausible structures. Furthermore, during fieldwork special attention should be given to the possibilities of dating individual settlement site elements. If datable material is available, it does not suffice to state that house plans date typologically to the Middle Bronze Age-B, as this is a five century block.[120] The scarcity of settlement site remains from the Early Bronze Age and Middle Bronze Age-A will presumably only be resolved by persistent campaigns of more extensive absolute dating.

Locating interesting areas: maps and approaches

The State Service for Archaeological Investigations (RACM)[121] maintains a nationwide map showing the probability of encountering archaeological remains, the 'Indicative Map of Archaeological Values'.[122] For the river area, the available geological maps and the publication by Berendsen and Stouthamer (2001) have been used as a base layer. The location of levee deposits on these maps have been assigned the highest probability, while – mainly in the river area east of the De Bogen excavations – a buffer zone of generally 150 m, but sometimes to 700 m around them is given a medium probability (Deeben, Hallewas & Maarleveld 2002, 25). While this is explicitly not the intention of the drafters of the IKAW map,[123] in archaeological practise it is sometimes used as a heritage decision tool at scales smaller than the 1:50.000 for which it was intended. Here, several problems must be mentioned. First, the chronological information available in the palaeogeographical map by Berendsen and Stouthamer (2001) is ignored in the IKAW map. This means that for given periods, a much better approximation of the location of active fluvial systems can be given than presently offered by the IKAW. A basic chronology of meander belts sequences is known, and additionally the location of younger (eroding systems) can be mapped for specific periods if desired. Second, I have argued that the aims and the methods used in compiling the base palaeogeographical map do not tie in with archaeological aims and prerequisites (section 2.7.3). In particular, crevasse splay deposits that are less than 50 cm thick are not depicted on the geological and Berendsen and Stouthamer (2001) maps (Berendsen 1982, 107), although they may have been suitable habitation areas. Third, crevasse splay deposits occur frequently in the river area west of the De Bogen excavations, and a wide buffer zone (of several hundreds of meters to some kilometers) may be necessary to incorporate them. It this respect I would like to refer to figure 2.8 in Chapter 2, where the location of the meander belts by Berendsen and Stouthamer is indicated on top of detailed geological maps drafted for the Schoonrewoerd and Hennisdijk fluvial deposits. There, a frequency of occurrence and erratic spatial distribution of smaller crevasse splay deposits is visible that only partly corresponds to hypothetical 'buffer zones' used in the IKAW map. At present, the second generation IKAW has been adapted to incorporate these (and similar) known smaller crevasse splay deposits previously lacking (*cf.* Arnoldussen 2000, 112). However, such detailed maps are not available for all parts of the Dutch river area. Consequently, it is unclear how such parts should be represented on predictive maps. I strongly feel that instead of waiting for a larger number of adequately detailed geological maps– usable on an archaeological scale – to become available, a map showing the preferred fieldwork methodology in different parts of the river area may be a valuable asset. Suggesting or obligating the use of such a map, ensures it is a *proper approach*, rather than (determining) a confined *geographic entity* that becomes the focus of both archaeological fieldwork and strategic heritage decisions. This way, no large buffer zones need to be added to *probability* maps, but the probability of uncovering archaeological remains in such zones will be determined by proper fieldwork *strategies*. This strategy may lead foremost to a more refined palaeogeography of the Dutch river area and will moreover allow the full realization – and subsequent exploration and preservation – of the enormous archaeological potential of the Dutch river area for the Bronze Age and other periods alike.

119 Such parallels are moreover preferably reprinted in excavation reports, at the same scale as the structures proposed.

120 A similar time span as between 2008 and the birth in 1508 of Gemma Frisius (Jemme Reinerszoon Frisius), the Dutch doctor, mathematician and cartographer, who published seminal treatises on how clocks may be used to determine longitude in 1530 and on triangulation in 1533.

121 The National Service for Archaeology, Cultural Landscape and Built Heritage (*Rijksdienst voor Archeologie, Cultuurlandschap en Monumenten*; www.racm.nl).

122 Dutch: *IKAW*; see Deeben 2008, esp. 66; Deeben & Wiemer 1999; Deeben, Hallewas & Maarleveld 2002; Hallewas & Peeters 2005 for backgrounds.

123 Deeben, Hallewas & Maarleveld 2002, 41-48; Hallewas & Peeters 2005, 8.

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Samenvatting (Dutch summary)

Inleiding

Dit boek betreft een studie naar de aard en dynamiek van bronstijdnederzettingen in het Nederlandse rivierengebied. Op basis van een zestal in het centrale Nederlandse rivierengebied opgegraven delen van bronstijdnederzettingen wordt getracht de kenmerkende elementen, hun onderlinge samenhang en de veranderingen ervan vanuit een langetermijnperspectief te analyseren. De interrelaties tussen culturele dynamiek en landschappelijke dynamiek krijgen hierbij speciale aandacht, omdat de bronstijdbewoning in het rivierengebied zich afspeelde in een landschap dat doorlopend in ontwikkeling was. Deze landschappelijke dynamiek bood de toenmalige bewoners belangrijke voordelen (waaronder de continue aanwas van vruchtbare landschappen, die uitstekend geschikt waren voor het gemengde boerenbedrijf dat in de bronstijd gangbaar was), maar biedt tevens hedendaagse archeologische onderzoekers belangrijke meerwaarden. Hierbij moet vooral de goede conservering van archeologische resten, zoals sporen en vondsten, worden genoemd, maar evenzeer de mogelijkheid om resten van verschillende ouderdom goed te kunnen vergelijken op plaatsen waar deze door de vorming van nieuwe landschappen en doorlopende sedimentatie ruimtelijk van elkaar gescheiden zijn. Door de soms uitstekende conservering van nederzettingssporen uit de bronstijd is het mogelijk gebleken om nieuwe informatie te verzamelen die in belangrijke mate noopt tot het aanpassen van bestaande ideeën en beeldvorming over de aard en dynamiek van de woonplaatsen van bronstijdgemeenschappen in het rivierengebied (en daarbuiten).

De kritische analyse van de achtergronden die ten grondslag lagen aan bestaande beeld- en modelvorming wordt in deze studie aangevuld met een groot aantal ‘bouwstenen’ die het mogelijk maken vernieuwende conclusies te trekken op verschillende schaalniveaus die van toepassing zijn bij het onderzoek van laatprehistorische nederzettingen. Het schaalniveau varieert van kleine schalen (individuele nederzettingsstructuren, zoals huizen, bijgebouwen, kuilen en sporen, maar ook individuele vondsten en dateringen) tot grotere schalen, die uiteindelijk het fysieke landschap en cultuurlandschap op lokale, regionale (en soms supraregionale) schaal als studieobject hebben. De ‘bouwstenen’ die noodzakelijk zijn om tot uiteindelijke beeldvorming op het niveau van het bronstijdcultuurlandschap (en haar bewoners) over te gaan (Hoofdstuk 8) worden gepresenteerd als losse hoofdstukken (Hoofdstuk 1 tot en met 7), die in samenhang de essentiële argumenten bieden om de aard en dynamiek van bronstijdnederzettingen in het rivierengebied te kunnen typeren.

Hoofdstuk 1 gaat hierbij in op de onderzoeksproblematiek en laat zien dat gericht onderzoek naar de aard en dynamiek van bronstijdnederzettingen tot nu toe sterk is achtergebleven, ondanks het relatief grote aantal opgegraven vindplaatsen. Hierbij wordt beargumenteerd waarom juist het Nederlandse rivierengebied een ideale onderzoekslocatie is om deze lacune te vullen. Hiervoor is echter wel een gedegen kennis van de geogenetische processen – en de langetermijnontwikkelingen daarbinnen – van het rivierengebied noodzakelijk. Hiertoe bevat Hoofdstuk 2 een introductie op de specifieke kenmerken van riviersystemen (waaronder de verschijningsvormen, de dynamiek van veranderingen, de vegetatie en potentieel landgebruik) en de archeologische implicaties hiervan. Verder is het noodzakelijk om, voorafgaand aan inhoudelijke discussies over laatprehistorische nederzettingen, helderheid te verschaffen over de gehanteerde terminologie, de gangbare modellen en de aannames die hieraan ten grondslag liggen (Hoofdstuk 3). In het vierde hoofdstuk wordt een overzicht geboden van de dataset van opgegraven bronstijdnederzettingen door middel van de presentatie van een zestal representatieve macroregio’s binnen het rivierengebied. Hierbij is speciale aandacht voor de opgravingsmethodiek en de beschikbare informatie op de schaalniveaus van het huis, de huisplaats, de nederzetting en het landschap. Om te kunnen beoordelen hoe representatief de kwalitatieve gegevens van Hoofdstuk 4 zijn, wordt in Hoofdstuk 5 een overzicht geboden van de huidig aanwezige kennis aangaande de individuele nederzettingselementen zoals huizen, bijgebouwen, kuilen en andere grondsporen. Hoofdstuk 6 bevat een systematische analyse die als doel heeft te beoordelen óf, en zo ja, op welke wijze de verschillende nederzettingselementen in betekenisvolle relatie tot elkaar stonden. Dit betreft meer concreet een onderzoek naar op welke wijze bronstijdhuishoudens de directe omgeving van hun woonhuis (de huisplaats) inrichtten. Het is echter niet te verwachten dat de inrichting van het landschap binnen, tussen en buiten de huisplaatsen gedurende de hele bronstijd (ca. 2000-800 v. Chr.) gelijk bleef. Daarom staat in Hoofdstuk 7 een langetermijnanalyse van de veranderingen in nederzettingspatronen en nederzettingsdynamiek centraal. Hierbij wordt zowel gekeken naar veranderingen tussen de diverse archeologische perioden (beginnend vanaf het neolithicum tot en met de vroege ijzertijd) als ook naar de nederzettingsdynamiek van individuele huisplaatsen (langetermijnbewoningsgeschiedenissen). Hoofdstuk 8 biedt tenslotte een synthese van de geboden bouwstenen en tracht de essentie van het bronstijdcultuurlandschap – en meer specifiek de aard en dynamiek van de nederzettingen daarbinnen – en haar bewoners te typeren.

Hoofdstuk 1 – Introductie

De geschiedenis van Nederland wordt vaak opgehangen aan de strijd tegen het water en deze visie op het water als bedreigend element heeft er mogelijk voor gezorgd dat specifieke aandacht voor de prehistorische bewoning van de onbedijkte laaggelegen delta aanvankelijk wat achterbleef bij het onderzoek van de hoger gelegen Pleistocene delen van Nederland. Het is echter duidelijk dat de Nederlandse delta en het centrale rivierengebied sinds het Paleolithicum door mensen zijn gebruikt. De bronstijd wordt hierbij traditioneel gezien als de eerste periode waarin boerengemeenschappen vanuit permanent bewoonde nederzettingen met duidelijk herkenbare huisplaatsen (erven, mogelijk vergelijkbaar met huisplaatsen zoals deze tot voor kort nog in het Nederlandse agrarische landschap gangbaar waren) het landschap op grote schaal inrichtten en geschikt maakten voor de gecombineerde akkerbouw en veeteelt die de bestaansbasis vormde. Hoewel bronstijdnederzettingen uit het rivierengebied al sinds 1967 bekend waren (en daarbuiten vanaf 1955), hebben deze nooit geleid tot specifieke studies naar de vorm, de betekenis en het gebruik van huizen, naar de specifieke inrichting van de huisplaatsen of naar de aard en de begrenzing van nederzettingen als (sociaal) geheel.

Deze lacune vormt het bestaansrecht van de huidige studie, waarin de gegevens van eerder opgegraven nederzettingen uit het rivierengebied (te Dodewaard, Zijderveld en Wijk bij Duurstede) worden gecombineerd met die van recent opgegraven bronstijdnederzettingsterreinen te Rumpt (Eigenblok), Geldermalsen (De Bogen) en Lienden (Lienden-Kesteren). Deze vindplaatsen zijn bij de aanleg van de Betuweroute goederenspoorlijn onderzocht tussen 1995 en 2000 en bieden door de goede conservering (van organische resten, sporen en vondsten) en de gedetailleerde wijze waarop deze zijn onderzocht een belangrijke kennisbron voor de studie van bronstijdnederzettingsterreinen. Deze kennisbron kan in het centrale rivierengebied nog worden gecomplementeerd met een groot aantal minder extensief opgegraven vindplaatsen. Verder vormt het centrale Nederlandse rivierengebied al lange tijd het onderzoeksterrein van diverse grootschalige en gedetailleerde paleogeografische karteringen, die het toestaan om de Holocene landschappelijke ontwikkeling op diverse geografische schalen te volgen en bestuderen. Hierdoor kunnen zowel de meer uitgebreid opgegraven nederzettingssporen als de meer beperkt onderzochte vindplaatsen – in hun landschappelijke samenhang en ontwikkeling – geïntegreerd worden bestudeerd, hetgeen de selectie van een studiegebied in het centraal Nederlands rivierengebied rechtvaardigt.

Hierbij staan onderzoeksvragen op drie verschillende ruimtelijke schalen centraal. Op het niveau van de individuele huizen wordt gekeken welke aanwijzingen er zijn voor de functie, gebruiksduur en gebruiksgeschiedenis. Verder staan op dit niveau de betekenissen van chronologische en regionale verschillen tussen huizen (meer specifiek de plattegronden die daar de archeologische neerslag van zijn) centraal, hetgeen vraagt om een kritische beschouwing van bronstijdhuistypologie. Eén schaalniveau hoger, staat het onderzoek van de directe omgeving van de bronstijdboerderij centraal. Op welke wijze richtten huishoudens uit de bronstijd hun directe huisomgeving in en zijn de veranderingen hierin door de tijd heen te verklaren? Het hoogste schaalniveau waarvoor specifieke onderzoeksvragen worden geformuleerd is dat van de nederzetting als geheel. Hoewel er weinig discussie is over het feit dat delen van bronstijdnederzettingen archeologisch herkenbaar zijn, is het veel minder duidelijk óf, en zo ja, hoe, bronstijdgemeenschappen zich als nederzettingsgemeenschappen manifesteerden. Werden, bijvoorbeeld, de nederzettingsterreinen op een bepaalde wijze gemarkeerd met structuren (zoals hekken of greppels) die de grens van als gemeenschappelijk ervaren woonlocaties aangaven? Ook is er aandacht voor de locatiekeuze van nederzettingen in de bronstijd. Het rivierengebied bood een divers spectrum aan bewoonbare locaties en in deze studie wordt getracht grip te krijgen op de achtergronden achter de keuzes voor bepaalde plaatsen (en veranderingen daarbinnen gedurende de tijd).

Hoofdstuk 2 – Het centrale Nederlandse rivierengebied: rivierdynamiek en paleogeografie

Het centrale Nederlandse rivierengebied kent een lange aardkundige onderzoekstraditie, waarbij vroege gedetailleerde bodemkundige studies, zoals die van Vink en Modderman, in de late 20e eeuw worden aangevuld met steeds meer zeer gedetailleerde – en op diepere boringen gebaseerde – paleogeografische karteringen. Deze bieden een goed inzicht in de verspreiding van de diverse afzettingsmilieus die kenmerkend zijn voor een rivierdelta. Verschillende riviertypen kennen een verschillende morfologie (bijvoorbeeld brede of smalle oevers), (laterale) stabiliteit en dynamiek en schaal van verandering, welke allemaal van invloed zijn op de potentie voor archeologische bewoning (en het later archeologisch detecteerbaar zijn hiervan). Zodoende worden de belangrijkste riviertypen en hun afzettingsmilieus besproken. De riviertypen worden hierbij geklasseerd op basis van het aantal actieve 'stromen' (met bedding- en oeverafzettingen per watervoerende geul), het aantal actieve 'watervoerende geulen' en de sinuositeit van deze watervoerende geulen. Op basis hiervan worden vlechtende, meanderende, rechte en anastomoserende riviersystemen onderscheiden.

In aanvulling hierop worden crevasseafzettingen als een apart afzettingsmilieu besproken. Crevasses zijn oeverwaldoorbraken waarbij een mengsel van bedding- en oeversedimenten in de naast de oever gelegen kommen wordt afgezet. Crevassevorming is een intrinsieke eigenschap van met name anastomoserende riviersystemen, maar komt ook bij meanderende en rechte riviertypen voor. De vorming van crevasses is slecht voorspelbaar en kan veroorzaakt worden door belemmeringen van de waterafvoer (beverdammen, drijfhout, ijsschotsen) en/of zwakke plekken in de oevers (bijvoorbeeld waar oudere zandige afzettingen worden aangesneden). De archeologische relevantie van het herkennen en opsporen van crevasseafzettingen is groot, aangezien crevasseafzettingen in de bronstijd vaak voor bewoning werden gebruikt. Het feit dat dit relatief hoger gelegen delen waren, die veelal niet onder directe invloed stonden van de jaarlijkse overstromingen, gecombineerd met een uitstekende drainage en hoge bodemvruchtbaarheid, maakte crevasseafzettingen waarschijnlijk ideale woon- en akkerlocaties.

Het rivierenlandschap wordt gekenmerkt door een dynamiek die zich op verschillende tijdschalen laat analyseren. Op kleinere (en voor mensen waarneembare) tijdschalen staan processen centraal zoals erosie, beginnende vegetatieontwikkeling, jaarlijkse veranderingen in de waterstand (en de overstromingen die hier het gevolg van zijn) en spontane veranderingen zoals crevassevorming en het geblokkeerd raken van eerder nog watervoerende crevassegeulen en restgeulen. Van sommige andere processen, zoals het geleidelijk aan 'verdrinken' van de lagere delen van het landschap (door differentiële klink, doorlopende sedimentatie en stijgende grondwaterstanden) of vegetatiesuccessie (zoals de ontwikkeling van zachthout- naar hardhout-ooibossen), is het de vraag of deze nog binnen een menselijke generatie waarneembaar waren.

Processen zoals de verlegging van rivierlopen, het vormen van bodemontwikkeling en de vorming van uitgebreide complexen van crevasseafzettingen speelden zich vermoedelijk af op tijdschalen van enkele eeuwen. Veranderingen in de aard van riviersystemen en de ruimtelijke verspreiding daarvan binnen de Nederlandse delta, alsook het ontstaan van volledig nieuwe rivierpatronen spelen zich af op de grootste tijdschaal, die van eeuwen tot millennia. Om een goed overzicht te verkrijgen van de landschappelijke processen die zich zowel binnen als buiten de diverse macroregio's afspelen wordt een beknopte en versimpelde paleogeografische ontwikkeling van de Nederlandse delta tussen 2450 en 450 v. Chr. geschetst.

Kennis van de landschappelijke ontwikkelingen in het rivierengebied heeft een directe relevantie voor archeologisch onderzoek in dit landschapstype. Ten eerste verschillen actieve en inactieve (ook wel: fossiele) rivierlandschappen in hun potentiële gebruiksmogelijkheden, waarbij voornamelijk akkerbouw op locaties die vaak en lang onder sedimentatie te lijden hebben een kritische negatieve factor bij locatiekeuze kon zijn. Actieve riviersystemen boden echter wel een grote rijkdom aan plantaardige materialen en dierlijke rijkdommen, maar ook moet het belang van een actieve watervoerende geul voor drinkwater, transport, communicatie en contacten via het water niet worden onderschat. Bij inactieve systemen moesten de bewoners hiervoor naar een (meestal dichtbijgelegen) actieve watervoerende geul, maar was het risico op overstromingen minder en kon – doordat bijvoorbeeld geen laterale verplaatsing meer optrad en restgeulen vol raakten – een groter oppervlak aan oever- en (aangesloten) crevasseafzettingen worden gebruikt voor bewoning, beweiding en akkerbouw. Met name de crevasses waren vruchtbare en vaak makkelijk te exploiteren (want aanvankelijk relatief boomloze) landschapstypen, die vanuit archeologisch perspectief om verschillende redenen vaak goede conservering van archeologische resten bieden. Uitgaande van de door mij beargumenteerde potentie van de verschillende landschapstypen voor bronstijdbewoning resteert het probleem dat de aanwezigheid en omvang ervan in archeologisch onderzoek adequaat moet worden vastgesteld. Dit vraagt om methoden van archeologisch veldwerk die zijn toegesneden op het karteren van kleinschalige geogenetische eenheden en waarbij de kartering van (gestapelde) paleolandschappen – en de complexe processen van erosie en sedimentatie die van invloed zijn geweest op eventueel aanwezige archeologische resten daarin – centraal staat.

Hoofdstuk 3 – Terminologie, modellen en aannames

Studies van laatprehistorische nederzettingen maken vaak gebruik van terminologie waarvan de achtergronden, conceptuele reikwijdte en connotaties slechts zelden worden geëxpliciteerd. Daarom is het noodzakelijk duidelijk te stellen wat er met termen als 'nederzetting', 'erf' of 'huis' wordt bedoeld. Voornamelijk de termen nederzetting en erf dragen belangrijke connotaties met zich mee. Bij een nederzetting gaat men ervan uit dat het een aantal gelijktijdig bewoonde huizen betreft, waarvan de bewoners onderling een sociale verbondenheid voelden. Het woord 'erf' draagt associaties met zich mee van een betekenisvolle en gestructureerde (bijvoorbeeld middels hekken en bijgebouwen) huisomgeving. Het is echter de vraag of zulke associaties bij archeologisch gebruik wenselijk zijn, omdat de kans bestaat dat interpretatie en typering door elkaar gaan lopen. Daarom wordt voorgesteld om analytische labels te scheiden van interpretatieve labels. Zo is een huisplaats ('*house-site*') een goede analytische term om de aanwezigheid en structuur van eventuele gestructureerde huisplaatsen (erven, '*farmsteads*') te onderzoeken. Op gelijke wijze vormen nederzettingsterreinen ('*settlement sites*') de analytische schaal waarop onderzoek naar de realiteit van nederzettingen in sociale zin (gehuchten of dorpen, '*settlements'*) plaatsvindt. Ten aanzien van huizen is er minder terminologische onduidelijkheid, maar hier spitst de discussie zich toe op de criteria die de geloofwaardigheid van de herkenning en reconstructie van huizen in archeologische context beïnvloeden. De bouwwijze van de huizen, grootte van de opgraving en spoordichtheid en zichtbaarheid ter plaatse, maar ook de strategieën waarmee de waarschijnlijkheid van huisreconstructies wordt gecontroleerd (resterende spoordiepte, aanwezigheid van parallellen) spelen hierbij een belangrijke rol. Verder verdient het interpretatieve kader waarbinnen veranderingen op huisplaatsniveau tegenwoordig vaak worden beschouwd enige kritische toelichting. Zo blijkt de hedendaagse toepassing van het cultureel-biografisch perspectief (*sensu* Kopytoff 1986) voor de beschrijving van veranderingen in de tijd van zowel huisplaatsen als landschappen soms in tegenspraak te zijn met de originele uitgangspunten. Nuances dienen te worden aangebracht wanneer men in dit licht spreekt over de culturele biografie van (cultuur)landschappen. Op een meer gedetailleerd niveau blijkt de diachrone studie van het (veranderend) gebruik van huisplaatsen niet voldoende rekenschap te geven van de verschillen tussen reparaties, het verbouwen, het herbouwen en het overbouwen van huizen. Dit zijn echter cruciale verschillen, omdat bijvoorbeeld herbouwen en reparaties kunnen wijzen op een langduriger gebruik van huisplaatsen.

Bronstijdhuisplaatsen worden gedacht, hoofdzakelijk na een enkele fase van bewoning, te zijn verplaatst naar een andere locatie binnen het ruimere bewoningsareaal. Dit systeem van bewoningsdynamiek staat bekend onder de naam 'zwervende erven' ('*wandering farmsteads'*, Schinkel 1994; 1998) en vormt het dominante model gebruikt ter beschrijving en verklaring van aangetroffen sporen van huisplaatsen uit de bronstijd. Hoewel oorspronkelijk opgesteld voor de beschrijving van jongere nederzettingssporen raakte dit model snel ingeburgerd in de bronstijdnederzettingsarcheologie. Hierbij lijkt kritische toetsing aan de tot de beschikking staande dataset veronachtzaamd te zijn. Hierdoor ontstaat de (deels onterechte) indruk dat éénfasig bewoonde huisplaatsen (er werd immers na één fase verhuisd) de norm vormen. Grafische weergaven van het zwervende erven-model droegen bij aan de populariteit ervan, maar introduceerden ook nieuwe onzekerheden, zoals de representativiteit (zwierf iedereen?), de rol van (oudere) grafmonumenten (grafheuvels bij huizen of huizen bij grafheuvels?), het chronologische bereik (voor welke periode(n?) beschrijft het zwervende erven-model nu accuraat de bewoningsdynamiek?) en het meest fundamenteel, de drijfveren (waarom zwierf men?).

In hoofdzaak worden drie belangrijke drijfveren genoemd die de verplaatsing van huizen na één bewoningsfase tijdens de bronstijd zouden kunnen verklaren. Dit zijn: het uitgeput raken van de akkers (waardoor een nieuw te exploiteren gebied werd opgezocht), de beperkte levensduur van het bouwhout (de staanders worden geschat slechts 25-30 jaar mee te gaan) en veranderingen in de samenstelling van het huishouden (bijvoorbeeld wanneer het hoofd van het huishouden overlijdt of een nieuw huishouden wordt gesticht). De zeggingskracht van deze drie factoren wordt kritisch bestudeerd, waarbij akkeruitputting niet als waarschijnlijke oorzaak wordt gezien. Ten eerste is in het rivierengebied de grond zeer vruchtbaar en ten tweede is er geen dringende reden waarom *akker*uitputting tot herlocatie van de *huizen* moet leiden. Inschattingen van de levensduur van het bouwhout zijn veelal gebaseerd op experimenten die het toenmalig gebruik van bouwhout slecht representeren. Op basis van direct gedateerd constructiehout kan betoogd worden dat de gebruiksduur van bronstijdhuisplaatsen eerder rond de 50 jaar of langer was. Het derde argument, dat veranderingen van de samenstelling van het huishouden een rol speelden bij herlocatie, mist overtuigend bewijs. Ten eerste is de samenstelling van prehistorische huishoudens en sociale groepen in essentie onbekend en ten tweede lijken er geen argumenten te zijn die erop wijzen dat de levenscycli van huizen en huishoudens eenduidig te koppelen zijn.

Hoofdstuk 4 –'*Case Studies*'

De bronstijdnederzettingen die zijn opgegraven binnen de zes macroregio's in het centrale rivierengebied worden in Hoofdstuk 4 kort en op vergelijkbare wijze geïntroduceerd. Dit biedt een kwalitatief inzicht in de opgravingsresultaten van de diverse campagnes die onderling sterk in methodiek, schaal, doel en resultaten verschillen. Zo zijn sommige opgravingen relatief lang geleden gestart, maar is recent – deels door het Betuwelijnonderzoek – nieuwe aanvullende informatie verkregen (bijvoorbeeld voor Dodewaard en Zijderveld). Wijk bij Duurstede werd onderzocht tussen 1977 en 1994, maar voor de nederzettingssporen uit de bronstijd die hierbij werden aangetroffen ontbreekt het nog immer aan een definitieve publicatie. Voor deze site is daarom getracht om voor het niveau van de huizen, de huisplaatsen en de nederzetting in zijn landschap tot een vergelijkbare presentatie te komen op basis van nog ongepubliceerde data. Een systematische bespreking maakt het mogelijk de resultaten evenwichtiger onderling te vergelijken en biedt tevens een inhoudelijk klankbord voor de meer toegesneden analyses in de volgende hoofdstukken. Een laatste reden om de opgravingsresultaten hier kort samen te vatten is dat voor sommige vindplaatsen (met name voor Lienden-Kesteren en Geldermalsen-De Bogen) de interpretatie in de huidige studie soms afwijkt van die in de originele publicaties. In dit hoofdstuk wordt daarom de visie van de huidige auteur ten aanzien van de interpretaties op de schaalniveaus van het huis, de huisplaats, de nederzetting en het landschap verduidelijkt. Teneinde de omvang van de vindplaatsbesprekingen te beperken wordt voor de meer gedetailleerde discussies en de daaraan ten grondslag liggende argumenten verwezen naar Appendices I-VI.

De opgravingen te Zijderveld hebben in totaal vier huisplattegronden uit de midden-bronstijd(-B) opgeleverd, die vanwege de vaak lage spoordichtheid goed bestudeerd kunnen worden. Middels het bewaard gebleven bouwhout kon één huis zeer nauwkeurig gedateerd worden tussen 1426 en 1390 v. Chr. De huisplaatsen rondom de huizen hadden soms grote hoeveelheden bijgebouwen (met name spiekers), waarbij op één huisplaats niet kan worden uitgesloten dat deze te maken hebben met jongere bewoning. Dateringen en ruimtelijke patronen wijzen er echter op dat de andere bijgebouwen in relatie tot de huizen begrepen moeten worden. Opmerkelijk is de goede conservering van sporen van hekwerken te Zijderveld. Van deze hekwerken wordt gedacht dat ze mogelijk de huisplaatsen begrensden en zodoende als aanwijzingen voor de vorm en grootte van erven mogen worden gebruikt. Indien de vier huisplaatsen deel uitmaakten van een enkele nederzetting lijkt binnen de opgegraven delen (die honderden meters beslaan) geen begrenzing hiervan te zijn aangetroffen. De huisplaatsen zijn aangelegd op oever- dan wel crevasseafzettingen van inactieve rivieren, waarbij mogelijk de oriëntatie van de restgeul van invloed is geweest op de oriëntatie van andere cultuurlandschappelijke elementen zoals de huizen en de hekwerken. Het fysieke landschap lijkt voorafgaand aan de midden-bronstijd-B relatief stabiel te zijn geweest, wat de schaarste aan oudere sporen en vondsten opmerkelijk maakt. Een reactivering van de restgeul ter plaatse beëindigt mogelijk de bewoning rond het einde van 14^e eeuw v. Chr., waardoor de neerslag van de bronstijdnederzetting relatief duidelijk bewaard is gebleven en kan worden bestudeerd.

In de Eigenblok macroregio zijn twee nederzettingsterreinen uit de bronstijd opgegraven. Te Enspijk werden drie, waarschijnlijk deels overlappende, huisplattegronden ontdekt die niet direct gedateerd konden worden. Op basis van typologie en ^{14}C-dateringen lijkt een midden-bronstijd-B ouderdom echter het meest waarschijnlijk. Er zijn geen duidelijke erven te herkennen en de aangetroffen sporen van hekwerken lijken een nabij gelegen restgeul te volgen. Bij de opgravingen van Rumpt-Eigenblok werden vijf of zes huisplaatsen aangetroffen, waarvan één huis vermoedelijk herbouwd is. De huisplattegronden verschillen onderling sterk en voor twee zijn ^{14}C-dateringen voorhanden die wijzen op een midden-bronstijd-B ouderdom. Ook hier zijn de erven niet eenduidig te herkennen, hoewel de vorm van nabijgelegen hekken bij één huisplaats erop lijken te wijzen dat de hekken ooit de directe omgeving van het huis begrensden. Door de lage spoordichtheid en beschikbare ^{14}C-dateringen kan voor een enkele huisplaats een lange (10 tot maximaal 143 jaar) bewoningsduur worden gepostuleerd. Net als te Zijderveld lijkt de grens van een eventuele nederzetting in de uitgestrekte opgravingsputten niet bereikt te zijn. Te Eigenblok kan de bewoningsgeschiedenis aanvullend worden bestudeerd doordat er stratigrafisch gescheiden niveaus (daterend van vóór de 17e eeuw v. Chr.) bewaard zijn gebleven bij twee huisplaatsen. Opmerkelijk hierbij is dat met midden-bronstijd-B vergelijkbare nederzettingsstructuren op deze niveaus ontbreken, maar dat er wel mogelijk twee grafheuvels mee samenhangen. De nederzettingssporen te Eigenblok bevinden zich op de oever- en crevasseafzettingen van een inactief riviersysteem, dat al gedurende de midden-bronstijd-B sterk door 'verdrinking' in bruikbare omvang afnam.

De opgravingen in deze studie gegroepeerd in de macroregio 'De Bogen' omvatten losse putten aangelegd in een uitgestrekt gebied, met enkele grotere aaneengesloten opgegraven gedeelten hiertussen. Bij deze opgravingen is op basis van het vondstmateriaal en de ^{14}C-dateringen duidelijk dat met intensievere eerdere activiteiten uit het laat-neolithicum, de vroege bronstijd en de midden-bronstijd-A rekening moet worden gehouden. Anders dan in de originele publicaties is verwoord, wordt in deze studie echter beargumenteerd dat voor deze perioden geen betrouwbare huisplattegronden (maar mogelijk wel enkele bijgebouwen) kunnen worden aangewezen. Enkel de huizen uit de midden-bronstijd(-B) lijken goed herkenbaar te zijn, maar de datering berust uitsluitend op geassocieerde ^{14}C-dateringen en typologische argumenten. Er zijn geen evidente erven aan te wijzen en ook de plaatsing van bijgebouwen lijkt minder strikt gebonden aan die van de huizen. Opmerkelijk zijn een huisplaats die afwisselend voor begraving en bewoning lijkt te zijn gebruikt en een andere huisplaats waarvan het huis tot drie maal toe herbouwd werd. Zowel palissades als hekken zijn aangetroffen, die beide echter niet als begrenzing van huisplaatsen geïnterpreteerd kunnen worden. Vooral de hekken lijken eerder het landschap tussen en buiten de huizen in lange stroken te verkavelen. Deze landschapsinrichting lijkt op basis van oriëntatie in ieder geval in twee fasen te zijn uitgevoerd. Verder is opmerkelijk dat de oriëntatie van de systemen van hekken en die van de huizen geen rekening lijkt te houden met het microreliëf van het onderliggende gestapelde crevasselandschap. Het was blijkbaar belangrijk (mogelijk een uiting van sociale samenhang) om de bestaande oriëntatie over grotere afstanden te handhaven of te respecteren. Vermoedelijk aan het einde van de midden-bronstijd-B of gedurende de late bronstijd maakt nieuwe crevassevorming een einde aan de bewoning op de crevassekoppen van De Bogen.

De opgravingen rondom Wijk bij Duurstede in de gelijknamige macroregio hebben op twee locaties resten van nederzettingen uit de bronstijd opgeleverd. Binnen de opgraving 'De Horden' werden 10 tot mogelijk 12 huisplattegronden herkend. De spoorconservering was matig, waardoor met name enkel dieper ingegraven paalsporen zichtbaar waren. Opmerkelijk is dat zeker één huis en mogelijk twee op dezelfde huisplaats zijn herbouwd. Er zijn geen directe dateringen beschikbaar voor de huizen, die op basis van algemene ^{14}C-dateringen en typologie in de midden-bronstijd-B worden geplaatst. Erven zijn niet duidelijk herkenbaar, maar de clustering van bijgebouwen om de huizen heen en de afstanden tussen huisplaatsen geven mogelijk toch een indicatie van de grootte van de huisplaatsen. Opmerkelijk is dat één huisplaats aansluit bij een mogelijke bronstijdgrafheuvel. Op basis van de overeenkomstige oriëntatie, de mogelijk beperkte gebruiksduur en de ruimtelijke spreiding van de huisplaatsen wordt geopperd dat een aantal van deze huisplaatsen gelijktijdig kan hebben gefunctioneerd. Een greppel die ten zuiden van de huisplaatsen loopt – waarvan de vorm mogelijk beïnvloed is door de loop van een meer zuidelijk gelegen kronkelwaardgeul –, maar die helaas slecht gedateerd is, zou hierbij een gemeenschappelijke begrenzing van een aantal gelijktijdig functionerende huisplaatsen kunnen zijn. Slechts 700 meter meer noordelijk zijn binnen de opgravingen van 'De Geer' nog twee huisplaatsen herkend. Deze zijn, net als een aantal huizen op 'De Horden', met greppels omgeven. Bij één huis strekken deze greppels zich uit naar een gebied waar vermoedelijk vierpalige bijgebouwen hebben gestaan. Dit versterkt het idee dat huizen en bijgebouwen onderling sterk verbonden nederzettingselementen vormden in de midden-bronstijd(-B). De oriëntatie van de huizen op 'De Geer' wijkt af van die op 'De Horden', hetgeen wordt geïnterpreteerd als een bewust keuze die sociale verschillen tussen (dorps?)gemeenschappen weerspiegelde. De huisplaatsen van beide opgravingen zijn gelegen op kronkelwaardafzettingen van een riviersysteem dat al vele eeuwen vóór de midden-bronstijd inactief werd. Aan het einde van de midden-bronstijd-B of gedurende de late bronstijd intensiveerde de sedimentatie op het eerder bewoonde terrein. Dit beëindigde de bewoning, om pas in de vroege of midden-ijzertijd – bovenop bijna een meter aan nieuwe crevasseafzettingen – weer aan te vangen.

Archeologisch vooronderzoek voorafgaand aan de aanleg van Betuweroute goederenspoorlijn resulteerde in de opgraving van een deel van een bronstijdnederzetting te Lienden. Dit nederzettingsterrein was gelegen op crevasseafzettingen direct langs de oevers van een riviersysteem dat mogelijk nog actief was – of mogelijk net inactief was geworden – gedurende de midden-bronstijd. De restgeul van de crevasse waarop gewoond werd, was zeker niet meer watervoerend. In de sporenconfiguraties laten zich maar moeilijk huizen en bijgebouwen herkennen. De vele mogelijke structuren uit de originele publicatie zijn in deze studie vervangen door een alternatieve interpretatie van twee redelijk zekere huisplattegronden en een aantal bijgebouwen. Voor geen van beide zijn directe dateringen aanwezig, zodat op basis van algemene ^{14}C-dateringen en typologie met bewoning in de (start van de) midden-bronstijd-B rekening moet worden gehouden. Er zijn geen duidelijke erven te herkennen, maar bijgebouwen zijn geclusterd nabij de huisplattegronden. Aangezien de huizen in uitvoering en oriëntatie verschillen en vrij ver uiteen zijn aangetroffen, is het twijfelachtig of deze ooit gelijktijdig bewoond zijn geweest. Door 'verdrinking' van de lagere crevassedelen en hernieuwde komsedimentatie van een riviersysteem, dat start rond het einde van de midden-bronstijd-B of gedurende de late bronstijd, stopt vermoedelijk de bronstijdbewoning te Lienden.

De bronstijdnederzetting uit de Dodewaard macroregio is reeds opgegraven in 1967, maar het bestaande beeld kan aangevuld worden met de binnen de Betuwerouteprojecten verzamelde gegevens. Binnen het opgegraven deel zijn twee duidelijke huisplaatsen ontdekt, waarvan het huis op één huisplaats zeker is herbouwd en mogelijk nog eens is uitgebouwd. Er zijn geen directe dateringen voor de huizen voorhanden, zodat deze op basis van typologie en geassocieerde vondsten in de midden-bronstijd(-B) worden geplaatst. De spoorconservering was goed, maar in de plaatselijk dichte spoorclusters zijn veelal geen duidelijke structuren te herkennen. Veel resten van hekwerken zijn te herkennen, maar deze lijken niet te zijn aangelegd om huisplaatsen te begrenzen. Bijgebouwen tonen veelal dezelfde oriëntatie als de huizen. De gebouwen en hekken waren aangelegd op (complexen van gestapelde) crevasseafzettingen die direct nabij een mogelijk nog actief riviersysteem waren gelegen. Toch deed zich gedurende de bronstijd weinig sedimentatie voor en is het pas in de vroege ijzertijd dat door 'verdrinking' en continue komsedimentatie het grootste deel van de eerder bewoonde afzettingen niet langer voor bewoning geschikt waren.

Hoofdstuk 5 – Bronstijd nederzettingselementen

De verschillende nederzettingselementen zoals huizen, bijgebouwen, waterputten en greppels die in Hoofdstuk 4 zijn geïntroduceerd worden in dit hoofdstuk in meer detail (met aandacht voor de functie, de typologie en hun datering) en vanuit een interregionaal vergelijkend perspectief besproken. Dit maakt het mogelijk om de data uit het rivierengebied beter te evalueren en te typeren.

Als eerste staat de datering van bronstijdhuizen centraal. Voor de vroege bronstijd (ca. 2000-1800 v. Chr.) zijn slechts een drietal betrouwbare huisplattegronden uit Nederland bekend, die onderling sterk verschillen en slecht binnen bredere Noordwesteuropese kaders geplaatst kunnen worden. Enkel de tweeschepige structuur lijkt een verbindend element te vormen. Voor de midden-bronstijd-A (ca. 1800-1500 v. Chr.) zijn – ondanks een aantal geclaimde voorbeelden en goed herkenbaar aardewerk uit deze periode – geen betrouwbaar gedateerde huisplattegronden bekend. Een tweetal vindplaatsen heeft mogelijke structuren opgeleverd die vermoedelijk in deze periode geplaatst kunnen worden, maar de functie, datering en representativiteit van deze structuren staan nog ter discussie. Een kritische beschouwing van de beschikbare absolute dateringen maakt duidelijk dat de beter bekende, regelmatige, driescheepige huisplattegronden van de midden-bronstijd-B waarschijnlijk niet eerder dan vanaf de late 16^{e} eeuw v. Chr. voorkwamen. De bestaande typologie van boerderijen uit deze periode blijkt ongeschikt om de variatie aan plattegrondtypen goed te beschrijven en om een interregionale vergelijking op te baseren. Daarom wordt een voorstel gedaan voor een typologie waarbij het aantal en de vorm van de rijen dakdragende stijlen het uitgangspunt vormt. Op basis van deze typologie worden de huizen uit een aantal verschillende regio's (de zuidelijke en noordelijke zandgronden, de stuwwallen, West-Friesland en het kustgebied) gekenschetst en vergeleken met die uit het rivierengebied. Hierbij komen regionale verschillen in gebouwtypen, dateringen en processen als her- en uitbouw aan het licht. Sommige kenmerken worden echter op grote schaal (tussen regio's) gedeeld, zoals het voorkomen van de driescheepige bouwwijze en de regelmatige plaatsing in de lengterichting van de dakdragende stijlen. De zekere uniformiteit die huizen uit de midden-bronstijd(-B) typeert lijkt te verdwijnen in de late bronstijd, wanneer de verschillen in huisplattegrondtypen zowel binnen als tussen regio's toenemen. Hierdoor worden huizen in bepaalde regio's moeilijker herkenbaar en is de dataset hierdoor sterk beperkt. Pas in de vroege ijzertijd is er weer sprake van een toegenomen interregionale uniformiteit, wanneer een huistype verschijnt dat in bouwkundig opzicht weinig meer lijkt op de plattegronden van de bronstijdhuizen.

Uit de bronstijd is een grote variatie aan bijgebouwen bekend. De grootste bijgebouwen – die mogelijk als schuren, stallen, werk- of opslagplaatsen hebben gediend – komen relatief weinig voor en zijn nauwelijks gestandaardiseerd in grondplan. Hoewel sommige een driescheepige draagstructuur kunnen hebben gehad, is van een groot deel de bovengrondse opbouw onduidelijk. Deze bijgebouwen (‘*barn/shed-type outbuildings*’) komen nabij huizen voor, maar lijken er niet significant bij geclusterd te zijn. De kleine bijgebouwen – die gewoonlijk als spiekers worden aangeduid (‘*granary-type outbuildings*’) – zijn voornamelijk in het rivierengebied talrijk en divers van structuur. Er lijken echter slechts drie hoofdtypen te zijn, die bestaan uit een grondplan van 4, 6 of 9 in een rechthoek of vierkant geplaatste palen. Het is aannemelijk dat een deel hiervan diende voor de opslag van agrarische producten. Met name vierpalige bijgebouwen zijn sterk geclusterd nabij bronstijdboerderijen in het rivierengebied.

Er is nog weinig systematisch vergelijkend onderzoek verricht naar de typen van hekken en palissades die voorkomen op nederzettingen uit de bronstijd. Hekken bestaande uit een enkele rij nauw gestelde staken (vermoedelijk vlechtwerkhekken) en bestaande uit wijd gestelde dubbele staken komen het meest voor op bronstijdnederzettingen. De hekwerken van deze typen zijn vaak onderdeel van uitgestrekte systemen van landinrichting tussen en voorbij de huisplaatsen en zijn niet primair bedoeld als erfafscheiding. Deze systemen veranderden soms binnen een nederzetting van oriëntatie, hetgeen mogelijk een chronologische betekenis heeft. Palissades zijn divers van paalzetting en vorm en vormen een slecht begrepen fenomeen. Greppels van verschillende typen komen voor op bronstijdnederzettingen. Wanneer deze dicht bij huizen zijn aangelegd, dienden ze hoofdzakelijk om de huisplaats te draineren, maar een aantal kan ook het regenwater dat vanaf de dakvoet stroomde hebben opgevangen. Buiten het rivierengebied (met name in West-Friesland) lijken greppels onderdeel uit te maken van systemen die de drainage verzorgden, maar die gelijktijdig mogelijk ook huisplaatsen en omliggende kavels met andere functies begrensden en verbonden. Er zijn slechts beperkte aanwijzingen dat greppels (aanvullend) functioneerden als gemeenschappelijke begrenzingen van nederzettingen.

Tot slot wordt in dit hoofdstuk ingegaan op fenomenen die minder vaak op bronstijdnederzettingen worden aangetroffen – zoals waterkuilen en waterputten, silo’s, afvalkuilen en haardkuilen – en waarvan de functie veelal lastig te achterhalen blijkt. Verder wordt ingegaan op de betrouwbaarheid van (deels discutabele) structuren, zoals ‘twee- en driepaal’-structuren, ‘ronde structuren’, onregelmatige paalstellingen en verbrande zones. Hierna is ook nog aandacht voor fenomenen die wel te verwachten zijn op bronstijdnederzettingen, maar die slechts zelden worden aangetroffen (bijvoorbeeld productieplaatsen van aardewerk en brons of begravingen).

Hoofdstuk 6 – Op zoek naar bronstijderven: analyse van prehistorische huisplaatsen

In dit hoofdstuk staan de interrelaties centraal tussen de verschillende nederzettingselementen (die apart werden besproken in Hoofdstuk 5). Indien we erven beschouwen als huisplaatsen waarbij een duidelijke structurering van de omgeving van het woonhuis heeft plaatsgevonden, is het zaak inzichtelijk te krijgen hoe deze structurering eruit ziet. Dit behelst een systematische analyse van huisplaatsen uit de bronstijd.

Om de systematische vergelijking van bronstijdhuisplaatsen binnen – en tussen – nederzettingsterreinen mogelijk te maken wordt een methodiek gevolgd die gebaseerd is op de visuele analyse van overlappende kaartbeelden (‘*Visual Analysis of Spatial Overlays’*, kortweg VASO genoemd). De achtergrond bij deze methodiek is dat, indien bepaalde nederzettingselementen in betekenisvolle relatie stonden tot nabijgelegen woonhuizen, deze ook vaker – en mogelijk vaker op dezelfde locatie in relatie tot de huisplattegronden – zullen voorkomen. Praktisch gezien vraagt dit om het digitaliseren van opgravingstekeningen, waarbij de elementen die men in de analyse wil betrekken (in dit geval huizen, bijgebouwen, hekken, kuilen, waterputten, hoefindrukken, verbrande zones en ploegsporen) per type (cartografisch) herkenbaar worden gedigitaliseerd. Vervolgens worden van dit bestand kopieën gemaakt voor het aantal herkende huizen of huisfasen. Door translatie (en rotatie) voor de diverse kopieën van de centra van de huisplattegronden naar een arbitraire centrumcoördinaat kunnen kaartlagen met verschillende huisfasen overlappend worden afgebeeld. Afbeeldingen van zulke overlappingen (*VASO plots*) worden visueel geïnterpreteerd voor het herkennen van patronen (waarbij een aantal belangrijke beperkingen in ogenschouw dienen te worden genomen). Op deze wijze kan bijvoorbeeld systematisch worden onderzocht of er een voorkeursplaatsing is van bijgebouwen in relatie tot huisplattegronden, of hekken huisplaatsen begrenzen en soortgelijke andere hypothesen. Hierdoor kan op minder subjectieve wijze worden beoordeeld óf huisplaatsen uit de bronstijd op een bepaalde wijze werden gestructureerd, waaruit die structurering bestond en in hoeverre deze structurering binnen nederzettingen en tussen nederzettingen in overeenstemming was. Hiertoe wordt voor de in Hoofdstuk 4 besproken opgravingen een VASO analyse uitgevoerd, waarbij gekeken wordt naar de inrichting van de directe omgeving van de woonhuizen. Per vindplaats worden de waargenomen patronen besproken. In aanvulling op de eerder besproken vindplaatsen worden ook de resultaten van een meer recent onderzochte vindplaats te Tiel - Medel (vindplaats 8) hier aan een identieke analyse onderworpen. Hoewel deze vindplaats strikt gezien geen deel uitmaakt van de dataset van deze studie is het voorkomen van een aantal erven uit de midden- als ook uit de late bronstijd belangrijk genoeg om deze vindplaats toch kort te bespreken in dit hoofdstuk. Hierdoor wordt het namelijk mogelijk om ook over de meer zeldzame late bronstijdbewoning in het rivierengebied uitspraken te doen en kunnen de resultaten voor deze periode vergeleken worden met die van de voorafgaande midden-bronstijd binnen één vindplaats.

Volgend op de individuele besprekingen van de vindplaatsen wordt ingegaan op de gemeenschappelijke structurerende principes. Hierbij komt naar voren dat het *soort* ruimtelijke relaties die structuur geven aan de huisplaats (bijvoorbeeld 'de oriëntatie van de huizen' of 'de plaatsing van bijgebouwen in relatie tot de huizen') veelal hetzelfde zijn voor verschillende vindplaatsen, maar dat de specifieke *invulling* van die ruimtelijke relaties juist verschilt tussen de vindplaatsen. Kort gezegd gebruikt men dus soortgelijke structurerende principes, die echter voor de individuele nederzettingen anders worden ingevuld. Op basis van de oriëntatie van de huizen betoog ik dat deze verschillen tussen vindplaatsen vermoedelijk bewust zijn gekozen en gehandhaafd en dat ze mogelijke sociale categorieën (gemeenschappen) weerspiegelen.

Verder blijkt dat met name de clustering en overeenkomstige oriëntatie van bijgebouwen in relatie tot de huizen het meest voorkomende structurerende principe is bij bronstijdhuisplaatsen. De overgrote meerderheid van de spieker-type bijgebouwen komt in het rivierengebied in de directe (25-35 meter) nabijheid van bronstijdhuizen voor. Uit kritische analyses van het ruimtelijke voorkomen van hekken, kuilen en waterputten wordt duidelijk dat deze *geen* essentieel onderdeel uitmaakten van bronstijdhuisplaatsen. Zo blijkt dus dat, indien men van 'erven' wil spreken in de bronstijd, de geldigheid hiervan met name beperkt is tot de nauwe interrelaties tussen bijgebouwen en huisplattegronden. Uitgaande van dit vertrekpunt blijkt dat – in de clustering van bijgebouwen, de ruimtelijke spreiding van vondstmateriaal rondom de huizen en de spreiding van de huizen onderling – er aanwijzingen zijn dat bronstijdhuisplaatsen ruimtelijke zones betroffen van circa 10 tot 40 meter rondom het huis.

Hoofdstuk 7 – Nederzettingsdynamiek

Een analyse van de nederzettingsdynamiek in het studiegebied moet rekening houden met het feit dat deze de uitkomst is van een moeilijk te ontwarren samenspel van landschappelijke en culturele dynamiek. Het behelst zowel synchrone analyses van verschillen in landschapsgebruik – waaraan zowel door culturele als landschappelijke elementen kaders worden gesteld – als diachrone analyses waarin het veranderende gebruik van specifieke locaties op kortere en langere termijnen centraal staan. Daarom wordt op deze plek een analyse van nederzettingsdynamiek in het rivierengebied gepresenteerd die start in het neolithicum en stopt in de ijzertijd, zodat de diachrone verschillen en veranderingen in nederzettingsdynamiek in langetermijnperspectief geanalyseerd en gepresenteerd kunnen worden.

Ik betoog dat de beeldvorming aangaande de nederzettingsdynamiek van neolithische en vroege bronstijdgemeenschappen in (te) grote mate steunt op interpretatieschema's (de zogenaamde *grand narratives*), die de veranderingen vanaf het mesolithicum tot aan de bronstijd gestuurd zien door een drietal ontwikkelingen. Dit zijn een toenemende mate van sedentariteit (en dus een afname in de diversiteit van de gebruiksduur van vindplaatsen), een toenemend belang van de gecombineerde akkerbouw en veeteelt (en dus een afnemend belang van de jacht voor de voedselvoorziening) en het afnemen van de variatiebreedte aan vindplaatstypen (waarbij er enkel nog continu bewoonde nederzettingen zijn en geen begeleidende kampjes voor specifieke taken). Het probleem is echter dat de kennis over de ontwikkelingen vaak niet toereikend is om deze beeldvorming te staven. Mogelijk zijn het hele jaar door bewoonde nederzettingen al gangbaar vanaf het midden-neolithicum, is het belang van akkerbouw en veeteelt al ver vóór de start van de bronstijd toegenomen en tot slot zijn de 'kamp'-achtige vindplaatsen zowel voor het neolithicum als de bronstijd niet goed bekend.

Een inhoudelijke analyse van de bekende vindplaatsen uit het midden-neolithicum in het rivierengebied toont aan dat deze meestal van onvoldoende kwaliteit zijn om ze in de bovenstaande discussies te mogen betrekken. Het weinige beschikbare bewijs (met name het gevolg van de afwezigheid van specifiek op deze periode gerichte onderzoeken en slechts ten dele door latere erosie) toont aan dat zowel rivierduinen als de oevers (en vermoedelijk ook crevasseafzettingen van zowel actieve als inactieve riviersystemen) in het midden-neolithicum werden gebruikt. Mogelijk betreffen dit (semi-)permanent bewoonde nederzettingen, maar hiervoor zijn niet voldoende aanwijzingen.

Voor het laat-neolithicum tot en met de midden-bronstijd-A bestaat de paradoxale situatie dat – wegens het in hoge mate diagnostische karakter van het aardewerk – vele vindplaatsen bekend zijn die in deze perioden geplaatst moeten worden, maar dat er nauwelijks informatie is over wat het nederzettingspatroon en de nederzettingsdynamiek waren. Dit is grotendeels het gevolg van de slechte zichtbaarheid van de nederzettingsstructuren (Hoofdstuk 5) in deze fase. Veel van de in de midden-bronstijd bewoonde terreinen leveren echter vondsten en dateringen op die in deze eerdere perioden geplaatst moeten worden. Het is mogelijk dat deze resten activiteiten representeren die niet wijzen op een gebruik als nederzettingsterrein (hierbij implicerend dat er nog geen duidelijke nederzettingen uit het laat-neolithicum tot en met de midden-bronstijd-A in het studiegebied zijn aangetroffen), maar meer waarschijnlijk is het dat het nederzettingspatroon van deze perioden in dergelijke mate lijkt op die van de aansluitende latere periode(n), dat deze resten niet langer herkenbaar zijn. Anders gezegd zou men kunnen stellen dat de variatiebreedte van nederzettingsstructuren voor deze periode dermate breed was dat deze slecht archeologisch zichtbaar zijn, maar dat zij tevens niet dermate fundamenteel van de latere bronstijdbewoning verschilden dat ze in palimpsestsituaties herkenbaar blijven.

Wegens de grotere dataset die voorhanden is voor de midden-bronstijd-B, is het mogelijk om voor deze periode in meer detail in te gaan op de bewoningsdynamiek. Hierbij is ook gekeken naar het eerdere gebruik van terreinen die in de midden-bronstijd-B als huisplaats werden ingericht. Het blijkt dat circa 25% van deze huisplaatsen werd aangelegd op niet eerder gebruikte locaties en een even groot deel op vermoedelijk eerder (deels voor bewoning) in gebruik genomen terreinen. Hierbij kan ook bewust aansluiting zijn gezocht bij eerder gebruikte locaties, waarbij met name grafheuvels en palissades kunnen worden genoemd.

Bij het in gebruik nemen van een nieuwe woonlocatie werden andere of oudere huisplaatsen gerespecteerd en het overbouwen van huizen is dan ook een zeldzaam fenomeen. Eenmaal gevestigd lijkt het bij herhaling herbouwen van spiekers en het herbouwen en aanbouwen van huizen erop te wijzen dat de bronstijdboeren in het rivierengebied ernaar streefden om het gebruik van individuele huisplaatsen zo lang mogelijk te continueren. Hierbij dient wel opgemerkt te worden dat er duidelijke regionale verschillen zitten in de levensloop en mogelijke gebruiksduur van bronstijdhuisplaatsen. Waar bijvoorbeeld in het rivierengebied, West-Friesland en de duinstreek herbouw op de oude huisplaats frequent voorkwam, was in Noordoost-Nederland aanbouw van een nieuw huiscompartiment een veel gekozen oplossing en zijn in Zuid-Nederland huisplaatsen vaker éénfasig. Op basis van het feit dat (in ieder geval in het rivierengebied) huisplaatsen elkaar respecteerden en de huizen (en waar bewaard, hekken) vaak binnen één systeem van oriëntatie werden gebouwd, kan vermoed worden dat agglomeraties van mogelijk gelijktijdig functionerende huisplaatsen ontstonden. Hierbinnen kan nog steeds periodieke herlocatie hebben plaatsgevonden, maar dit maakt dan eerder onderdeel uit van een systeem van 'verschuiving en groei' (*'shift-and-growth'*) dan van geïsoleerde zwervende erven.

Analyses van de paleogeografische context van de vindplaatsen uit de diverse perioden maakt duidelijk dat vrijwel alle typen rivierlandschappen (rivierduinen, oevers en crevasseafzettingen van actieve, recent inactieve en lang fossiele riviersystemen) door mensen voor activiteiten werden gebruikt. Veelal is echter de aard van de activiteiten onduidelijk en ook zijn enkele kennislacunes aan te duiden (zoals het gebruik van de oevers van actieve riviersystemen en de crevasses van recent inactief geworden rivieren), waarvoor nog onvoldoende gegevens bekend zijn. Het is wel duidelijk dat enkel voor de midden-bronstijd, de late bronstijd en de vroege ijzertijd nederzettingsterreinen voldoende herkenbaar zijn om deze in hun landschappelijke context en dynamiek te kunnen analyseren. Hierbij wordt duidelijk dat midden-bronstijdboerengemeenschappen gradiëntrijke en sterk gecompartimenteerde landschappen kozen als nederzettingsterreinen. Op deze locaties konden op korte afstand van elkaar gelegen goed gedraineerde uiterst vruchtbare akkerlocaties, goede weidegronden en locaties met stromend water (voor drinkwater en contacten via het water) worden geëxploiteerd. Vrijwel alle beschikbare delen van oeverafzettingen en crevasseafzettingen die aan deze criteria voldeden (en die niet aan excessieve sedimentatie blootstonden), lijken op deze manier in gebruik te zijn genomen. Uit de inrichting van sommige nederzettingsterreinen spreekt eveneens dat deze gemeenschappen rekenschap geven (bijvoorbeeld in de oriëntatie van huizen en hekken, de vorm van greppels en de plaatsing van waterputten) van de morfologie en de gebruiksmogelijkheden van het hen omringende landschap. Hoewel de nederzettingsdynamiek (en de relatie met de landschappelijke dynamiek) niet verantwoord in een grafisch model gevat kan worden, is wel een tekstuele beschrijvende modellering van de generieke nederzettingsdynamiek gedurende de midden-bronstijd-B in het rivierengebied mogelijk.

Voor de late bronstijd en de vroege ijzertijd is slechts een veel kleiner corpus aan nederzettingsterreinen uit het studiegebied bekend. Dit is te verklaren door de (wederom) toegenomen variatiebreedte van verschijningsvormen van nederzettingsstructuren (Hoofdstuk 5) en het feit dat rond het einde van de midden-bronstijd-B en de late bronstijd er een drastische herstructurering van de riviersystemen in de delta plaatsvond. Hierdoor ontstonden nieuwe riviersystemen en nieuwe crevasseafzettingen, waardoor eerder redelijk droge locaties nu aan een (voor akkerbouw en bewoning) onacceptabele sedimentatie blootstonden.

Hoofdstuk 8 – Synthese

Dit hoofdstuk biedt een synthese van de gegevens en interpretaties geboden in de voorafgaande hoofdstukken. Hierbij verplaatst zich echter het accent naar het schaalniveau van het cultuurlandschap. Getracht wordt om de essentie van het bronstijdcultuurlandschap in het rivierengebied en haar bewoners te kenschetsen. Hierbij staat met name het proces van 'categoriseren' centraal. In het bronstijdcultuurlandschap hadden verschillende handelingen en functies een eigen, vast omschreven zone in het landschap waar ze ten uitvoer gebracht dienden te worden. Deze categorisering laat zich goed typeren aan de hand van de nederzettingssporen, het grafbestel en de locaties die werden gekozen voor de depositie van voorwerpen.

Het meest typische van de nederzettingen binnen het bronstijdcultuurlandschap is de wijze waarop het landschap binnen en rondom de nederzettingen wordt verkaveld. Hiervoor lijken in het rivierengebied met name systemen van hekwerken te zijn gebruikt. De methodiek van verkavelen laat zich het beste typeren als een bi-axiaal, haaks, systeem. De schaal waarop dit soort systemen zich uitstrekken, is niet goed bekend, maar overspant zeker enkele honderden meters vanaf de huisplaatsen. Het feit dat vaak meerdere huizen en de hen omringende bijgebouwen de oriëntatie van de systemen van hekken delen, suggereert dat de huizen (deels) gelijktijdig waren, óf dat de oudere huisplaatsen en systemen van landinrichting werden gerespecteerd, óf beide. De redenen waarom agglomeraties van (deels) gelijktijdig bewoonde huisplaatsen ontstonden, blijven onduidelijk, maar het vergroten van de bestaanszekerheid (door de beschikbaarheid van hulp bij agrarische taken, maar ook het uitwisselen van fokdieren en delen van zaaivoorraden) kan hierbij een rol hebben gespeeld. Samenwerking en de nabijheid van anderen waren mogelijk belangrijke voorwaarden bij (de locatiekeuze van) nederzettingen uit de midden-bronstijd. Er lijken in de nederzettingsgegevens in ieder geval weinig aanwijzingen te zijn voor een sterk gedifferentieerde sociale structuur met boeren, krijgers en hoofdmannen, zoals voor de Scandinavische bronstijd – die sterk vergelijkbare nederzettingspatronen kent – wordt vermoed.

Het is treffend dat, waar de bronstijdnederzettingen in het studiegebied een mogelijk grote dichtheid aan (gelijktijdige) bewoners laten zien, de overledenen grotendeels onzichtbaar blijven. Vlakgraven met inhumaties zijn onbekend en losse menselijke resten binnen nederzettingen zijn zeldzaam in het rivierengebied. Er zijn dus hoogstwaarschijnlijk aparte zones in het landschap geweest – buiten de nederzettingen – waar formele begravingen plaatsvonden. Bekende grafheuvels uit de bronstijd liggen vaak op markante hogere locaties in het landschap. Het feit dat in het rivierengebied grafheuvels op natuurlijke verhogingen (zoals toppen van crevasses) werden aangelegd sluit hierbij aan, hoewel deze hoogstwaarschijnlijk van vóór de midden-bronstijd-B dateren. Voor de overledenen uit de midden-bronstijd(-B)huizen was dus binnen de nederzettingen geen plek. Omgekeerd leveren grootschalige opgravingen van grafheuvellocaties uit de bronstijd ook geen bewoningsporen op. Dit onderstreept de strenge categorisering van het cultuurlandschap in deze periode.

In de verschillende patronen die herkenbaar zijn in de typen van voorwerpen en de locaties waar deze blijvend gedeponeerd zijn, spreekt evenzeer dit streven naar categorisering. Metalen voorwerpen lijken met name in locaties te zijn gedeponeerd waar geen of nauwelijks menselijke invloed (zoals ander vondstmateriaal, ingravingen en/of structuren) aanwezig waren. Hierbij is verder sprake van selectieve depositie (Fontijn 2003), waarbij zwaarden en supralokale ornamenten in grote rivieren werden gedeponeerd en andere voorwerpen (waaronder bronzen sikkels) mogelijk vaker op nederzettingen werden achtergelaten. Op basis van een kritische beschouwing van de context van metaalvondsten op bronstijdnederzettingen uit het rivierengebied blijft het echter onzeker of deze voorwerpen wel bewust zijn achtergelaten. Echter met name vanwege het feit dat grotere voorwerpen minder snel zoekraken en omgesmolten hadden kunnen worden, is intentionele depositie een mogelijke optie wanneer deze toch worden aangetroffen. Enkel voor de bronzen lanspunt in een paalspoor van een bronstijdhuis opgegraven te Rhenen is een interpretatie als bouw- of verlatingsoffer plausibel.

Maar dit wil zeker niet zeggen dat nederzettingsterreinen in de bronstijd *niet* werden gezien als geschikte locaties voor objectdeposities. Het blijkt echter dat op nederzettingen andere categorieën dan metalen voorwerpen hierbij een belangrijke rol innamen. Vooral aardewerk (complete potten en gestapelde scherven), schedels van dieren (met name runderen en hoornpitten van andere dieren) en maalstenen lijken vaker intentioneel te zijn achtergelaten op nederzettingsterreinen. Bij deze handelingen speelde mogelijk het proces van fragmentatie (en de daarmee geassocieerde werktuigen) een betekenisvolle rol.

Samenvattend kan gesteld worden dat het centrale Nederlandse rivierengebied niet alleen een levend landschap, maar evenzeer een voor (goed) leven geschikt landschap was in de ogen van de bronstijdbewoners. De variëteit aan landschapstypen die op korte afstand toegankelijk waren, de grote vruchtbaarheid van akkers en weiden en de beschikbaarheid van snelle communicatieroutes langs actieve en fossiele riviersystemen lagen ten grondslag aan deze geschiktheid. Omvangrijke zones rondom de voor bewoning uitgekozen locaties werden door middel van uitgestrekte systemen van hekken verkaveld. Zowel bewoning, agrarisch gebruik, deposities en begravingen lijken in dit cultuurlandschap hun eigen plek(ken of zones) te hebben. Ook op langere termijn werd van de gekozen landschapsinrichting en de daarbij gehanteerde categorisering nauwelijks afgeweken. Uit dit alles spreekt mogelijk een sterk traditionalisme (of anders gezegd, de intentie die boerengemeenschappen hadden om ‘te blijven zitten waar we zitten’ en daar ‘te doen wat we altijd doen’, oftewel een langdurig vasthouden aan ‘*having everything in its place’*). Het feit dat de leefomgeving continu in ontwikkeling was en aan verandering onderhevig lijkt hierbij geenszins als belemmerend te zijn ervaren. Ik heb dan ook betoogd (Hoofdstuk 2) dat van de processen die de gebruikspotentie van het landschap beïnvloeden, slechts weinige desastreuze gevolgen kenden binnen de duur van enkele menselijke generaties. Bronstijdboeren waren vermoedelijk volledig op de hoogte van de kansen en risico’s die leven in een levend landschap met zich meebracht.

Tot slot wordt kort ingegaan op een aantal kennisleemtes en richtingen voor verder onderzoek. Ik stel voor dat – indien niet uiterst nauwkeurig geëxpliciteerd – de term ‘erf’ weinig te bieden heeft voor onderzoekers van laatprehistorische nederzettingen. Vergelijkingen met historische en hedendaagse Nederlandse boerenerven leiden hoofdzakelijk tot onbruikbare analogieën. Het feit bijvoorbeeld, dat bronstijdhuisplaatsen soms *de facto* door hekken worden omgeven, verschilt van hedendaagse voorbeelden waar structuren specifiek met dit doel zijn aangelegd. Ook op basis van de etymologische achtergronden van het woord ‘erf’ (en ‘*farmstead*’) en de grote verschillen tussen archeologie als wetenschap en de onderzoeksterreinen waarin erven wél legitieme onderwerpen van studie zijn, lijkt het niet wenselijk deze term te handhaven binnen het onderzoek van laatprehistorische nederzettingen.

Verder dient ook het gebruik van het ‘zwervende erven’-model bij het onderzoek van laatprehistorische nederzettingen enkel te worden voortgezet op kritische wijze, met voldoende aandacht voor de (zwakke) hieraan ten grondslag liggende aannames en de beperkte representativiteit. Dit betekent dat nieuw onderzoek zich juist moet richten op zaken als de samenstelling van sociale groepen – zoals huishoudens en lokale gemeenschappen –, de levensduur van gebouwen en de gebruiksduur van huisplaatsen en nederzettingsterreinen, als ook op de drijfveren van eventuele herlocatie. Specifiek en lokaal onderzoek van de bodemvruchtbaarheid en uitputtingsgevoeligheid van bodems, maar ook prehistorische akkerbouwsystemen in bredere context zijn hierbij een belangrijke onderzoeksrichting. Een andere dankbare richting voor verder onderzoek is de overgang van de midden- naar de late bronstijd. Bestaande theorieën over welke veranderingen (er wanneer) plaatsvinden, lijken nog maar weinig houvast te hebben aan de bekende gegevens.

Het is verder gebleken dat het centrale Nederlandse rivierengebied een schatkamer vormt voor onderzoek naar de schaarse nederzettingen uit het midden-neolithicum tot en met de midden-bronstijd-A. Anders dan in de Pleistocene gebieden bestaat juist hier de mogelijkheid om goed geconserveerde en ruimtelijk gescheiden resten uit deze perioden te onderzoeken. Om deze potentie echter ten volle te realiseren, moeten diegenen die archeologisch veldwerk in het rivierengebied (laten) verrichten wel doordrongen zijn van het feit dat dit vraagt om specifieke strategieën bij de prospectie en waardering. Ook diegenen die de keuzes maken welke vindplaatsen er op welke wijze moeten worden onderzocht, moeten zich ervan bewust zijn dat de grootste wetenschappelijke winst veelal niet zit in de locaties met de meeste “archeologie per euro”. Uitgaande van specifieke vragen, die getuigen van inzicht in actuele kennislacunes en met een gedegen (paleo)landschappelijke aanpak, biedt het Nederlandse rivierengebied voor de bronstijd – maar ook voor andere perioden – nog een enorm (belangrijk) onderzoekspotentieel.

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After graduation, I have spent a few years working with the Leiden University in-house excavation unit 'Archol'. The atmosphere was very pleasant (spending weeks together crammed in old farmhouses at Oss, and undertaking various trips to 't Kaatje and the karting track) and I have benefited much from working with colleagues that were both knowledgeable and often prepared to go that extra mile to maximize scientific gain. With such colleagues, (field)work is no burden and I must thank them all (for brevity here collectively[1]) for the pleasant cooperation and numerous things they have taught me.

From 2003 to 2007, I participated in the research project '*Living in a dynamic (cultural) landscape. The Bronze Age in the Dutch river area*', that was housed at the Faculty of Archaeology of Leiden University and funded by the Netherlands Organization for Scientific Research (NWO). In this project several archaeologists, a physical-geographer and a palaeobotanist joined forces to study the essence of Bronze Age occupation in the Dutch river area. Liesbeth van Beurden and Wilko van Zijverden have tried their best to introduce me to the intricacies of palaeobotany and palaeogeography respectively, and I would like to thank them for their significant contribution to the project in general and my thesis in particular. Similarly, I would like to express my gratitude to David Fontijn, Harry Fokkens and Peter Jongste for the recurring informal discussions that helped me to present my arguments ever more clearly (frequently countering my stubbornness with solid argumentation), and which provided a valuable source of inspiration, and have as such also increased the quality of the present study. During the various informal PhD activities, such as playing pool (with Alistair Bright, Luc Amkreutz, Bleda Düring and Erik van Rossenberg), playing poker (with Alice Samson, Corné van Woerdekom, Karsten Wentink and Quentin Bourgeois) and frequent lunches (mostly with Arne Wossink, Ellis Grootveld, Erik van Rossenberg, Eva Kaptijn, Gerrit Dusseldorp, Luc Amkreutz and Welmoed Out), PhD pleasures and problems were shared and discussed, helping to maintain a proper perspective on the progress, relatedness and importance of our diverse research topics and trajectories. In addition to the resident PhD's, various other faculty members contributed to providing an inspiring research community (I have particularly enjoyed the fact that the doors to Alexander Verpoorte's, Corrie Bakels', David Fontijn's, Harry Fokkens', Leendert Pieter Louwe Kooijmans' and Richard Jansen's rooms were always open to discuss academic matters and they have provided valued comments on various of my arguments and articles), provided interesting case-studies or (anthropological; thank you Raymond Corbey) analogies, or pleasant distractions (particularly Olga Yates, Claudia Regoor, Eric Dullaart and Tjaco Mast, the latter two – together with Milco Wansleeben – were moreover always available to offer advice on computer-related matters).

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2 J. Aalberts-Bakker, E. Altena, R. Annaert, N. Arts, M. Artursson, A. van As, E. Ball, K. Becker, R. van Beek, I. Benjamins, J. Bennik, H. Berendsen †, R. Berkvens, M. Bink, S. Bloo, Y. Boonstra, J. Bourgeois, I. Bourgeois, J. Bouwmeester, R. Bradley, P. van den Broeke, F. Brounen, J. Brück, E. Bulten, P. Crombé, S. Deiters, P. Della Casa, S. Diependaele, J. van Doesburg, M. Dorst, E. Drenth, M. Dütting, E. Eimermann, P. Floore, F. Gerritsen, T. Goossens, E. Graafstal, J. van den Hazelkamp, S. Heeren, J. Hendriks, W. Hessing, E. Heunks, H. Hiddink, J. Hielkema, A. van Hilst, A. de Hingh, S. Hoffmann, M. Høgestøl, M. Holst, J. Hoorne, J. Huis in 't Veld, C. Huth, W. Jong, J. de Jong, A. van Kampen, R. Kelm, J. van Kerckhove, E. Koeneman, M. Kok, R. Kok, J. Kolen, P. Kooi, K. Koot, J.-W. de Kort, M. Kosian, K. Kristiansen, C. Kruidhof, Y. Lammers-Keijzers, J. Lanting, K. Leijnse, O. Lemercier, E. Lohof, B. Makaske, B. Meijlink, S. Mooren, J. Moree, G. de Mulder, A. Müller, D. Mullin, S. Needham, A. Numan, D. Ollauson, R. van Oosten, L. Petit, H. van der Plicht, P. Ploegaert, R. Pope, J. Precht, A. Prins, D. Raemaekers, B. Ridderhof, P. van Rijn, B.van Rijswijk, A. Robeerst, B. Roberts, S. van Roode, P. Sarnäs, J.-A. Schenk, J. Schoneveld, M. Schurmans, A. Sheridan, P. Skoglund, B. Smit, S. Snijders, E. Stouthamer, C. Sueur, L. Theunissen, G. Tichelman, A. Tol, M. van Trierum, A. Ufkes, P. Verhagen, L. Verhart, E. Verhelst, A. Verlinde, S. Vrins, M. de Waal, A. Waasdorp, A. ter Wal, M. Wanders, T. Waterbolk, K. Wendt and C. Wilson.

Curriculum vitae

Stijn Arnoldussen was born in 1977 in the city of Nijmegen. Many childhood summer evenings were spent collecting rubbish (and rarely anything archaeological) from the fields around his parents house in Deest. Between 1989 and 1995 he attended secondary education at the 'Pax Christi College' in Druten, where initial interest in archaeology was sparked. Between 1995 and 2000 he studied 'Prehistoric Archaeology of north-western Europe' at Leiden University and participated in fieldwork at Vlaardingen, Oss, Postholt and Guadeloupe. He wrote his Ma thesis on the Late Neolithic and Bronze Age occupation of the central Dutch river area in 2000 (for which he was awarded the '*W.A. van Es-prijs*', which is a biannual award for the best Dutch archaeological MA thesis). Between 2000 and 2003 he was employed by 'Archol bv', the Leiden University excavation unit. He participated in, and reported on, various archaeological fieldwork campaigns, among which the excavation of an Early- and High Mediaeval settlement at Bakel - Achter de Molen (2002) and a campaign of test-trenches at the Bronze Age settlement site at Zijderveld (2003). From 2003 to 2007 he participated as a PhD student in the NWO-funded project 'Living in a dynamic (cultural) landscape. The Bronze Age in the Dutch river area' at Leiden University, which resulted in the present dissertation. He is currently employed with the National Service for Archaeology, Cultural Landscape and Built Heritage (RACM) as a senior researcher specializing in the Later Prehistory of the Holocene parts of The Netherlands. From December 2008 he will be employed as a lecturer in Later Prehistory at the University of Groningen.

A LIVING LANDSCAPE

This study focuses on the nature and dynamics of Bronze Age settlement sites in the Dutch river area. Throughout the Holocene, the Dutch river area was a vast deltaic area characterized by ceaseless fluvial activity. Although such landscapes may seem inhospitable, the often excellently preserved archaeological evidence indicates that people settled these wetland areas in prehistory.

This study describes why Bronze Age farmers were keen to settle here, and in what ways these communities structured the landscape around their houses. It is commonly assumed that during the Bronze Age, a new type of domestic compound emerged: the 'farmstead'. Such a farmstead is traditionally characterized as comprising a farmhouse with its associated outbuildings and pits, which are enclosed by fences or ditches. Moreover, the dominant model for describing Bronze Age domestic mobility – known as the 'wandering farmsteads' model – even takes its name from it.

Unfortunately, traditional interpretations of what Bronze Age farmhouses and their direct vicinity looked like are rarely based on systematic analyses of the available settlement site data. This means that it is far from certain whether the farmstead description given above applies to the Bronze Age. Could it be that this interpretation is (mis)guided by the analogies of the neatly parcelled post-World War II rural Dutch landscape? Did the concept of a 'farmstead' hold any significance for Bronze Age farmers themselves?

To answer such questions, data from several extensively excavated Bronze Age settlement sites in the Dutch central river area are used. Because of the large scale of the excavations (up to 14 ha) and the often well-preserved features and finds (e.g. preserved house posts) it is possible to undertake comparative analyses of Bronze Age houses, house-sites and settlement sites, that benefit from wetland preservation and ample opportunities for palaeogeographical and palaeobotanical reconstructions. This means that Bronze Age houses, house-sites and settlement sites can be studied in relation to the physical environment, and the changes in it over time.

Bronze Age communities altered the appearance of the settlement environment extensively through the construction of systems of fence-lines. These fence-systems – encircling groups of houses and outbuildings – can often be traced over a distance of hundreds of meters. Moreover, it is shown that settlements reflect only one domain within the wider cultural landscape, and that locations for object deposition and funerary sites occupied distinctly different zones within the (cultural) landscape. Evidently, Bronze Age communities explicitly strived to maintain a distinct spatial categorization of (cultural) landscape use over long periods of time. Therefore, this study aims to characterize the development of the Bronze Age cultural landscape – and the entwined processes of cultural and landscape dynamics – from a long-term perspective, starting in the Middle Neolithic and ending in the Iron Age.

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