THEMATA 2

Land 1 scapes

Excavations around a monument with aspects of the Bronze Age to the Modern

(Beverwijk & Heemskerk, N-H)

In the Broek polder

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Landscapes in the Broekpolder volume 1

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THEMATA 2
AAC/PROJECTENBUREAU • UNIVERSITY OF AMSTERDAM

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a The ridge with flax. A hightened area along the west side of the monument;
b The offering pool;
c The remnant creek bedding, now a 'skating creek'.
Also included by the municipalities were contracts for landscape art such as (above) a snake in the watery pool. Below, looking from the south, the most southernly point of the monument.

List of Abbreviations

AAC Amsterdam Archaeological Centre, University of Amsterdam, Faculty of Humanities

AHN Actual Height Model of the Netherlands

AWN Archeologisch Werkgemeenschap Nederland (Netherlands society of amateur archaeologists)

EDNA E-depot for Netherlands Archaeology

NAP Ordnance datum *(Normaal Amsterdams Peil)*

ROB > RCH State Service for Archaeology now State Service for Cultural Heritage *Rijksdienst voor het Oudheidkundig Bodemonderzoek > Rijksdienst voor het Cultureel Erfgoed*

RAAP Regionaal Archeologisch Archiverings Project

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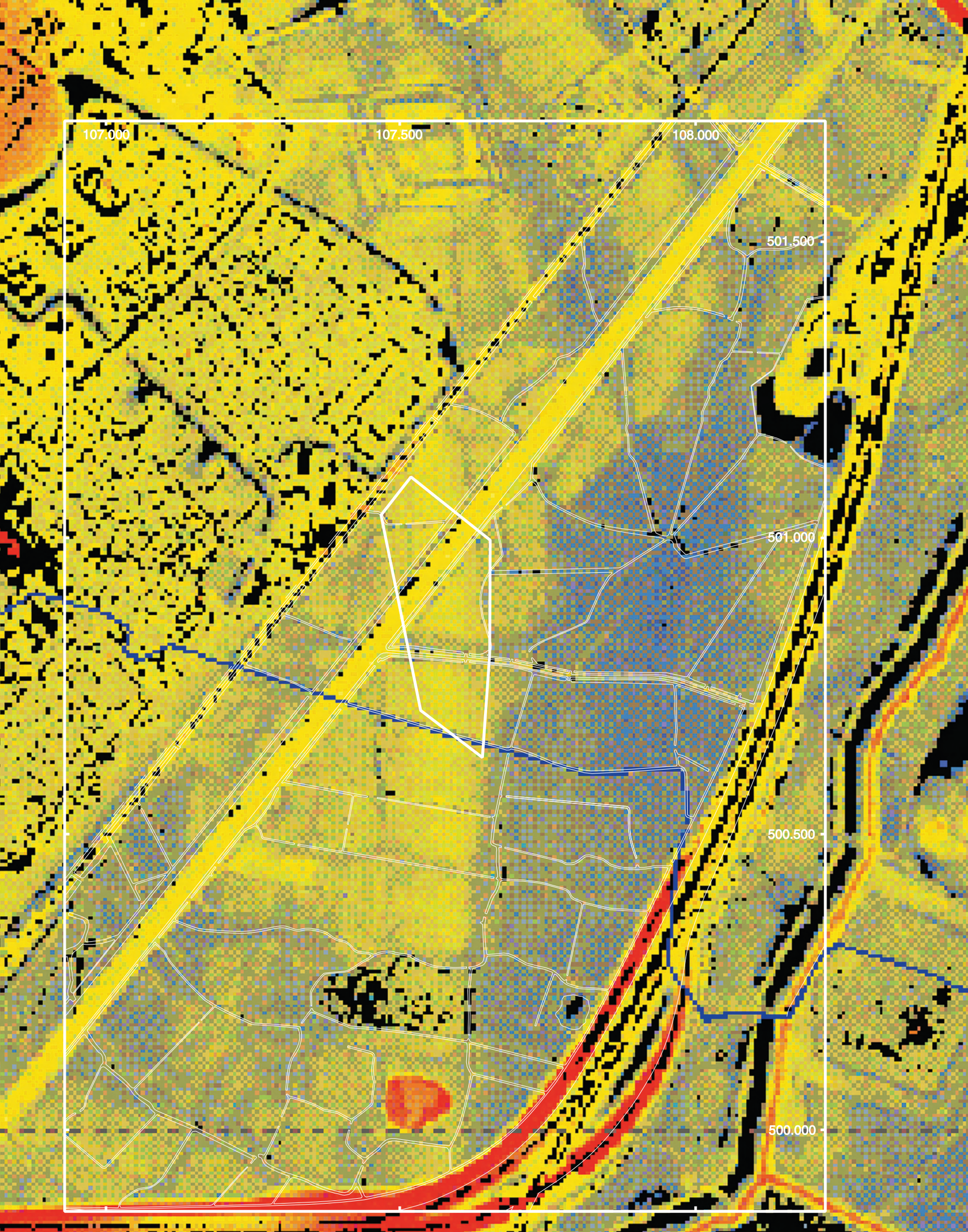
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A number of people with temporary contracts were involved with working for the Broekpolder Project during the excavation seasons. Through the changing structure of archaeology in the Netherlands, few students could take part. In addition to these few AAC students, thanks are due to various 'machine men', but especially Erik Andela and those with (temporary) staff positions held for part of the field work: Sjeng Dautzenberg, Yurie Eijskoot, Christian Nockemann, Cor Ravesloot, Henk van Ramshorst, Doris Schmutzhart and Jeroen Vaars.

The authors

Peter Vos (Netherlands Institute of Applied Geoscience TNO) in the field studied and sampled two deep sections for palaeogeographic constructions and Lucy Kubiak-Martens (BIAX Consult) analysed macro-remains to round this important facet out for the physical landscape and crops grown. Both were involved in post-excavation discussions for interpretation as well as in contributing texts. I with the other authors all executed the field work and we were responsible for various facets of excavation and for post-excavation work. In addition to this basic field work and registration, other tasks were rather specific, particular to certain people: Elles Besselsen studied the animal burials, and with Marjolijn Kok collated registration and digitised drawings; Marjolijn Kok was responsible for data-base management and analyses (databases are archived at EDNA, http://easy.dans.knaw.nl); Marian Diepeveen-Jansen: post-processual theory, pottery analyses; Sander Gerritsen: Roman import identification, regional analyses, and small finds drawings; Jeffrey Slopsma: zoological identification and analyses; Jos Kaarsemaker: from the field drawings and finds drawings to reworking of photographs and design of illustrations for publication. My task was in trying to further research questions after working 25 years within this same Oer-IJ region with a group of enthusiastic people, and in attempting a collation and presentation of analyses particular to the Broekpolder.

Linda L. Therkorn, *project director*
AAC, University of Amsterdam


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Past research and aims of the project

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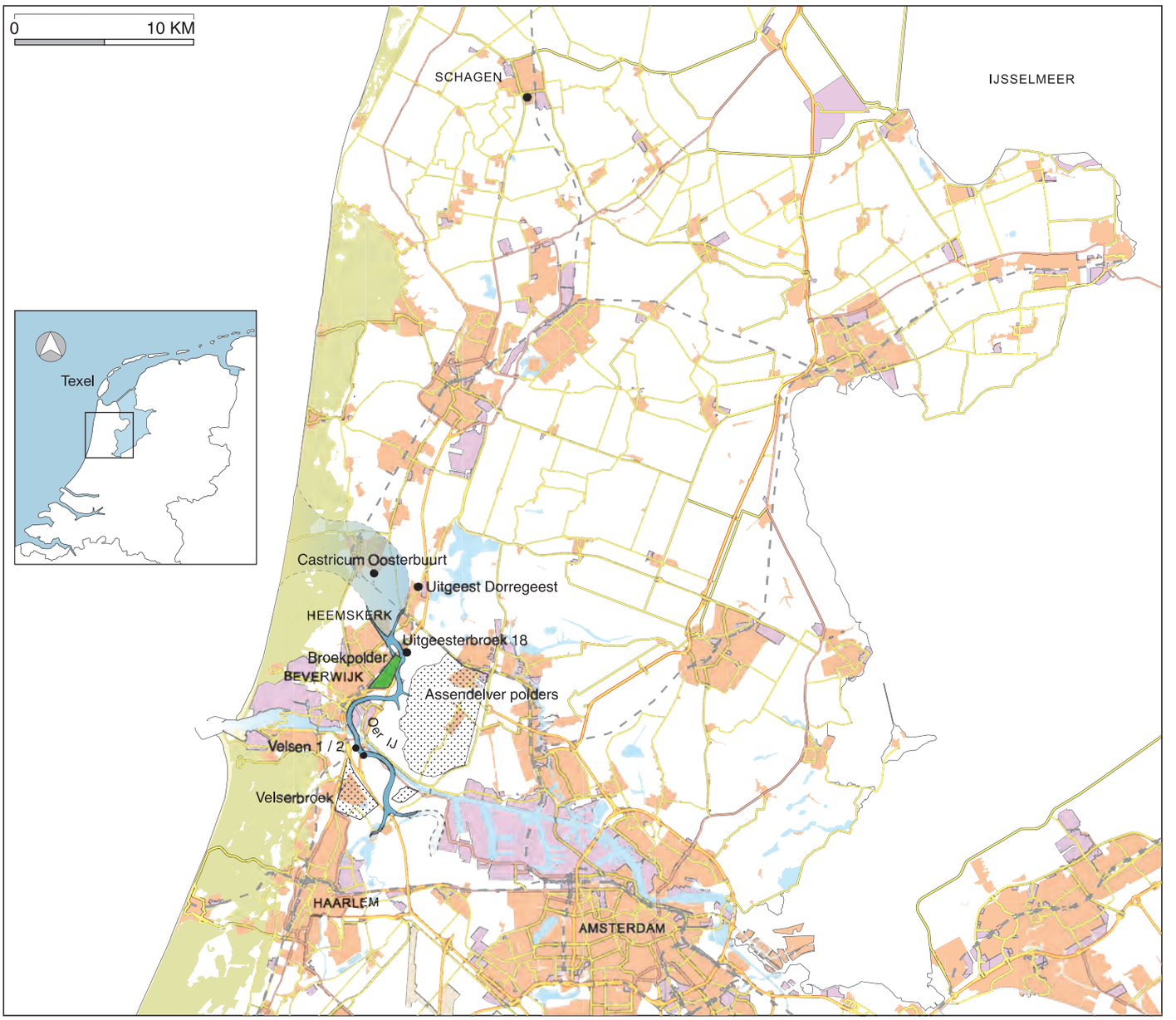
The Broekpolder lies 20 km to the northwest of Amsterdam. It was part of the Wijkerbroek and Zuidbroek polders in the recent past. The area of pastureland was rezoned in 1987 to provide for housing needs in the two municipalities of Beverwijk and Heemskerk. The boundary between the two runs east-west through the Broekpolder. Combined with alterations to the route of the A9 motorway, this project involved an area of 150 ha area being enclosed and renamed the 'Broekpolder.' It is bordered to the west by the railway line running alongside the built-up area of Heemskerk and Beverwijk and to the east by the newly created high embankment alongside the A9 motorway *(fig. 1)*.

1.1 Introduction

Within the new Broekpolder housing estate, 5.6 ha has been preserved as an archaeological monument, retaining some past signs of the physical and past settled landscape The area had retained various features referring to a more distant past up to the time of the excavations. Before the start of building activities in 2006, a pattern of drainage ditches running throughout the entire Broekpolder had remained almost unaltered since the Medieval period. Levelling of fields had not occurred, and underlying layering was considered undisturbed since the land had long been used as pasture. The area was relatively undulating compared to other parts of the province of Noord-Holland, with field level differences of up to 50 cm. Normally, all empoldered land now below sea level along the coastal region of the Netherlands has only very slight natural physical landscape features. Elevation variations are attributable to Holocene geological processes arising as the Oer-IJ estuary formed in this area of the province of Noord-Holland.

The soil scientist Gúray (1952) gave the name 'Oer-IJ estuary' to the former marine tidal system which in prehistory was located in the area between the towns of Castricum, Heemskerk, Uitgeest, Assendelft, Velsen, Zaandam and Amsterdam *(fig. 2)*. A precursor of the Medieval IJ lake, the Oer-IJ estuary developed around 2500 BC from the large middle-Holocene

Fig. 1 The immediate area of the Broekpolder showing the situation in the mid-1990's on the Actual Height Model of the Netherlands (AHN), achieved through airborne laser altimetry (by courtesy of the Survey Department of the Directorate-General of Public Works and Water Management). The image has been projected on the topographical map and shown as well is the outline of the archaeological monument. The higher-lying salt marsh ridge is clearly visible running north-south through the Broekpolder. The low-lying area on the east is the depression over the last phase of the Oer-IJ channel. The prehistoric creek depressions across the salt marsh ridge are somewhat visible – compare with Plan 3.



tidal basin of the Amsterdam area, with its main tidal inlet located just north of Haarlem. By the Iron Age, the inlet had shifted to the north, near Castricum (*fig.* 2 and Plan 2). Former peat rivers drained via Flevo lake into this former marine system. Compared with the marine systems of the northern and southern Netherlands, the Oer-IJ estuary was a relatively small tidal system with very diverse, small-scale, morphogenetic landscapes. The various types of habitats available for utilization and various resources all lay within 0.01 km to 4 km of this central part of the former tidal system.

The area has long been the subject of study and the interpretation of physical processes and human presence is ongoing, also through a changing series of research perspectives. This chapter introduces facets of the 'archaeological partnership', and various theoretical and analytical frameworks, including a few points of research within the region. It briefly describes the context within which the Broekpolder excavations were launched, and the objectives of research.

Broadly speaking, Ingold's (1993, 152) perspective is useful for providing structure and drawing attention to various fields

Fig. 2 The region, with the position of the Broekpolder and the trajectory of the Oer-IJ channel of the estuary for the immediate Broekpolder area during the Iron Age. Sites and areas of research mentioned in the text are shown.

of interaction. He regards the landscape as 'an enduring record of – and testimony to – the lives and works of past generations who have dwelt in it, and so doing, have left there something of themselves'. The key concepts of Ingold's 'dwelling perspective' are interrelation, interactivity and processes of incorporation. In the following sections and chapters we will discuss how these apply to the Broekpolder in terms of:

– inclusion of the archaeologist as a partner in creating an image of past societies;
– a spatial framework in which the focus is on the interrelation of all constituting features and;
– a temporal framework in which the archaeological record is a partial testimony of a continuous and never-ending process occurring through the lives of people.

1.2 The archaeologist as a partner in creating an image of past societies

Archaeological traditions of interpretation and areas of interest affect expectations of places thought worthy of excavating and analysing on the basis of the differing perspectives of those involved.[1] The decision as to what to do, archaeologically, within the 150-hectare Broekpolder was taken in five main stages over the period 1991 to 1998, and can be briefly summarized as follows:

1991 Woltering and Jager (1991) of the ROB *(Rijksdienst voor het Oudheidkundig Bodemonderzoek)*[2], reported findspots with sherds dating to the Late Iron Age/Roman Iron Age and accompanying layering which had been recorded by a local group of amateur archaeologists of Beverwijk, during relocation of the motorway *(fig. 3)*.

1993 The municipalities of Heemskerk and Beverwijk asked the ROB to survey the enclosed Broekpolder area. The ROB commissioned RAAP (Regional Archaeological Archiving Project) to perform an assessment *(Aanvullende Archeologische Inventarisatie, AAI)*. Initial understanding of the Broekpolder was based on De Roo's (1953) soil map. Surveying was carried out by inspecting molehills and the spoil from dredged field ditches, fieldwalking over the three ploughed fields, and core-boring the grassland. These activities identified features dating to the Late Iron Age and Roman Iron Age relating to a core habitation area and apparently outlying, less intensively used areas.

While the intensively used area was thought to require excavation, it was suggested that watching briefs during construction activities for the new housing estate would be adequate for the less intensively used areas. The results of the fieldwalking and core-boring also led to a quality assessment report and a suggestion of where an archaeological monument might best be situated (Soonius 1993). The positions of the core-borings are shown in *Figure 3*.

1994 The ROB performed an evaluation *(Aanvullende Archeologisch Onderzoek, AAO)* consisting of nine trial trenches with a total length of 2.5 km (Hagers 1995). The trenches were distributed over areas that the ROB was considering for protected monument status, based on the RAAP report *(fig. 3)*. Commensurate with the evaluation guidelines applying at the time, trenches were dug only to the top of features, and finds were sampled by occasionally sectioning features. Middle Iron Age and Late Iron Age/Roman Iron Age features were identified on the basis of pottery typology.

1995 – 1996 The outline of the scheduled monument was decided upon. It originally encompassed 20 ha *(fig. 3)*, but would be brought back to an area of 5 ha on condition that the surrounding 15 ha be excavated as fully as possible. The excavation was to be funded primarily by the municipalities of Beverwijk and Heemskerk, with additional funding from the Province of Noord-Holland and central government. Once the amount of funding available became clear the ROB estimated that about 3.5 ha of the 15 ha surrounding the 5 ha area that was to be preserved could be excavated (ROB, Plan van Aanpak, 1996).

1996 – 1998 After discussions with Hagers in mid-1996 about our willingness to excavate in the Broekpolder, the senior author was contacted by the ROB in mid-1997 and asked if she would arrange to tender for the excavations via the University of Amsterdam, within the budget available. After reading the reports cited above, and regarding the area from a somewhat different theoretical and regional perspective than that taken by the authors of those reports, some points were noted as to the potential of the archaeology in the Broekpolder over and above strict, late prehistoric settlement archaeology – focused on the immediate areas of dwellings – in the 20 ha scheduled monument. A broader 'landscape' approach was adopted in the discussions between the University of Amsterdam and the ROB concerning the strategy and the division of funding,

1 See De Zwart (1999), for a summary of the processes involving those in local government, province and state agencies, with at times diametrically opposed views.

2 Now, *Rijksdienst voor Cultureel Erfgoed*, National Service for Cultural Heritage.



which lasted from January to May 1998. Finally, a revised decision for distributing the funding available for excavation was agreed upon.

In principle, 70% of the funding would be reserved for the core monument area *(kerngebied)*. This was the part of the originally scheduled monument surrounding three sides of the 5 ha that would retain monument status once the housing estate was complete *(fig. 3)*. However, 30% of the funding could be used for the archaeology in the areas outside the core area. It was also decided that a change in this division of funding would be possible depending on the interim results obtained during three successive excavation campaigns.

Fig. 3 The Broekpolder with the positions of the first find-spots, subsequent RAAP core-borings and the ROB trial trenches. Compare with the altimetric map *(fig. 1)* for the contours and Plan 1 for position of the excavation trenches during the Broekpolder Project.

Budgeting according to a different standard led to an estimate that between 12 and 15 ha could be excavated, analysed and published with the amount of funding available.[3] This was outlined in a research design along with the objectives, theoretical perspectives, and details of staffing and methods (Therkorn *et al*. 1999).

1.3 Archaeologists and past research aspects of the Oer-IJ Estuary Project

The archaeological approach to the Broekpolder study started from a landscape perspective, which had been developing within the Oer-IJ Estuary Project research programme since its inception with the Assendelver Polder excavations in 1978 – 1981 (Brandt *et al*. 1987). Then, the term 'landscape archaeology' was applied to the project (cf. Coles 1988). The scale of the research was expanded after the Assendelver Polder Project to include the entire Oer-IJ estuary region, rather broadly defined as also including the peat areas of the hinterland. Over the last two decades, understanding of regional archaeology and the search for methods to illustrate and put theory into practice, have led to a refocusing of interest towards various problems and aspects of the remains of this former estuarine area. The University of Amsterdam carried out fifteen excavations within the Oer-IJ Project after 1981, and the various research themes, excavation results and analyses shaped expectations of the Broekpolder excavations.[4] The term 'landscape archaeology' still applies, and will continually shift as both terms are redefined, though it still includes the perception-model emphasis characterized early on by Brandt (1986, 1988).

Assumptions and analytical traditions affecting interpretations are also interwoven in explanations of the past. A number of research topics have remained constant, albeit within themes that have changed since the inception of the Oer-IJ Project in the early 1980s. They will be touched upon again in the following chapters, in the interpretation of the Broekpolder features. They were also the main factors determining the research objectives.

1 Brandt (1986) long ago drew attention to the concern of 'the Dutch' with water, and the emphasis placed by archaeologists on the 'threat' of water as a somewhat historically imbued mentality affecting perception, and thus interpretations, of coastal landscape use in the past and, in particular, in determining the past. Abbink (1986) briefly argued, within a framework of structuration theory (cf. Giddens 1979), that specific 'wet-feet' explanations are irrelevant to our understanding of the prehistoric inhabitants of the coastal area.

As mentioned above, the 'Oer-IJ' main estuarine channel was certainly a prominent landscape feature in the past and greatly influenced the development of the physical environment. The main channel has the characteristics of a myth however. Although the effects of formation processes are evidenced in the geological and archaeological record of the region, its actual location has long been the subject of research. From having a tidal inlet more to the north, higher up the coast, at Bergen (cf. Vos 1983), the estuary inlet was placed more recently near Castricum. In combination with the second and third objective below, geological analyses in the Broekpolder would re-examine past research results and assumptions about the extent, duration and magnitude of marine influences shaping the physical landscape, and thus also the natural vegetation and the quality of the available water, fresh to brackish, as well as what inhabitants did during Oer-IJ periods of greater and lesser marine activity.

2 In addition to the fuzzy physicality of the Oer-IJ, it has also taken a very concrete and central position within the modern archaeological definition of a 'region'. The supposed trajectory of the Oer-IJ has formed a literal central feature on archaeological maps. From the Assendelver Project onwards, through the 1990s (cf. Van Heeringen 1992, Meffert 1998), archaeologists have perceived this region as a space of past unity, with the channel binding rather than separating areas. There was an implicit correspondence between a region as 'research unit' and a past regional 'territory'. With the growth in the number of sites excavated in the 'region', it has become increasingly clear that there are marked differences in the archaeological record to either side of the Oer-IJ channel. One subject for future research would be the further definition of possibly different identities (as archaeological traces of traditions) existing on either side of the Oer-IJ channel.

3 Within the Oer-IJ region larger-scale excavations had been carried out mainly on sandy (clay) deposits, though there were also findspots and small-scale excavations of farmhouses on peat. In the 1980s, dwellings on peat were considered an anomaly, mainly as the result of a modern perception of peat as an inhospitable place. However, the advantages of peat and farmstead situation began to be emphasized as a form of past

3 Hagers used the Castricum-Oosterbuurt site (Hagers & Sier 1999) to estimate costs/unit area. Therkorn chose from a greater number of sites, whereby some aspects were averaged, but most were assumed to parallel conditions at the nearby site of Uitgeesterbroek 18, a habitation site with adjoining field systems (Therkorn 1989, 2004).

4 Interim reports in *Holland* by Therkorn and student co-authors, Perger & Hendrichs (1991) and Hendrichs (1992), and final reports (Therkorn 1988, 2004; Therkorn *et al.* [1998] 2006) on excavations in Noord-Holland; various analyses of groups of materials and features as part of Master's dissertations and material practicals by students at the University of Amsterdam.
There are plans to have the remaining backlog of Oer-IJ excavations published.

selection, rather than a result of (implicit) determinism or a reaction to over-population, leading to settlement in 'marginal' situations. For instance, Groenman-Van Waateringe (1983) used four-dimensional time-space analyses to define the various opportunities offered by the natural resources available in an area rich in biotopes, all within walking distance of the dwelling, whether situated in sandy areas of creek levees or on accumulations of peat. Despite the numerous findspots in peat, an opportunity to carry out large-scale excavations did not arise until the 1990s. Large-scale excavations on peat in the Assendelver Polders (Therkorn *et al*. [1998] 2006) revealed a normal array of settlement features comparable to settlements on sandy-clay situations. And, as 'sites' are never fully excavated, no matter how large the area uncovered, so too it was found in peat areas that (late) prehistoric features extended far beyond the farmhouse. In addition, there were clear signs that vast areas of peat had been cut as a resource during the Iron Age, considerably altering the natural, physical landscape.

The peat area in the southwest of the Broekpolder had been ignored during the 1993 RAAP survey, and thus also during trial trenching. It would however also gain attention during the excavations. Furthermore, greater integration was to be attempted in interpreting peat remains, not as basic factors reflecting a 'natural' setting, but in the context of larger categories of integrated concerns and the selection of landscape components used by past inhabitants.

4 The general settlement pattern within the region is one of shifting single farmhouses inhabited probably for only one generation. These dwellings have been analysed through the theoretical perspective that they were 'the principle locus for the objectification of generative schemes' (Bourdieu 1977, 89). The 'materials' objectifying concerns were interpreted through the varying types of deposits as illustrating facets of gender and subsistence but also whereby the nature of the use of space as seen in orientations and buildings with particular dimensions could indicate differences between regions which could be 'tribal' areas (Therkorn 1987 a & b).

'Generative schemes' and the house as part of the microcosmological concerns of inhabitants were subsequently included (Therkorn 1992, 2004). In past inhabitant 'time' and the long term, and within a matrix of excellently preserved features and materials, short annual cycles were suggested for the type and particular placement of features for five sites excavated previous to the Broekpolder. Interpretations included lived space and the cycles of seasons and economy as bound to landscape, with direct reference to past perceptions of the spatial division of the sky. Pits are of particular interest. The bits of daily life and complete objects in pits are interpreted as representations of various meanings, marking the landscape through sky references as they were then perceived. These features and the interpretations within past cosmology particularly as enfolded within landscape and time would be addressed further during the Broekpolder project.

5 The interest in the long term and the desire to bind prehistory with history in a way that transcends 'periods' of specialist interest had been inspired by work done by Garthoff-Zwaan (1987) as part of the Assendelft project on ethno-historical texts in the vernacular, and later popular cultural traditions once commonly called 'folk traditions'. The importance of perception in settling the coastal zone had been used to interpret the mentality towards natural features (Brandt 1988). Garthoff-Zwaan took things one step further by more research of the historical period where texts are clear on the meaning invested in natural materials found in the landscape. Thanks to the preservation of the Oer-IJ features, organic material from plants and trees, in particular, could be explored for facets of meaning beyond simple functionality or the 'chance' fact of them being available in the environment. The aspect of selection as evident in tree species used in farmhouse construction and to mark particular places in the farmhouse (Therkorn *et al*. 1984, Garthoff-Zwaan 1987), for example, would be broadened if possible. And aspects of texts such as myths would also be examined on the basis of broad similarities with supra-regional ideological concerns associated with materials. Without projecting meaning on the past, materials linked with later texts and also evident as part of the landscape could be used to distinguish patterns of materials, the cycles of 'things' and the 'meanings of things' (cf. e.g. Hodder 1989). This aspect of research method, within the theoretical concerns of the long term, allows institutionalised practice to be revealed, and meanings to be postulated, as each life cycle is embedded in the structural history of the *longue durée* (Braudel 1969). There are complex interrelations between social beings, the material world, the conceptual world (conjunctural history) and reactions to the occurrence of specific situations or circumstances (evenemential history). The embedding of specific cultural constructions of social life and the environ-

ment in which it unfolds directs transformation processes (Bourdieu 1977).

In the Broekpolder project, it would be possible to progress the theme of the long term and the traditions of using and marking the land, particularly as related to the transition from paganism to Christianity, within the regional perspective, incorporating all of the above points as integral aspects of tradition.[5] Tracing tradition necessarily involves regarding what went before and what went after. To put it simply, no features would be ignored during the excavations, even if they were relatively recent.

6 Finally, the results of recent work in Noord-Holland were to be applied and threads followed, including Abbink's (1999) approach to pottery, itself an extension, and more theoretically inclusive work carried out during the Assendelver project (cf. Van der Leeuw *et al.* 1987), as well as Woltering's (2000) analysis and interpretation of subsistence economy in prehistoric farming communities.

1.4 Landscape and recent theoretical approaches

Recent approaches to 'landscape' have been considered as a means of interpreting the past. Regarding materials as dynamic and active instruments in the constitutive processes of society preceded the same development as the approaches towards 'landscape'. In current research the perception of material culture as an integral part of human society and activity is gaining more and more influence, as seen in the reiteration of the basic message (cf. Hodder 1986, 1987) that the identity of individuals and groups is bound up with goods (Weiner 1992, 4; Thomas 1996, 162), while the specific contexts in which they are used are instrumental in the definition and realisation of individual and collective identities, and in their social and spatial interrelations and rights (Diepeveen-Jansen 2001). Objects are constructed in the routine of every day, materially as well as symbolically, using selected resources perceived as available. Every act is 'meaningfully constituted, because in carrying them out agents deploy cultural categories, traditions, symbolic connotations and associations' (Thomas 1996, 59).

Ingold (1993, 162 – 163) introduced the concept of 'taskscape,' the array of incorporated activities forming the landscape. The taskscape is intrinsically temporal because it is constituted by the network of interrelations in a complex interweaving of many recurrent cycles. But the landscape is not only formed by the recurrent cycles of human practice, it also generates the actions of people. In this respect Ingold's view corresponds with Giddens' (1984) duality of structure or Bourdieu's (1977, 1992) concept of socialisation. The central idea of all three authors is the dynamics of the process of interaction between thought and action, between long-term world views (the matrix of perceptions, appreciations and actions) and sociocultural-specific remodelling in circumstances and situations bounded in time and space.[6] Landscape is the embodiment of the principles of the social order, including cosmology; at the same time, constitutive ideas and values are inculcated and reproduced by growing up in a social/natural environment. Such ideas were incorporated into the Oer-IJ project from an early stage (cf. Abbink 1986, Brandt 1988).

Natural, built and dug features are integral parts of the landscape. However, high/dry and low/wet places, pits, gullies or built structures do not have any intrinsic meaning. Their social meaning depends on their positioning within the entire constellation of features and on the types of activities centred in or around these features: places derive their meaning in social practice. Morphological aspects of features cannot therefore be directly related to an economic or religious function because places for dwelling, working and ritual activities are inextricably intertwined, and features can represent several activities at one and the same time.

One theory that is certainly applicable is Tambiah's (1990, 92 – 93) 'multiple orientations to reality' or 'multiple orderings of reality' as included in the social construction of meanings and used to stress the interlacing of ritual and profane practices which often occupy the same place. The term could also be used to describe a European Medieval mentality, and the same interwoven quality is present in 'the ensouled world of Celtic tradition, in which every place and artefact has its own personality, reflecting multiple meanings in physical and non-material worlds' (Pennick 1996, 9). Within the Assendelver Polder Project, Garthoff-Zwaan interpreted European mentality studies for more northern areas as showing that 'phenomena in the material world are interconnected, but there are also connections between the phenomena in the material world, and those in an immaterial world of a higher order transformed' and 'related to a system of classification of natural phenomena which implies links between the material and non-material world' (Garthoff-Zwaan 1987, 335). These ideas have been taken as the basis of a method to illustrate them.

5 There were plans at the inception of the project to delve more deeply into the later historical development of the Broekpolder as part of developments within the province more generally. This was not done, however. It was also the intention to approach the present users of the polder concerning certain facets of the archaeological traces created within living memory (one to three generations). It quickly became apparent that the inhabitants had no such knowledge, or were unwilling to part with information on certain questions such as why pits were dug and filled after deposits were made (into the 20th C) or about various 'dumping' practices. A more formal approach, in the context of anthropological/sociological research, which may add to our understanding of the most recent landscape biography of the Broekpolder is feasible, but it was not pursued in this project. The few interviews that were conducted are not published here, though they have been documented.

6 In the last decade the latter approach to the landscape has been a central concept in archaeological theory: see also Bender 1995, Hirsch & Hanlon 1995, various articles in the 1995 and 1997 *Archaeological Dialogues* journal, Kolen & Lemaire 1999, Gerritsen 2001.

1.5 Illustrating theory

An attempt has been made in the Oer-IJ Project to illustrate aspects of interwoven points of theory, methodology and method associated with it. Generally speaking, the above can be considered part of the following:

'Since action in the world partly depends on concepts, and since concepts are learnt through experience in the world, in which one is brought up and lives, it is feasible that long-term continuities in cultural traditions exist, continually being renegotiated and transformed, but nevertheless generated from within. Part of the aim of archaeology may be to identify whether such long-term continuities exist, and how they are transformed and changed' (Hodder 1986, 9 – 10).

'… where the surviving material culture data are sufficiently networked, it is possible to grasp variations in meaning in different contexts because the network is itself the attempt by people in the past to construct order through the repetition of similarities and differences along various culturally chosen dimensions of variation' (Hodder 1987, 7).

Studying patterns – recurring patterns and how features and materials are networked – across 'sites' and throughout a 'region', through time, can give rise to interpretations of action other than in the sense of the 'flat time' of anthropology and sociology, within the broad scope of interpretation provided by theoreticians such as Bourdieu and Giddens. Archaeologists have the opportunity to chart changes in patterns, something that is impossible for anthropologists/sociologists (cf. Fabian 1983). Anthropological examples of the web of relationships between the social community, activities and the surrounding world have proved valuable in introducing archaeologists to contemporary small-scale societies, however (e.g. Morphy 1995).

Within the region, it has become increasingly clear that domestic space and features in the surrounding landscape have a religious content. In the long term, and in the landscape theory of context, this work has involved using texts as interpretative springboards. Texts from Germanic language areas are deemed to have more situational import than southern texts. Numerous texts exist, most of them from Scandinavia, on late pagan practices. Throughout Europe, the travels of missionaries also produced a considerable textual trail detailing forbidden practices. The travels of one missionary, Willibrord, brought him to the vicinity of the Broekpolder around 700 AD, and he founded a church at Velsen, five kilometres away. Specific texts on Noord-Holland are rare, but the texts on practices throughout most of Europe are so similar that a generality of pre-Christian religious precepts can be assumed.

Inseparable elements in the surrounding material world constituting a complex of meanings are well illustrated. Material culture, religion, divination, mythology, territorial rights, natural phenomena and economy are bound to the sense of landscape and are much more prevalent in these texts of the late pagan world than in texts inspired by the church. One example is the 11th C *Landnámabók* (Book of Settlements) on Norse families settling Iceland:

'Thorstein Rednose… said to possess great powers of foreknowledge, used to be consulted every year as to which sheep should be singled out for killing in the autumn. He could make a wise decision, because he knew which animals were doomed to die in any case, and so his flocks prospered. Thorstein is not said to have worshipped the gods, but he made offerings to a waterfall near his farm, throwing gifts of food into it' (Davidson 1981, 126).

In the Netherlands, archaeologists generally still ignore such texts on practice, as a result of the divide between late prehistory and the Medieval period. An example, from *Eyrbyggja Saga*, is cited here in full to illustrate the numerous facets enfolded in historical texts. Written in the 13thC, it recounts events in the 9th – 10thC as if it were a record of history, though it is described by some as a proto-historical novel (Pálsson & Edwards 1989, 2). The fourth book of the saga describes how a priest of Thor settled in Iceland. In addition to the interweaving of concerns, presenting material substantiating the theory of landscape beyond anthropology, it is also considered to have a bearing on a possible interpretation of the Broekpolder offering site (Chapter 2.11).

Eyrbyggja Saga 4

'Thorolf Mostur-Beard held a great feast and asked the advice of his friend Thor about what he should do, either make peace with the King, or leave the country and try his luck elsewhere. As it turned out, Thorolf was advised to go to Iceland, so he bought a sizeable ocean-going ship, prepared it for the voyage, then sailed off with his goods, his household, and those of his friends who had decided to go with him. He dismantled the temple, and, along with most of its timbers, put aside some of the earth from under Thor's pedestal.

Thorolf put to sea and had a good passage. He made landfall in the south and sailed west along the coast round Reykja Ness.

By the time the fair wind began to fail them, they were able to make out some broad bays cutting into the coast. Thorolf threw overboard the high-seat pillars from the temple with the figure of Thor carved on one of them, and declared that he would settle at any place in Iceland where Thor chose to send the pillars ashore. No sooner had the pillars begun drifting away from the ship than they were swept towards the western bay – not slowly either, from what people could see. Then a breeze sprang up, and Thorolf sailed westward round Snaefell Ness into the bay. They could see it was broad and long, with high mountains on either side, so Thorolf gave a name to it and called it Breida Fjord. He put in to land half-way up on the south side, and where he brought his ship in came to be known later as Hofsvag. Then he began exploring the land. On the tip of the headland to the north of the creek they saw where Thor had come ashore with the pillars. It has been called Thor's Ness ever since. Thorolf carried fire round the land he claimed, between Staf River in the west and the one he called Thor's River in the east, and settled his crew there.

Thorolf established a great farm at Hofsvag which he called Hofstad, and had a large temple built there with its door in one of the side walls near the gable. Just inside the door stood the high-seat pillars with the so-called holy[7] nails fixed in them, and beyond that point the whole building was considered a sanctuary. Inside the main temple was a structure built much like the choir in churches nowadays, and in the middle a raised platform like an altar. On this platform lay a solid ring weighing twenty ounces, upon which people had to swear all their oaths. It was the business of the temple priest to wear this ring on his arm at every public meeting. There was a sacrificial bowl on the platform too, with a sacrificial twig shaped like a priest's aspergillum for the blood of animals killed as offerings to the gods to be sprinkled from the bowl. Inside the choir-like part of the building the figures of gods were arranged in a circle right round the platform. Every farmer had to pay tax to the temple. Another of their duties was to support the temple priest in his missions, just as farmers nowadays have to support their chieftains. It was the priest's business to see to the temple and maintain it properly at his own expense, as well as hold sacrificial feasts.

Thorolf gave the name Thor's Ness to the region between Vigra Fjord and Hofsvag. On this headland is a mountain held so sacred by Thorolf that no one was allowed even to look at it without first having washed himself, and no living creature on this mountain, neither man nor beast, was to be harmed until it left of its own accord. Thorolf called this mountain Helga Fell [Holy Mountain] and believed that he and his kinsmen would go into it when they died.

Thorolf used to hold all his courts on the point of the headland where Thor had come ashore, and that was where he started the district assembly. This place was so holy that he would let no one desecrate it, either with bloodshed or with excrement; and for a privy they used a special rock in the seas which they called Dritsker [Dirt Skerry].

By now, Thorolf was running his farm in fine style and had a large number of men with him. At that time there was plenty of food to be had both from the islands and from the sea' (trans./eds. Pálsson & Edwards 1989, 28 – 9).

The material design of the social landscape changes and, with Christianising influences, a traditional, underlying system of cosmological ideas and values is considered to have continued as a result of reformulation or relocation and integration into the social system. These transformations are amply illustrated by many Medieval texts on forbidden practices that did in fact continue into the modern era in the form of popular culture, i.e. 'folkloric' practices. 'Trees' are particularly evident, as well as other materials subsumed under the general term 'good luck charms', referred to by some as 'superstitions'. Taking the present as part of the long term, the growing revival of 'pagan practices' also includes attribution of powers to materials, and research on the reformulation of belief systems.[8]

Interesting is the list *Indiculus superstitionum et paganiarum* from the mid-8th century. It is probably the chapter headings of a lost work detailing banned practices and sites of practices. This list and the exact translation of some of the terms, let alone the meaning, has long been the subject of debate (cf. McNeill & Garner 1965, Schuyf 1995, 34, Mostert 1999, 27). Mostert considers the text to have arisen in Holland, within the circle of Boniface,[9] who worked with Willibrord to convert the Frisians. Time, places and materials are indicated, sometimes clearly; here is one translation of the headings, with some comments by these editors (McNeill & Garner trans./eds. 1965, 419 – 21):

1 Of sacrilege at the graves of the dead.
2 Of sacrilege over the departed, that is, 'dadsisas.' (possibly feasting, but more likely a practice similar to the Irish keening-dirge is meant.)

7 Davidson (1993, 83) translates the term *reginnaglar* as 'gods' nails' rather than holy nails.

8 For instance, the Pagan Federation has expanded since 1971 to include chapters in most western countries. Jones and Pennick (1995, 196 – 220) briefly trace how paganism fared under Christianity, from the various movements and markers of 19th C Romantic paganism, through neo-paganism to the present.

9 The list cited by Mostert has 27 headings; nos. XII, XXIX and XXX are not included. Thirty were listed at the end of the Capitulare Karlomanni of 743, at the synod of Listines. A good discussion and translations with comments from other translators can also be found in Dowden 2000, 153 – 4.

3 Of the swinish feasts in February. (A festival kept in honor of the advancing sun; it was attended by the sacrifice of swine.)
4 Of the little houses, that is, sanctuaries. ('fanis,' booths or huts for pagan worship, made of branches of trees.)
5 Of those sacrilegious acts in connection with churches.
6 Of the sacred rights of the woods which they call 'nimidas.'
7 Of those things which they do upon stones.
8 Of the sacred rites of Mercury and of Jupiter.
9 Of the sacrifice which is offered to any of the saints.
10 Of amulets and knots.
11 Of the fountains of sacrifices. (that is, fountains where sacrifices are offered.)
12 Of incantations.
13 Of auguries, the dung or sneezing of birds or of horses or of cattle.
14 Of diviners and sorcerers.
15 Of fire made by friction from wood, that is, the 'nodfyr.'
16 Of the brains of animals.
17 Of the observance of the pagans on the hearth or in the inception of any business.
18 Of undetermined places which they celebrate as holy.
19 Of the bed-straw (plant) which good folk call Holy Mary's.
20 Of the days which they make for Jupiter and Mercury.
21 Of the eclipse of the moon, when they call, 'Triumph, Moon!'
22 Of storms, and horns, and snail shells.
23 Of furrows around villas.
24 Of the pagan course which they call 'yrias,' with torn garments or footwear. (or 'frias,' from Frea, goddess of fruitfulness. The celebration apparently resembled the Roman Lupercalia.)
25 Of this, that they feign for themselves that dead persons of whatever sort are saints.
26 Of an idol made of dough.
27 Of idols made of rags.
28 Of an idol which they carry through the fields.
29 Of wooden feet or hands in a pagan rite.
30 Of this: that they believe that women command the moon that they may be able to take away the hearts of men, according to the pagans.

These types of injunctions against presumed traditional practices issued during the introduction of Christianity could be used more consciously than is the present practice, where 'commonsense' is at time seems the prevalent interpretative mode, mainly within functional categories of materials and features. Somewhat later history can be used as a guide to changing mentality as part of a historical-anthropological approach to interpreting deposit contexts, defining patterns and regarding materials and landscape as multi-facetted ways of charting the occurrence and interpretation of various meanings (e.g. Gurevich 1992).

1.6 Combining past research, expanded themes and choices in the Broekpolder project

As mentioned above, the practice of archaeology is itself a form of dwelling in the landscape (Ingold 1993, 152). Places and goods are subjective phenomena in a dual hermeneutic sense (Giddens 1984, 284; Hodder 1992, 101): in terms of how both the society under study and the archaeologist perceives and values the material world. The selection criteria determining the choices made in planning research, excavation method and analyses resulted from previous research, with the extension of certain themes to this area of the Oer-IJ region, and greater emphasis on later (historical) traces in illustrating the long term, as part of the archaeology of the region.
In the process of obtaining the final excavation permit, it was felt that, despite the survey and the trial trenching by the ROB for assessment and evaluation purposes (see above), little was understood of the area outside the 20 ha monument, and little of the stratigraphy of the monument itself. There was also uncertainty as to the geological interpretation of the higher-lying ridge *(see fig. 1)* from which most of the initial finds had been recovered, including the area covered by the scheduled monument.

In Noord-Holland sherds are almost always confined to the immediate area around farmhouses, and those recovered during the survey before the excavation of the Broekpolder were no exception. It was also known that many traces of utilization[10] beyond the immediate houseplot could not be found with the survey methods used at the time. As the final boundary of the monument was based on sherds, we could assume it would cover dwellings. Dwellings are relatively well understood thanks to the focus on settlement archaeology in the last century, but lower-lying areas are not.

Lower-lying areas had not been included in the scheduled monument when it was first planned at 20 ha. However, within a landscape approach, the combination of higher- and

10 The concept of off-site archaeology is not useful because it implies an intrinsic hierarchy of valuation of archaeological sites with dwellings at the top, and a rather narrow definition of what a 'site' is.

lower-lying areas is basic to the physicality of this landscape. Lower areas tend to have been disregarded as a result of the modern view of water as a 'threat', combined with the somewhat mythical archaeological quality of the 'Oer-IJ', and the inattention to the dialectics of water:land and boundaries. The Broekpolder is bounded by the prehistoric course of the Oer-IJ to the east and the sea to the west, and the Oer-IJ salt marsh ridge (the designation arrived at through geological study during the project) is subdivided by west-east creeks cutting through it. As such, the land is physically defined by water and, ultimately, land is created through sedimentation as part of processes not unknown to prehistoric inhabitants of the region.

This higher lying salt marsh ridge was referred to in the reports of the preliminary stages as tidal flat islands, an inversion ridge, and a levee of the Oer-IJ. The initial survey report also mentioned areas that had been 'eroded' off the eastern slope of the sandy ridge. These areas were examined only cursorily in subsequent ROB trial trenching. It was however hard to understand what type of erosion this may have been, at such a high level, or when it had occurred. The low-lying area was also near a convergence of several Medieval/modern field ditches, suggesting a very wet place and even the possible remains of a pool. Because deposits in watery contexts are a well-known phenomenon in northwestern Europe and two offering sites were known in the region, this place drew our particular attention, and did indeed prove to be an offering site which was excavated as fully as possible. As mentioned above, 70% of the funding was to be spent on excavation, analysis and reporting on the area within the boundaries of the originally scheduled monument. This left 30% for lower-lying adjacent areas and other areas of the polder perceived as interesting. Additional constraints on our movements in the polder included planning mismatches between the national level (ROB) and the municipality, which leased the land to tenant farmers. Final permission for excavating within the area of the original monument in the municipal area of Beverwijk was not granted until September 1998. The tenants had land-use contracts until October 1999 for those fields falling within the municipality of Heemskerk. Two tenant farmers fortunately allowed us to excavate within the Heemskerk area during the 1999 excavation season. This goes some way towards explaining the sequence of the trenches excavated, the archaeologist presence within the Broekpolder, mirrored by the sequence of trench numbering 1 to 51 (Plan 1), and the trail through the excavation seasons from 1998 to 2000.[11]

Larger trenches followed trial trenches if the features were thought significant enough to be uncovered completely, or if the features or their interrelationship were not understood. As far as possible, all traces of all periods were dealt with to the same level of detail and registration. Not all of the details, or detailed drawings, are published here. Occasionally registration failed to achieve any sort of standard. Two 'periods' remained incompletely examined during the excavation, when we were also confronted with cultural features at levels relating to the Early Iron Age and the Bronze Age. The Broekpolder proved to have a greater time depth than originally expected on the basis of the RAAP survey and ROB trial trenching.

In Chapter 2 the results of geological analyses leading to a physical description of processes and the outline of the archaeological remains are set out in chronological order for each of the three main areas distinguished on the ridge.

In Chapter 3 aspects of cycles of settlement in relation to some other areas of the region are summarised, along with the main mode of subsistence and connections in the material culture. Some interpretation is put forward of greater schemes of motivivation – ritual/religious concerns – with emphasis especially on the use of the pool as an Early Medieval offering site.

Chapter 4 evaluates the archaeological process and the processes for managing the monument itself, as physical entity and as an area used by the new inhabitants of the Broekpolder housing estate.

Short texts have also been supplied by expert contributors, providing information on particular subjects and/or the background to their work. Other box texts delve more deeply into specific aspects of a subject, types of feature or finds. These texts appear throughout the book in boxes along with the main text (see List of Boxes). Volume 2 consists of the Appendices, with details of dating, the features, drawn materials, and summaries presented in tables. The data-bases are available at the Netherlands electronic archiving system (EASY), data-archiving and networked services (DANS): http://easy.dans.knaw.nl.

11 In addition to the generally available topographical, soil and reconstructed palaeogeographical maps of the polder, an additional source of information prior to excavation was a series of aerial photographs of the Broekpolder taken by Dr. Willy Metz in January 1998. The features shown are discussed in Chapter 2.





Fig. 4 The winding field ditch (mid-top to mid-right) running west-east within the field system was still present at the start of the project. It suggested an earlier creek trajectory. This area is of the southern segment of the salt marsh ridge (cf. *fig.* 1). Trench 15 was placed between the mound of soil and the ploughed field (cf. Plan 1; Plan 7). The ploughed field, one of only two within the polder, demonstrates damage to the ridge in the lighter, sandy material visible.

Aerial photograph: Willy Metz, January 1998, taken from the east.

Cultural activities, landscape development

Aspects of the Earlier Bronze Age to the Modern period

2

Plan 1 positions of trenches and section lines
Plan 2 sections and representations of Oer-IJ development
Plan 3 – 8 trench plans

A total of 12.5 ha was excavated in the Broekpolder and almost every trench showed traces of use from at least the Early Iron Age onwards, and some from the Earlier Bronze Age onwards. The survey (RAAP) and trial trenching (ROB) had not revealed this time depth. The 150 ha polder was grassland, except for two fields ploughed only in recent years whereby plough damage was slight to the archaeological traces. The phases of early use were separated, up to the Late Iron Age, by layers representing natural deposits related to greater and lesser periods of marine influence within the Oer-IJ intertidal region.

2.1 Introduction

During the project, the actual rather than recreated trajectory of the Oer-IJ channel was determined for the area within the Broekpolder as well as the nature of the somewhat higher-lying ridge, on which most of the farmstead traces were found. This is a salt-marsh ridge cut by creek depressions, fossilised in the landscape, to the west of the depression over the Oer-IJ channel *(fig. 4)*. During different periods, a fresh to brackish milieu had cyclically arisen, but marine influence was rare by the Late Iron Age. There is no indication for an open channel to the sea after this period, and flooding during storm surges was of little consequence for the Broekpolder area.

The progression in environmental development has been detailed mainly through geological and macroremain analysis. The deep stratigraphy was studied in greatest detail in 1999: trenches of various lengths were excavated up to 2 m deep adjacent to the already excavated trench 32/33 and extended further to the east, to within 80 m of the A9 motorway embankment. A refined geological description of the layering was produced in the field and samples were taken for analysis of the micromorphology (Kooistra 2000), diatoms (De Wolf 2000), molluscs (Meijer 2000), seeds and pollen, and for dating. The first three analyses were integrated to identify the morphology of the main salt-marsh ridge, and the characteristics of the underlying tidal flat sediments, as the visible landscape feature, as well as the higher fill of the Oer-IJ channel.[1] Pollen and microremains from natural layers and ploughsoils from this and other sections contained insufficient data for conclusions to be drawn, due to the desilification and decalcification of even the deepest levels associated with the

1 The internal report produced by Vos (2000) is now regarded as preliminary, as it is somewhat incorrect as regards a few, sometimes basic, points which were subsequently clarified through the dating of samples, and results of the last season of excavation. It should not be used for the reconstruction; the revised edition is presented interleaved below, and the revised palaeogeographical sections are shown on Plan 2.

earliest traces of use.[2] Samples from dug features did yield much information on vegetation, however.

The main geological section (*fig. 5* and Plan 2), combined with the other recorded sections, has been used as the model for the genesis of this small part of the Oer-IJ estuary during the Holocene period. It is central to the Oer-IJ discussion, and outlying sites can now be better understood. The archaeological features, particularly the macroremains from them, and ^{14}C dates,[3] are essential for understanding periods and the ecology of alternating periods of freshwater and marine influence. Aspects of land formation and environmental indicators are interspersed below in chronological order in between the descriptions of use and habitation traces of the people who landscaped the past.

Trenches 27 – 40, 47 (Plans 3 & 4) form the core of the excavations. These trenches were dug to cover the entire breadth of the salt-marsh ridge and lower-lying areas off the slight slope to east and west. The descriptions and interpretations for each period given below begin with these trenches. The large trenches to either side of the monument (tr 45 and 49, Plan 3 & 5) are then described, followed by less comprehensively excavated traces to the south and north of the polder (all periods: Plan 7). Later Medieval and post-Medieval traces are briefly described (Plans 7 & 8). Two trenches, tr 41 and tr 48, include an offering site (Plan 6), which is described at the end of the chapter.

By the earlier Bronze Age, a natural segmentation of the salt marsh ridge had arisen, as it was divided by west-east creeks. Each of the segments of ridge appears to have featured a farmstead by the Late Iron/Roman Iron Age, and is thus also reflected in the description of traces: the core excavated area (tr 27 – 40, 47) is part of the central segment; the northern

Tidal landscapes

Definition and processes

The natural landscapes of the Oer-IJ estuary, represented on the palaeogeographical maps of Plan 2, are subdivided on the basis of their position relative to the palaeotidal levels, the palaeomorphology and the lithology of the palaeosubsurface of sand, clay and peat.

Definitions of palaeotidal levels

Mean Low Water (MLW)
Mean water level during low tide, measured over a year.

Mean High Water (MHW)
Mean water level during high tide, measured over a year.

Extreme High Water (EHW)
Maximum spring flood/storm surge level, which might occur once in about twenty years (cf. Vos & Van Heeringen 1997).

Mean sea level (MSL)
Mean level measured during a year.

Definitions of tidal landscapes

Subtidal area
Marine tidal landscapes below MLW, such as the North Sea, tidal inlets and tidal channels.

Intertidal area
Marine tidal landscape between MLW and MHW. This type of area includes the sand flats and shoals, and mudflats and shoals.

Supratidal area
Vegetated salt-marsh area between MHW and EHW. The salt marsh can be subdivided into salt-marsh ridges along the intertidal area, tidal levees along the creeks in the salt marsh, and the salt-marsh plain, which is the relatively low-lying flat area between the marsh levees and ridges.

Stagnant water areas
Water areas within a terrestrial landscape where no tidal influence exists or the tidal influence is very limited, as in freshwater lakes and brackish lagoons.

Terrestrial landscape
Coastal land above EHW such as beach barriers, dunes, peat bogs and palaeotidal landscapes which are no longer flooded because of the decline in the EHW level.

Environmental changes

During the history of the Oer-IJ, the tidal influence in the area was not constant, so the absolute levels of MLW, MHW and EHW also fluctuated over time. These tidal levels were influenced by a gradual rise in mean sea level of between 5 cm and 15 cm a century. The MSL and the fluctuating tidal levels caused a migration of the tide-related coastal land. Further changes were determined by erosion processes (e.g. tidal channel migration), subsidence of the surface (caused by drainage of the peat areas, for example), alternating river discharges and fluctuating sediment supplies.

2 Another deep section was made in 2000, along the western side of trench 49 to the north of trench 51 to examine two higher linear features also charted on De Roo's soil map (see fig. 3). Some details as to layer build-up were added, but not such as to change the interpretation of the first deep sections. The deep section made in 2000 is not presented here.

3 See Appendix 1. In the text, all datings are given calibrated with 2 sigmas; in some instances, the one-sigma range is indicated.

segment includes tr 41 – 45 and tr 49 – 51. Trenches 1 – 25 belong to the southern segment of the salt-marsh ridge.

2.2 Geo-interlude: c 2500 – 1750 BC

The lowest levels studied during excavations were the 'geo-layers' G-VII and G-VI, at a depth of 1.50 m below NAP, in section A-E. These layers were found beneath the first cultural traces in layer G-V (Plan 2). No layering of 'Holland peat' was found in any of the deep sections below geo-layers G-VII/I. The tidal inlet of the Oer-IJ estuary shifted northward and from about 2000 – 1500 BC the tidal inlet of the estuary was located between Heemskerk and Uitgeest. The Broekpolder area acquired a more sheltered position within the estuary due to the development of a coastal barrier. At the time, the main tidal channel of the estuary was to the east of the position of the ridge on which the archaeological monument is located. The Broekpolder environment changed from an intertidal (tidal flats; layer G-VII) to a supratidal environment (salt marsh; layer G-VI).

No dates are available for G-VII and VI and the precise age of this environmental transition from tidal flat to salt marsh is unknown. The salt-marsh ridge in the Broekpolder began to form during the first stage of salt-marsh development as seen in the slight elevation of the eastern part of layer G-VI (Plan 2: section A-U, and also present in section 4). The original ridge was not completely preserved due to later abrasion. The beginning of salt marsh formation in the Broekpolder area at any rate predates traces of the earlier Bronze Age (humus-rich clay: layer G-V) that have been dated to between 1876 – 1636 BC (KIA 9492; one-sigma 1749 – 1687 BC).

To the west of the deep section (A), a creek, probably a tributary of the main channel, was seen to be sealed by the Bronze Age layer. The first recovered signs of people in the area were found on top of layer G-V.

2.3 Earlier Bronze Age
(Plan 3: feature numbers with a 'B' prefix)

The extent of the earlier Bronze Age traces could only be briefly researched during the excavation project. Features were at a level of 1.25 – 1.50 below NAP, stratigraphically separated from later features by overlying sediments. The earliest phase of activity was indicated by ard-marks and ploughsoil; there were also dug gullies to the west, in trenches 31, 32 and 38 – 40. Traces were recovered over a larger area, with a few finds in tr 45. Trench 49 had ard-marks in the western corner, and evidence of cattle in the trampled layer from tr 49 to the north. A few patches of ard-marks were found to the south of the Broekpolder, in tr 15, at a level of 1.30 below NAP, and these might very well relate to the Bronze Age.

Humic acids from ploughsoil sampled in the main geological section, layer G-V, yielded a dating of 1876 – 1636 BC (KIA 9492). To the east of the earliest (recovered) phase of the very low ridge, in tr 31 – 33, the layer with these traces had been truncated by the subsequent active marine erosion and sedimentation phase of the Oer-IJ.

2.3.1 *Ploughsoil and ard-marks*

The ploughsoil had developed as the top of G-VI. Samples were analysed for micromorphology, diatoms, pollen and seeds. The last three categories of analysis yielded no result

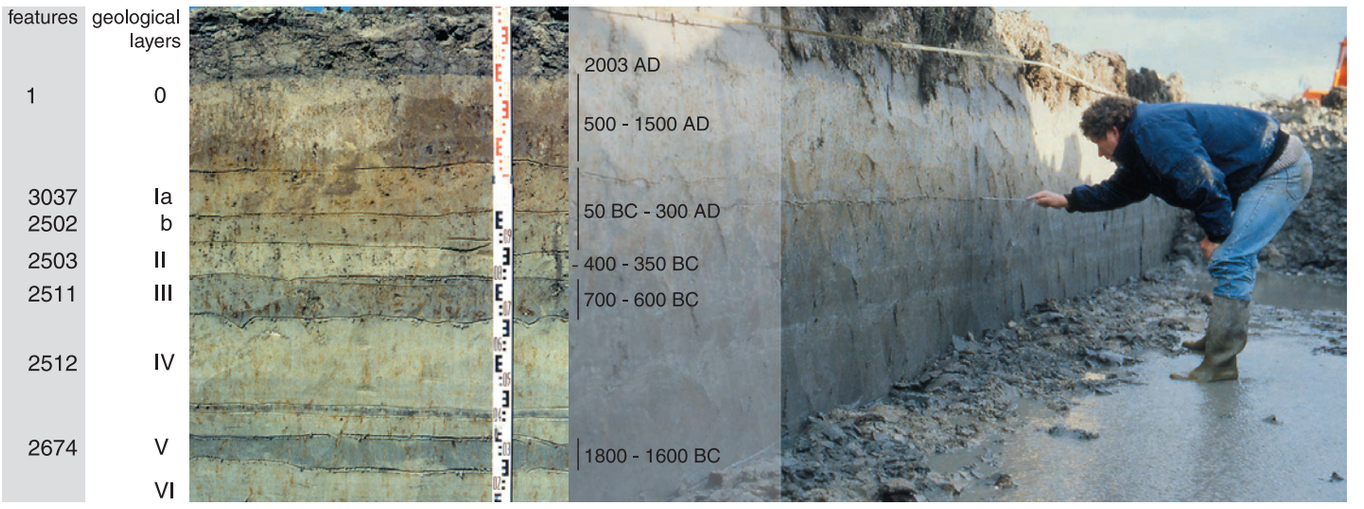
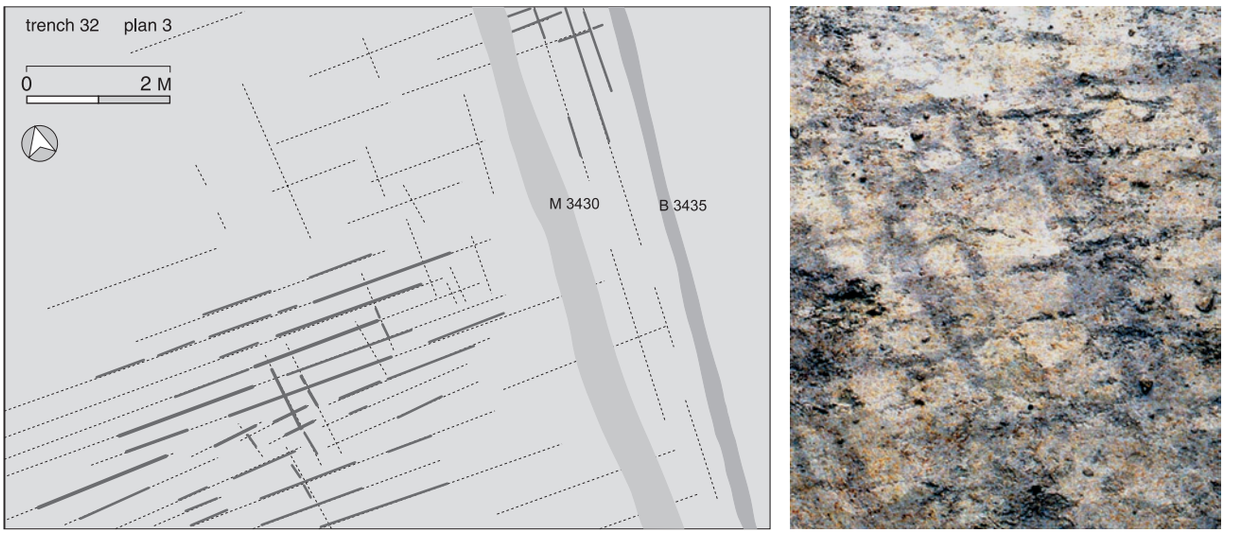


Fig. 5 The 'standard' stratigraphy of the higher lying area of the Broekpolder, originally a saltmarsh ridge. The geo-layer designations, layer numbers and broad dating are shown.



due to desilification and decalcification. Micromorphological analysis revealed particles of burnt herbaceous vegetation at the top of G-VI and in G-V (Kooistra 2000). This could represent a layer of vegetation burnt off prior to cultivation, remains of which had been brought up by ploughing, and/or possibly the burning of stubble. Ard-marks under the ploughsoil generally displayed a criss-cross pattern, at right angles to each other *(fig. 6)*.

2.3.2 *Dug features*

The gullies found in the corner of tr 31 were at most 30 cm deep, and had filled up quickly during a single flood. They had not been re-dug. They seem to have formed small plots or enclosures. One gully (f5000) enclosed a cultivated area at a level of 1.40 below NAP. The other gullies and ditches dating to this period did not strictly enclose areas covered with ard-marks. The ploughsoil was not found to be confined to one side or other of any of these features, which were all probably dug after cultivation had begun in the area.

Feature 4560 in tr 45 was a substantial ditch, up to 2 m wide in places and more than 1 m deep. The dimensions suggest a barrier for keeping livestock in and/or out. The ditch was re-dug once, and had traces of flood sedimentation *(fig. 7)*. The enclosed area had multiple sets of ard-marks within and outside the areas marked by f4560.

Finds from the ditch included wildlife represented by vertebrae from a catfish *(Siluris glanis)* approximately 1m in length, and a nose bone from a dolphin *(Delphinus delphis)* in the lower levels of the feature; bones from domesticates (dog, horse and cattle) came from higher levels and may have been later layers subsided into the ditch. They cannot be related with certainty to the Bronze Age. One pit f4328, 80.85 x 1.40 m, 10 cm deep, belongs either to this period or to the Early Iron Age. It contained the right shaft of a human femur.

2.3.3 *Cattle trample*

Cattle in large numbers were identified by their hoofprints in mud, apparently coming and going from the area of tr 49, the high salt marsh to the north, through to tr 51, towards the tidal flats. Two shell samples from the layer of an open, marine-influenced environment trampled by cattle were dated to a range from 1935 to 1617 BC (KIA 14277, KIA 14278), and are consistent with the dating from the ploughed layer of the higher-lying area.

2.4 Geo-interlude: 1600 – 800 BC *(Plan 2)*

The majority of the morphology of the salt marsh formed in the Broekpolder in the period 1600 – 800 BC, during a relatively active marine phase represented by layer G-IV. The date range has been estimated from the layers below and above.[4] Layers G-VI and G-V (sections E-F, 2 and 4: Plan 2) were eroded on the eastern side of the salt-marsh ridge during the first stage of the formation of layer G-IV. Erosion of the margin of the ridge may have been caused by a very localised westward migration of the main tidal channel of the Oer-IJ.

Creek tributaries were also present, and cut through the ridge during this period. The main salt-marsh ridge was intersected by at least three creeks connected to the main

Fig. 6 An area of ard-marks of the earlier Bronze Age within tr 32.

4 Traditionally, literature on the geology of the coast reckoned with a more active marine sedimentation phase, the 'Dunkirk 0' transgression, recognised between about 1800 – 1250 sol. years BC (1500 – 1000 ^{14}C years BC). The active marine phase represented by layer G-IV does not however fit into the classic trans- and regression scheme. The classic Dunkirk transgression terminology no longer features in the recent literature (e.g. Vos & Van Heeringen 1997; Beets & Van der Spek 2000). This terminology will not therefore be used in the present report.

channel of the Oer-IJ. These creeks long left their mark on maps of the landscape, as some of the late Medieval field ditches were re-dug following the winding trajectory of the existing creek depressions. Levees and depressions associated with these creeks were visible in the field, and some areas were excavated:

– To the south of the polder, the winding field ditch suggested a creek running E-W (f525). This was confirmed by means of excavation (tr 7 – 10, f23). An aerial photograph of the ploughed field to the east of tr 10 had indicated the continuation of the ploughed-out levee *(fig. 4)*. Trench 17/22 examined the creek junction with the edge of the main channel depression.[5]

– The edge of a creek (f2146) was examined in the southwestern corner of trench 31. Reeds recovered *in situ*, having grown during the sedimentation phase, as opposed to the channelling phase, gave a date of about 920 – 800 BC (UtC9276). A small tributary of this creek was also excavated in tr 31.

– A creek draining into the area later used as an offering site was still clearly visible as a depression running through the monument, and it had low levees on either side. The series of trenches (tr 46) was positioned in order to establish the course to the west, but no trajectory could be established. The elevation model of the Broekpolder *(fig. 1)* does however seem to show the trajectory, or at least a small tributary on this western side of the main ridge. A similarly early natural feature (f4280), excavated in trench 45, is a side arm, draining from the northwest.

The palaeoreconstructions (Plans 2 and 3; *fig. 68*) show these creeks, which were identified in the maps, aerial photographs and excavations. Erosion at the margins of the salt-marsh ridge halted during the second stage of the formation of layer G-IV. Progradation began and the ridge broadened eastwards. The maximum recovered thickness of G-IV on the salt marsh was 45 cm at E-F (Plan 2), which would become the highest area of the salt-marsh ridge, sloping to the east (4°). On the west side, the layer was only about 12 cm thick (cf. section B, Plan 2). Thus, a clear and natural segmentation arose in the Broekpolder through the salt-marsh ridge during formation of layer G-IV. The creek depressions, which remained in existence through to the Medieval period, drained the area to the west of the Broekpolder and brought fresh water into the Oer-IJ channel basin. The depressions were also used as sites of deposits up to the Medieval period. As mentioned, at least two of the creek depressions were used for trajectories of the Medieval field ditch system which still existed up to the time of excavation.

Layer G-III formed on top of G-IV while tidal activity in the Oer-IJ estuary was relatively low. The humus-rich clay (G-III) varied from 8 cm on the west, to 18 cm thick where the layer was taken up into the ploughsoil. Further to the east, there was reed vegetation. Diatom and mollusc analysis indicated a freshwater to (slightly) brackish environment off the ridge (see below).

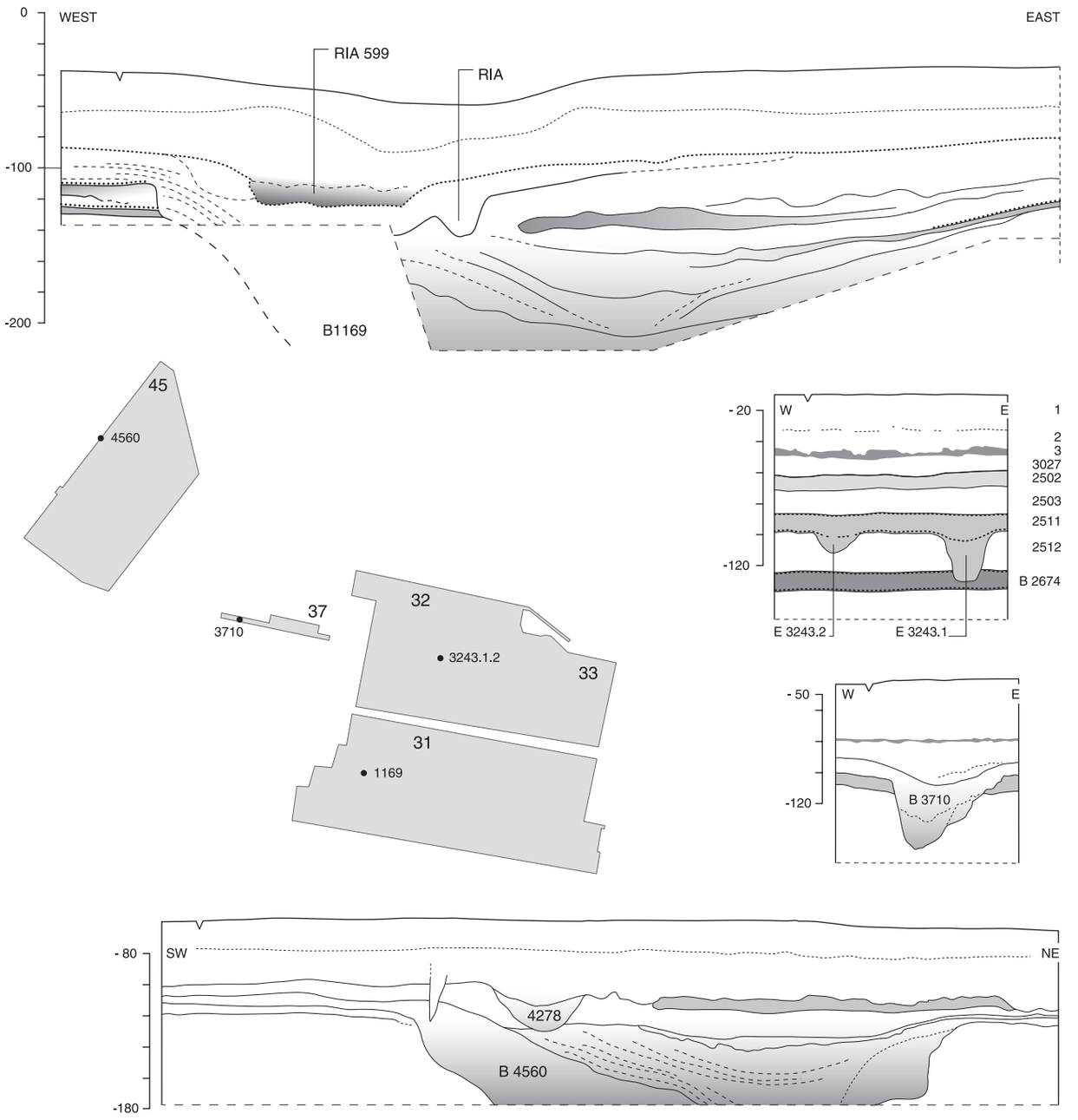
2.5 Early Iron Age
(Plan 3: feature numbers with an 'E' prefix)

The next period of recovered traces has been ^{14}C-dated to somewhere between 831 – 455 BC, based on two dates: one from the acid fraction of humus from the ploughsoil of ploughed G-III, and a bone from the same layer (KIA 9490 & KIA 12283). Given the date from reed in the still open but sedimenting creek (f2146) mentioned above and the dates associated with the next sedimentation phase, the period of use can be narrowed down to 750 to 600 BC. In view of the nature of the features, it is not likely that there was extensive or extended use of any of the areas. It is also unclear whether use of the three ridge segments was sequential or contemporaneous. The main ridge, segmented by the depressions of the creek tributaries, was not a continuous area at any rate. It is clear within each segment that cultivation occurred along a narrow strip, about 36 m wide, along the main ridge. Ard-marks and ploughsoil were encountered in all trenches along this trajectory of the segmented ridge (trs 15, 31, 32, 39, 40, 45), at 70 to 90 cm below NAP. Again, the central segment was most closely examined for this period. The ploughsoil varied in thickness from 9 to 15 cm. The ard-marks found within each area had the same general orientation – NE-SW and NW-SE – similar to the orientation of the earlier Bronze Age ard-marks. In tr 31, a single ring gully had been dug.

To the west of trenches 31 – 32, one to two sets of ard-marks not associated with a ploughsoil were recovered in the area adjacent to the area with ploughsoil. These traces may be the result of stripping sods to heighten and enrich the cultivated area.[6] Part of the area with ploughsoil, with ard-marks underneath, was bordered along the west by a narrow gully made up of separate lengths (f2517, f3243, f4102, etc.) extending from the north of tr 31 through to tr 40. The area cultivated could then have covered the area between two creek

5 A twig from the upper fill gave a date of about 2570 – 2290 BC (UtC9273). However, the wood must have been brought along with disturbed deposits intersected by the Oer-IJ. A sherd lying in the same upper fill as this twig is clearly Iron Age, rather than Neolithic.

6 Aniek Abbink suggested this process of using stripped sods during Velserbroek analyses in 1987. At the Velserbroek sites five km away, the problem consisted of series of single sets of overlapping ard-marks all at the same level, but with different types of fill, none of which were in any way similar to a much later overlying ploughsoil. Many single sets of ard-marks over outlying areas were found without any accompanying ploughsoil. Thick, well-developed ploughsoils found near to the farmstead reflect the cultivated fields where the sods obtained from these outlying areas were redeposited.
Traces on the island of Texel, Noord-Holland (also from the Bronze Age and Iron Age) have been better differentiated. Woltering (2000, 223) remarks: 'The palynological analysis of features associated with Iron Age farming however indicates manuring with grass sods rather than heather sods' [as a characteristic of the Bronze Age].



depressions and may have been in use as a single cultivated field in this central segment of the ridge. The gullies indicate the field had been extended to the north. During the initial phase, the cultivated area was about 1.03 ha and was later increased to about 1.24 ha. This falls within the estimates for land area and cereal harvest needed for one family per year, as will be discussed in Chapter 3.

The macroremains and pollen samples analysed from the ploughsoil produced no indications of what was grown. To the east, sediments were undisturbed and the presence of continuous vegetation bands indicates the area had not been stripped of sods. Reed marsh further away from the slope was indicated by reed stalks and root channels (section E-F, Plan 2). To the east, layer G-III had not been ploughed, and diatoms included species characteristic of brackish, supratidal conditions for salt marsh vegetation (De Wolf 2000). Samples of

Fig. 7 Examples of earlier Bronze Age features within the central and northern segment (see for positions the insets of trench plans and Plan 3).

molluscs from the same context contained both terrestrial and marine species. Two species, *Vallonia pulchella* and *Succinea elegans*, indicate damp to wet open terrain. *Arianta arbustorum* indicates wet and shadowy habitat consistent with reed expanses, as does the genus *Limacidae* (Meijer 2000). Barely developed marine molluscs *(Ostracoda, Foraminifera, Hydroidea)* were found in this sample too. The lack of fully-grown, or even juvenile, marine species can be taken as an indication of an environment unsuitable for the species and a limited duration of saltwater influence. The terrestrial species indicate that the soil was not salty and that there was a freshwater to slightly brackish environment (ibid.) off the slope to the east of the cultivated area at this time. Only occasional marine flooding of these lower-lying areas during the earlier Iron Age is indicated.

The soil cultivated was medium, clayey sand (lutum 25%). There was more land available for cultivation on both sides of the narrow 'strip field' if the model (Plan 2) of ridge and subsidence levels in relation to tidal levels is taken into account. Cultivation occurred on the highest part of the ridge, estimated to have been only about 10 cm above the extreme high water level. The slight slope to both east and west provided natural drainage, the positioning keeping the field drained after any overabundance of rainfall or short period of flooding. Taking sods from the west to raise and enrich the ploughed area would also have produced a better drainage situation. A few lengths of gullies were dug, possibly in response to heavy downpours.[7] The same type of gully will be identified below as a response to very short-term circumstances in the Late Iron Age/Roman Iron Age. Cattle hoof impressions were seen under the relatively thin ploughsoil, though not in linear patterns, so it is unclear whether cattle were grazing on fallow or stubble fields, or pulling cultivation equipment, or all three.

Early Iron Age traces were also recovered in the southern segment of the ridge. Trench 10 was situated over the narrow levee of one of the creek tributaries. There was a plough layer (f5) with ard-marks (f57) at 97 cm below NAP. Other features here included stakeholes with no discernible pattern, whose significance remains unclear (Plan 7).

There were only 18 finds from dug features and layers of the Early Iron Age. Thirteen came from the plough layer (f4503) in tr 45, at about 1.00 – 1.20 m below NAP. They included very small, eroded sherds and bone (1 ox pelvis fragment and a near complete humerus from a red deer, *Cervus elaphus*). A bone from the layer gave a broad date of 792 – 519 BC (KIA 12283). Tr 45 also included pit f4328 containing the right shaft of a human thighbone. The pit was oval (0.85 m by 1.40 m) and only 10 cm deep; it may date from this period or from the earlier Bronze Age.

Materials in layers at other sites in the region from this period are rarely found beyond the immediate vicinity of a dwelling. The finds in tr 45 indicated a dwelling in an adjacent area, possibly within the monument. Due to the undisturbed nature of the ploughsoil, and the vegetation layers to the east and west, the subsequent period of sedimentation does not seem to have disturbed Early Iron Age features. In other words, the features found seem to represent the original density of features and feature types for the Early Iron Age in the areas excavated in tr 31 – 33 and around the monument. It is impossible to determine whether cultivation occurred over the entire Oer-IJ ridge and tributary levees contemporaneously, or was practised in different parts by different generations. Ard-mark density and ploughsoil characteristics do not suggest extensive use in any of the areas.

2.6 Geo-interlude: 650 – 400 BC *(Plan 2)*

Around 650 BC the relatively calm period in the Oer-IJ came to an end and a new active marine sedimentation phase began. The lower extent (G-11b) of sandy-clay layer G-11 was deposited and the ridge broadened to the east in the direction of the main Oer-IJ channel system (sections A-U, 2 and 4, Plan 2). In the intertidal zone of layer G-11 to the east of the ridge, doublets of the mollusc *Scrobicularia plana* were found which are indicative of a brackish to marine intertidal environment. Two dates were obtained (KIA 9487 & KIA 9495) which would apply to the period between 600 to 400 BC.

G-11b was originally much thicker, but could be distinguished only through the presence of dug features. Geologically, the nature of this subdivided sedimentation phase could have been interpreted as part of a continuous salt marsh sedimentation process. To the east, the presence of more sand lenses with lenticular bedding visually differentiated the lower extent (G-11b) from the higher (G-11a). In micromorphological terms, the only difference established was that 2a was slightly sandier than 2b and had traces of later oxidation of iron and manganese (Kooistra 2000).

7 This suggestion leans heavily on what some farmers still do, as seen during the summers of 1998 and 1999, two of the worst recorded years of heavy rain during the growing season.

However, recovered archaeological features showed conclusively that layering had been severely eroded on the ridge between sedimentation phases G-IIb and G-IIa, reducing the level of G-IIb by 25 cm to 50 cm. Layer G-II was thinner from west to east but absent over the highest part of the ridge. To the east and west, G-II was 25 – 27 cm thick. To the west of the highest point on the ridge, the layer was also relatively sandy (15 – 20% lutum). Evidently, the ridge had been broader and higher during the Middle Iron Age, but 'topped' during the Late Iron Age.

The habitation surface must be supposed to have been higher at the time the Middle Iron Age features were dug. Reconstruction of the levels (Plan 2) adds 30 cm to the height of the ridge. Something of the top of the eroded layering was represented in the redeposited, very humus-rich sods in pits. The recovered sods were up to 20 cm thick, sometimes with multiple vegetation bands, alternating with sandy layers (cf. e.g. *fig. 10*). Very little pollen remained from f2654 (fnd 1799), but what there was indicated pasture influenced by marine flooding (App. 3, tab.12). This could certainly refer to the period when the area was used as grazing land, prior to and/or during settlement in the Middle Iron Age. Ingested material from cattle, possibly dung or intestinal contents, were also found in pits.

The samples analysed (App. 3) represent a variety of habitats including a few species from freshwater marshes and banks. A salt marsh is well represented, and would have been less than 200 m to the east of the highest part of the ridge. The indicator species are *Armerion maritimae.* Plants associated with *Juncetum gerardi* are particularly well represented. This halophytic plant community occupies the zone between 10 and 20 cm below mean spring tide level and storm-surge level (Van Zeist 1974), a zone that is inundated only during very high floods, once to several times a year. Species which are characteristic of this community and present in the botanical record are *Juncus gerardi* (saltmarsh rush), *Glaux maritima* (sea milkwort), *Triglochin maritima* (sea arrow-grass), *Trifolium fragiferum* (strawberry clover), and grasses *Festuca rubra* (red fescue) and *Agrostis* cf. *stolonifera* (creeping bent). A number of species could have been associated with the higher salt marsh of *Juncetum gerardi*. Vegetation characteristic of this part of the salt marsh include species with a less halophytic character such as *Leontodon autumnalis* (autumn hawkbit), *Medicago lupulina* (black medick), *Potentilla anserina* (silverweed), and species characteristic of freshwater grasslands such as *Trifolium repens* (white clover), *Bromus hordeaceus* (soft brome) and *Poa pratensis/trivialis* (meadow grass). All of these species are also indicative of grazing. *Leontodon autumnalis*, in particular, is favoured by intensive grazing.[8]

Extreme high water is estimated to have been around 40 cm below NAP. To reiterate: it is not known for certain how high the ridge was when habitation took place. On Plan 2, the ridge is shown to a height 30 cm above EHW, which is a general estimate derived from plant indicators and from redeposited layering recovered from dug features.

2.7 Middle Iron Age
(Plan 3: feature numbers with an 'M' prefix)

The best trace of any of the horizons for vegetation and activities associated with features was found in pits from the Middle Iron Age. Features in trenches 31 – 33 were separated from others by layering, and could thus be distinguished stratigraphically from layers above and below. Feature fills were used to further differentiate between two phases appearing at this horizon. Dug features from the period were also recovered in tr 49, but were not stratified relative to later features. AMS dates, horizontal stratigraphy and pottery were used to place features within this phase in tr 49. A few features in tr 49 not distinguishable by these criteria may appear on the later phase plan (Plan 5).

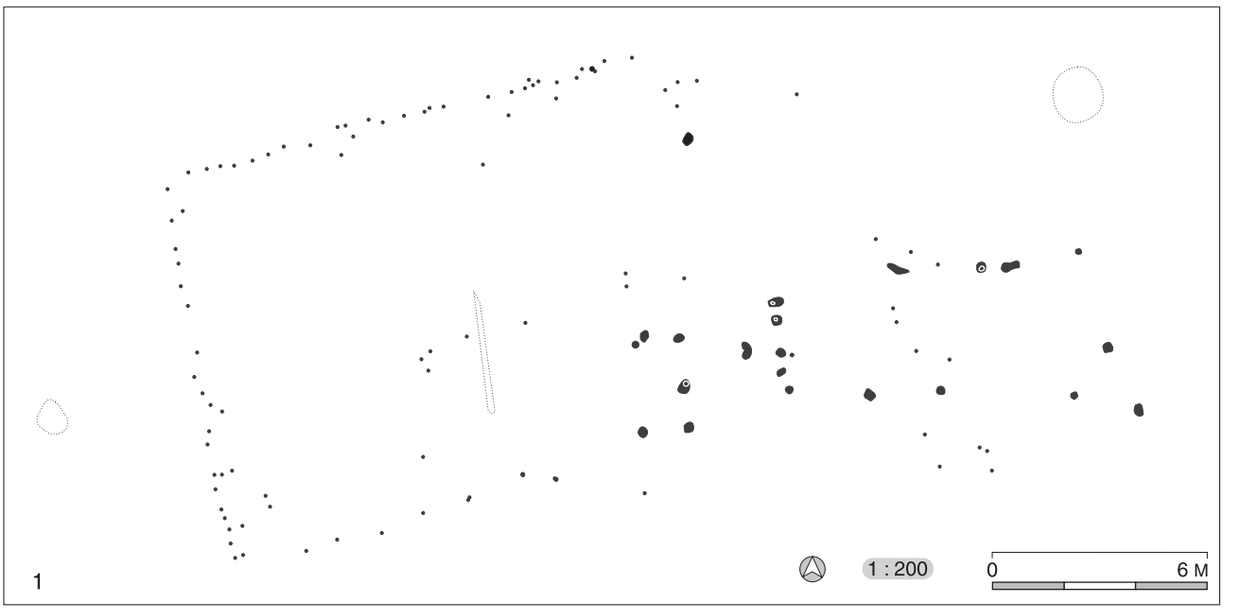
2.7.1 *Trenches 31 – 33, 37 – 40*

The pits and a few ditch lengths with a very humus-rich fill were dug around 400 BC, based on the one narrow range given by wood from pit f3584: 407 – 383 BC (KIA 12280). Two other dates from pit features in tr 31 – 33 could be similarly dated (f2619: KIA 10009 & f2815: KIA 12278). Use of the area would seem to have occurred mainly around 400 BC, but the density of features certainly points to a short duration of habitation, possibly no longer than one or two generations. The number of features is not great. Only one dwelling plan was recovered. As mentioned above, erosion had taken place, and might explain the shallowness – and possibly the complete absence of – some types of features.

Farmhouse with enclosure

Only one area had traces of a structure that could be a dwelling dating from the Middle Iron Age. It included heavier posts and suggestions of a wall line. The structure had an adjacent,

.**8** This conclusion is supported by research in areas where grazing is currently not so important and where this species is accordingly less prevalent (cf. Körber-Grohne 1992).



fenced-in enclosure to the west *(fig. 8)*. The 100 m² enclosure was formed by stakeholes some 15 cm deep, representing fencing.

The dwelling had a length of at least 14 m, taking into account only the area within the postholes, but it is more likely to have been at least 20 m long if the two larger stakeholes to the west in line with the southern row of postholes were also roof support positions. Postpipes in four of the postholes demonstrate wooden elements were consistent with the size of these larger post tip positions. The rows of postholes varied in depth from 22 to 66 cm. Representing the wall lines were just a few stakeholes, varying in depth from 5 to 30 cm. Along the north, they extended as far as a cluster of three, which might represent the corner of the structure if it was 20 m long.

The width of the structure would have been 5.80 m in total, with three aisles: side aisles approx. 1.30 m wide, and a central aisle approx. 3.20 m wide. The division between dwelling and byre area could be indicated by the clear row of five post depressions across the breadth of the structure. These post-holes over the width of the house are similar to features found in two of the farmhouses of the Late Iron Age/Roman Iron Age (houses 3 and 7, tr 49), and represent a construction detail which may be a local Broekpolder tradition. Contemporary features with clear finds of crops, bone and pottery were recovered in the immediate vicinity.

Features: ditches, pits and sod banks

The Middle Iron Age features were further limited to ditches, pits and the remains of sod banks.

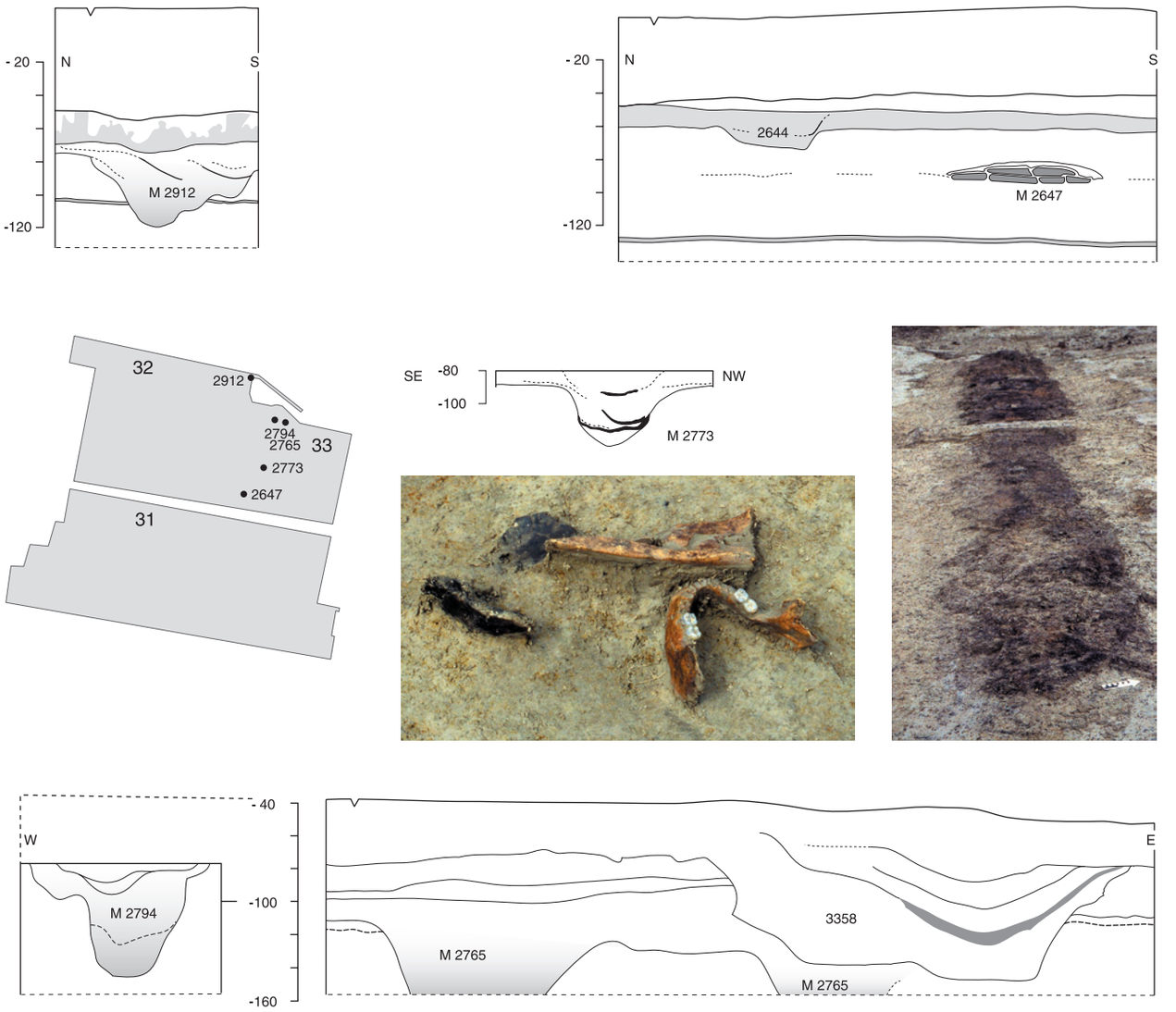
The gullies of the next phase, the Late Iron Age-Roman Iron Age, were sometimes no more than 12 cm deep, and if similar features had been present during the Middle Iron Age phase, they will have been eroded. Only a few gully-type features were recovered, mainly on the west, in a possibly less eroded area than that on the ridge. There are however signs that substantial ditches were dug along the eastern side of the ridge (f714, f3440, etc). Most of the recovered materials were found in pits.

Ditches (fig. 9)

Some material of a settlement nature had been deposited all along the eastern side in ditches. Finds included pottery, bone and quern fragments. Yew was found at the southern end of f552. Three short lengths of ditches forming a triangle were find-rich, with a fairly high density of materials. They included quern and loom weight fragments, as well as bone and pottery. Two pits were interconnected with ditch f2794.

f2773 45 cm deep. The short ditch had been re-dug and lengthened to the southwest. Interleaved between clean layers were clear traces of burning *in situ*, recovered as

Fig. 8 The Middle Iron Age house-plan and enclosure



charred layers containing both burnt and unburnt materials. The complete, unburnt lower jaw of a 17 – 25-year-old man had been included with cattle bone and several large sherds, possibly as one deposit *(fig. 9)*.

Materials appear to have been burnt in the ditch on several occasions. Burnt or scorched and unburnt bone occurs together, and much of it is unidentifiable. Skull and foreleg elements make up the majority of the identifiable bone. The ditch also contained charred pottery, stone (including part of a quern), a loom weight fragment, and clay. Uncharred pottery had also been deposited. One sample from one of the charred lenses (sample 1487, App. 3, tab. 1 & 2) was analysed. The material burnt *in situ* is characteristic of threshing remains, and may have been used to start the fire, as well as having served as an offering. The material also has some of the characteristics of 'fodder' (see 2.7.3; 3.2.4). There were charred remains of emmer wheat (a single grain and a large amount of chaff), barley (grains and chaff), and a gold-of-pleasure seed together with arable weeds and ruderals.

f2781 41 cm deep. In the initial layer, the only identifiable bone is from cattle, and they are all leg elements, largely from the forelegs. Materials deposited later were similar to those in f2773 in terms of the combination of burnt/scorched and unburnt finds associated with burnt and unburnt layers. Materials included unfired clay, sherds and mainly unburnt bone, and a loom weight fragment. Higher layer bone finds are from cattle, with only one sheep/goat bone.

Fig. 9 Examples of Middle Iron Age features within the central segment (for position, inset trenches and Plan 3), of ditches, one with human jaw, and the remains of a bank of sods.

f2783 50 cm deep. At least partially re-dug once, this contained fewer materials – 20 sherds and a few bone remains – than the sections of ditch described above.

f2794 70 cm deep. Most of the material occurred in one layer. The identifiable remains included a deposit of pottery and the skull and leg bones of an ox, and one sheep/goat bone.

f3455 25 cm deep. This short ditch length/long pit contained sherd material and burnt and unburnt bone, much of it fragmented, so that only cattle elements could be determined. It also contained one stone.

f3456 25 cm deep. At the bottom of this short ditch, or long pit, were unburnt finds of sherds, two bone fragments, a piece of sandstone and a sandstone grindstone. The second layer of deposits consisted of 152 sherds, some secondarily burnt, fragmented burnt bone, sandstone lumps, five of them burnt, and a whetstone.

Pits (fig. 10; Appendix 2a)

Pits of this phase were round to oval. Only two were less than one metre deep, while most were deeper than 1.20 m, with four features deeper than 1.80 m. Their diameters fall into four main groups: approx. 0.90 m, 1.40 – 1.45 m, 1.90 – 1.80 m, and 2.70 – 3.50 m. In most cases it could be determined that pits had been dug and deposits made at different levels, while the pit was backfilled. Two pits (f2796, f3238) had clearly been reopened, and partially re-dug, and backfilled after additional deposits had been made. This action of reopening might also apply to others.

The ritual nature of pits from different settlements within the region has been argued (Therkorn 2004). Pits from the Middle Iron Age were not included in previous studies of the region, although earlier and later sites were, as were areas to both sides of the Oer-IJ. This type of digging and filling of pits has been interpreted as part of seasonal rituals, with deposits emphasizing the regeneration of humans, animals and the landscape, representing the cyclical nature of time, as reflected in the seasons (cf. also Chapter 3).

In general, and here in the Broekpolder, pits tend to contain both fragmented and complete deposits, such as the complete wooden objects and pots, and animal deposits. Use of pigs and piglets is not typical of the region. Horse bone is rare, in contrast to the other settlements analysed, and here the pigs may have been the alternative family, or period, tradition. The wood spectrum is also well represented. Apart from the usual objects and unworked lengths of hazel, oak, ash, alder and willow, there is also the occasional length of juniper, and here in the Broekpolder there were rare finds of *Viburnum* (guelder rose) and *Clematis* (clematis). Other materials such as loom weights and quern fragments were also deposited. Remains of crops and crop processing were also recovered, both burnt and as intestinal matter from individual cattle. Human bone material was present in three pits.

Clearly, these few materials need not necessarily have been deposited in two-metre deep pits as part of a waste disposal pattern. Re-used storage pits within this environmental setting are simply not an option as an explanation. Water abstraction would be a possible explanation for some of the very shallow pits, but there was no natural silting was evident. The pit features are briefly described below and the materials are noted with the section drawings in Appendix 2a.

f596 1.25 m deep. One short length of hazel was recovered.

f644 2.05 m deep. The initial deposits were two complete pots and a complete, but perhaps unfinished, ladle or scoop made of ash. Bones included slaughter and meal waste from cattle and sheep/goat in this lowest layer as well as lengths of wood: hazel, oak, ash, birch, willow. After a backfill containing no find material, higher layers included bones (from cattle, sheep/goat, and one horse bone), pottery, a (loom) weight of pumice, one piece of sandstone, as well as lengths of hazel, alder, birch, willow and viburnum.

f646 20 cm deep. This pit contained two jaw fragments from a pig, a skull fragment from an ox and slaughter and meal waste from sheep/goat. Sherds weighing 1.5 kg represented portions of at least five different pots.

f677 74 cm deep. A young pig less than a year old was the initial deposit, laid on its right side, head to the north, with bones (mainly lower leg and skull) from cattle and sheep/goat, and meal waste from horse and sheep/goat, as well as partial pots. A complete awl-type implement (of sheep/goat bone) bore traces of use. There was much more meal waste in the higher layer, and also single teeth and other skull parts from cattle and pig. Horse was also represented by one bone.

f691 30 cm deep. Packed with 68 willow branches, one length of alder and one of Cornelian cherry *(Cornus mas)*, there were also two skull elements from an ox and two potsherds.

f706 1.20 m deep. There was little differentiation to be made in the fill of this feature except within the higher, natural infill of the not completely backfilled pit. Deposits in the backfilled layer consisted of a partial human cranium in the form of a near-complete parietal bone, a near-complete horse femur and a partial lower leg bone from an ox. Another find consisted of ash and two lengths of willow.

f708 1.60 m deep. The thick lowest layer contained three lengths of wood: willow, alder and juniper, and in the second layer, half of an ox mandible; the only other finds were four sherds in this and the highest fill.

f759 1.54 m deep. One cattle rib was found in the lowest layer, with pig bone; in the layer above there were finds of viburnum and bones from cattle (including a lower jaw), sheep/goat and pig. There was little pottery.

f877 90 cm deep. Initial deposits were of willow, bones from sheep/goat and cattle, and some pottery. Higher in the pit larger sherds were found and, again, bone from sheep/goat and cattle (including skull parts) and a horse bone.

f1048 30 cm deep. This pit contained wood only: a holed object of beech with a short 'handle,' a short length of hazel and two willow branches. A later ditch masked this pit, and the stratigraphic connection to the Middle Iron Age level is somewhat uncertain. The worked wood is beech and the species is unusual for the period. Deposits of finely worked wooden objects are however limited almost exclusively to pits of this period in the Broekpolder.

f1141 1.40 m deep. In the lowest layer were two finds of clematis, one of willow, and bone from cattle and sheep/goat. Pottery was found higher up the pit with bones from a sturgeon *(Acipenser sturio)* and, in the highest level, a horse jaw fragment.

f2041 1.20 m deep. The lowest layer contained alder, oak, skull and body elements of ox and pig, and two mice jaws *(Mus domesticus)*. Higher up were alder and willow; and above alder, oak and hazel and fragment of a cattle skull. A juniper branch was also recovered (layer unknown).

f2593 90 cm deep. Wash layers at the bottom of this pit indicated that it had stood open for a time; they were covered by backfill followed by sods and another backfill layer. The pit contained no finds.

f2619 1.65 m deep. This pit may have been reopened twice. The initial layer covered an alder stick, placed E-W, and somewhat higher up there was a large sherd that had originally been covered by sods which were disturbed when the pit was reopened. A pig with an estimated age of between 7 and 10 months had been deposited in an E-W orientation above the initial fill. A 25 cm-long branch of alder, with its side branches cut off, had been placed between the hind legs. A pig skull was also present, and dentition wear gave an estimated age of 17 – 19 months. Signs of ageing in the pig deposits might indicate a slaughter time of November. The bottom layer in the reopened pit (layer 3) contained a juniper branch and pottery covered with redeposited material including cut sods. Layer 2 appeared to represent fill from the last reopening and contained sherds and bone from cattle and redeposited sods.

f2654 1.90 m deep. Originally round, this pit had been reopened somewhat off-centre, leading to an oval upper part as a careful addition to the original fill, halfway above the bottom of the pit. Light clay and dark turf infilled the lowest layers of the pit, in which no deposits were found. Higher up, fine clay (layer 9) had been deposited, shaped to a near circular slab 7 cm thick. A complete 7 to 13 week-old piglet had been placed on top of this on its right side, with its head to the west.

The next layer contained four finds of hazel, including a 70 cm stick with both ends sharpened, and a longer length 80 cm long. There was also a somewhat shorter length of juniper, and a small, shaped piece of oak. A complete object of oak, probably a 'ropewood' (see box Rope Woods, Chapter 3), was found in the same layer. On the layer of backfill covering these finds were four complete pig skulls, and meal waste, mainly from pig. Cattle and sheep/goat bone was deposited in two concentrations above, consisting mainly of single teeth and lower leg bones. One dog was represented by a partial leg bone.



The oval of raw clay with a complete piglet laid on top is a particularly unusual detail for the region. The clay, of potting quality, must also be regarded as a deposit.[9] Pottery itself was noticeably absent, except in the form of small sherds in the upper backfill layer, possibly settlement surface debris.

f2795 1.75 m deep. This pit dug into ditch f2794 seems to have had three sequences of digging and backfilling. The original pit was round. A black burnished sherd was deposited at the bottom, with a sheep or goat dropping and two short lengths of willow. Redeposited material consisted of lumps of clay and grass sods, beneath a layer with dung, sods and peaty sods and a selection of six lengths of wood: hazel, juniper, oak and three of willow. The hazel find was a stick, with a charred end. Another black burnished sherd, a rib and metatarsal from an ox and two unidentifiable bones were also in this layer, which had subsequently been covered with sandy backfill.

Into this layer another pit was dug, with a backfill of peaty sods, and a deposit of a partial lower jaw of a sheep. A thin layer of clay which topped this layer also contained charcoal, wood chips and bone material from sheep/goat and ox.

A new pit was dug, with a first layer of humus-rich clay and a deposit of a complete lower leg bone (metacarpal 2 – 4) from a horse, three leg bones from an ox, and a partial upper jaw from a sheep, with three eroded sherds. The remainder of the pit was filled with sandy clay containing an eroded sherd and a short length of alder.

f2796 2.15 deep. A pit dug into early ditch lengths had probably been re-dug. The lowest fill of the original pit was 50 cm in diameter with redeposited material consisting of fragmented cattle bone and a few small sherds. At the level where the pit was 2.10 m in diameter was a layer of burnt material that also included burnt and scorched bone from sheep/goat legs.

Fig. 10 Two examples of Middle Iron Age pits sectioned, that on the right (f2796) with clearly layered, cut sods. And examples of recovered materials of wood of a large ladle fashioned from one piece of wood, a smaller unfinished ladle and one of the complete vessels.

9 Other deposits of raw slabs of unbaked clay have been recovered as initial deposits and next to complete pots, from pits of the 1st C AD on the other side of the Oer-IJ (Therkorn *et al.* 2006).

The sample analysed from this layer (fnd 1888, App. 3, tab. 1 & 2) contained charred material consisting of barley grains and chaff, emmer wheat chaff, cereal straw, flax fibres twined into fine string *(fig. 73)*, and a flax capsule fragment. There were waterlogged remains of barley caryopsis and chaff, emmer wheat chaff, remains of flax and gold-of-pleasure, various plants associated with salt-marsh grasslands, seeds of arable weeds and ruderals. Again, as with the material in the ditch f2773, the combination could be consistent with 'fodder'. Sods and dung were deposited over this layer with many finds, including a fragment of a loom weight, an articulated section of the rib cage and vertebrae of a sheep, together with a pine (Pinus sp.) burl, and a few sherds. Two deposits of sherds were found to either side. Some of these sherds fit with others from beneath the burnt material, while others fit with those from the highest layer and would seem to reflect the reopened character of the pit and disturbed deposits.

f3063 35 cm deep. Part of a scapula (25%) from a horse aged about 12 months, with chop marks and traces of burning was found in the bottom, along with 16 small sherds covered by a humus-rich layer containing a sheep/goat molar and a foot bone from an ox. The uppermost layer contained only one sherd.

f3238 1.70 m deep. This pit was reopened but no differentiation could be made between the original and later deposits. Undisturbed deposits around the edge of the orginal pit, in a matrix of sods, consisted of vitrified pottery and a fragment of a clay object, a sharpened willow stick, an ash tenon, and half of an ox ulna. At a higher level were a few black-burnished sherds and a lower leg bone from an ox. In the highest layer were small bone fragments and small sherds, a gneiss stone and a lower leg bone from an ox. The pit had been backfilled. A new pit was dug, and finds deposited, and the process was then repeated a third time. The last deposits consisted of cut willow branches (5 years old, cut in the autumn), and sherds in the bottom, followed by a lens of dung-like material, a few sherds and the base of a pot. A skull fragment from an ox had been placed west of centre. This cranium section is from the right side and includes part of the horn-core. The deposit was followed by backfilling which included two lower leg bones from cattle. There was also a complete molar from a sheep/goat, a large sherd, and a section of a pointed birch trunk, about 20 cm long, angled NE-SW, and pointing downwards. The top backfill contained small sherds and unidentifiable bone fragments.

f3242 60 cm deep. In the bottom was a small sherd in backfill, covered with sods, and then a thick layer of wash with two small sherds and two unidentifiable bones. A posthole (f3210) nearby contained no finds.

f3314 (pit or irregular depression): 5 – 10 cm deep. Contained a stone (whetstone?) and a molar from an ox.

f3327 55 cm deep. The bottom of the pit contained redeposited sods with a few sherds and bone fragments from a calf above. The highest redeposited material contained only small sherds, and a lower leg bone from a calf.

f3344 1.20 m deep. A large black burnished sherd lay on the bottom, covered by redeposited material on which was found another large black burnished sherd and a radius from an ox placed W-E. In the next redeposited layer was a pot with its opening angled downwards towards the NE. Small, black sherds were located in the SE quadrant. The finds were covered with redeposited material, followed by wash layers including small sherds and a sheep/goat bone. The next layer of backfilled material contained a deposit of cremated bone. Cremated human remains including two femur fragments and part of an atlas could be recognised. Parts of an ox skull (teeth and maxilla) and a hoof from a sheep/goat were also found to have been cremated. This layer had been overlaid with sods and then with sandier redeposited material. Both layers also contained small sherds and fragmented animal bone.

f3350 25 cm deep. This pit contained one fill and one find of half an antler from a roe deer *(Capreolous capreolous)*.

Sods: remains of banks

Two linear features (f 2646, f2647) were recovered which appeared to be the remains of sod banks *(fig. 9)*. They were heavily eroded, and the original situation could not be determined – such as whether they had been set into shallow ditch lengths or what the total original length had been. No seeds or pollen were preserved. The only outcome of analysis of the material was that the structure of the remains was consistent with herbaceous material, and consistent with a grass sod interpretation.

Later phase features from the Middle Iron Age in tr 31 – 33 (c. 350 – 300 BC)

Two features cannot be placed within the same phase as the features described above. They certainly do not belong to the general Late Iron Age/Roman Iron Age period, however. The traces did occur at the same level as the other features from the Middle Iron Age. In other words, they belong to the same 'horizon', but the dating must be after the end of the phase represented by the dwelling with associated pits.

– *Ard-marks* were found consistently at the same horizon, but cutting through the features of the Middle Iron Age described above. These were single sets and could be signs of the activity accounting for the later erosion of the Middle Iron Age surface. Rather than the form of criss-cross ard-marks as described above for the earlier Bronze Age and Early Iron Age, these marks were mainly unidirectional and 12 – 15 cm apart *(fig. 11)*. Ploughing traces were also consistently filled with lighter material than the layer into which they were cut. This indicates there was no humus layer through which the plough cut. The very light coloured, clayey sand represents a sedimentation layer deposited after the above phase of Middle Iron Age features. Layer 2a did not have the sand layers characterizing 2b, present when the layer was at its thickest (Plan 2, position E-F east, to H), and is probably the layer through which cultivation was briefly carried out. The traces were extremely vague, and no direct relationship could be identified with 2a.

– *Ditch (f2912)* was 40 cm deep, found along the north of tr 32/33, and the similarity in the fill of very light clayey sand means it might be part of the feature along the east of the ridge (f3590). It had filled very quickly, during flooding which deposited sediments infilling the ditch and forming the layer separating the Middle Iron Age from the higher traces from the Later Iron Age/Roman Iron Age.

A stone weighing 13 kg was the only find in either segment of the ditch. The size is remarkable and quite exceptional for the region. The stone is gneiss with bands of biotite, a description which (for most of us) does not do justice to its rough, dark-grey colour full of sparkling silver specks and generally glittery appearance, with smoother contrasting rose-coloured bands. The form is a squared oval, 33 x 29 cm, and 7 cm thick. Only a small area (12 x 9 cm) of biotite making up part of the flat surface has traces of wear similar to a whetstone or quern stone. The stone was positioned halfway up in the flood layer infilling the ditch. The context of 'ditch' may have no relation at all to function, but more to the flooding that was taking place; it might even have been an appeasement offering. This is not a stone easily thrown into a ditch, in any case, nor would the use surface have been functional in this position. This stone is the last deposit within this central segment of the ridge we recovered for the period representing the next two to three centuries.

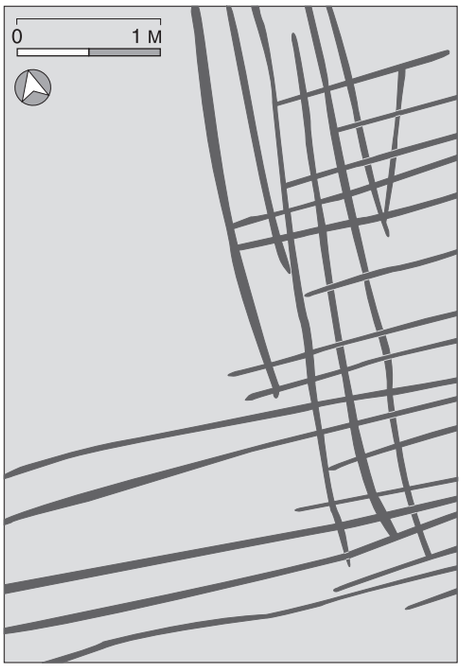


Fig. 11 Ard-marks of the (Middle) Iron Age.

2.7.2 *Trench 49: ditch and pits*

A few features from the Middle Iron Age were found in tr 49, over part of the northern ridge segment. In contrast to features in trenches 31 – 33, the stratigraphy in tr 49 did not have distinct layering separating the Middle Iron Age from later features. Only six features have been dated with certainty to this period, and these are shown on Plan 3. Feature over-cuttings, ^{14}C dates and pottery were the criteria for placing the features in the Middle Iron Age. A few features of the period without pottery or other date indications might therefore be included on Plan 4.

Ditch f5673, draining with the slope and containing finds of a horse's head and neck, a quern stone and pottery, is over-cut by the later ditch f5690, with no finds, dug along the slope. It divided higher from lower-lying areas. Lying within the northern segment, separated from the central segment by a creek, its positioning is similar to and on the same trajectory

as ditch f2765 in tr 31 – 33. The patterning in land division and marking is very similar to that in the central segment of the ridge.
The pits are also similar. Pit f5240 gave a dating with a range of 518 – 394 BC (KIA 12294). The pit was 2 m deep, and 3 m in diameter. Deposits, mainly from the upper layer of redeposited sods, included bones from a human skull, an 11 x 8 cm fragment of the frontal bone with the upper part of the orbital. In the same layer were a partial skull from a sturgeon *(Acipenser sturio)*; a skull and lower leg bone from horse; a pig mandible; pelvis and leg elements from sheep/goat (3), and cattle bones (23) from all body sections. There were two willow branches and an oak stake. There was also one metal find: a thin iron bar (fnd 5935), 7 cm long and square in section (4 mm). A total of 79 pottery sherds were found.
Pit f5503 contained leg bones of horse (4), sheep/goat (1), bones from various parts of cattle (17), quern stone fragments and pottery. It was dug into the bottom of a ditch, and thus also similar to the situation of pits f2796 and f2795 in ditch f2794 of tr 31 – 33.

2.7.3 *Botanical samples and Middle Iron Age crops (App. 3, tab. 1 & 2)*

Samples were analysed from layers of pits (f644, f2815-5, f2796-11, f3584-2, 3695-6) and the short ditch containing a human jaw and traces of regular deposits and burning *in situ* (f 2773-3). By far the greatest number of plant remains was found in the dung/intestinal samples, including remains of charred flax fibres; apart from these elements, the sample will be more fully discussed, along with the other dung/intestinal samples from other periods in Chapter 3, in the discussion on winter fodder. The pit contexts were 'closed' and all of the material found in them could have been deliberately deposited. Here, a general interpretation is given as to the habitats represented,[10] as well as the crops grown in this period.

No layer with ard-marks or ploughsoil was associated with the features from this period. The area where crops would have been cultivated was most likely in the immediate vicinity of the dwelling within the central ridge segment, and to the north below the monument. The samples from dug features yielded significant quantities of charred cereal chaff fragments, dominated by emmer wheat glume bases and spikelet forks, together with rachis internodes and also grains of barley. These were found together with only a few charred seeds from arable weeds. The large amount of cereal chaff and seeds from arable weeds strongly suggest that these plant remains were derived from crop processing, mainly threshing.

– *Emmer wheat (Triticum dicoccon)* A large amount of charred chaff remains (including glume bases and spikelet forks), and only one grain of emmer was recovered from the ditch (fnd 1487) and from two pit samples (fnd 2712 and 1888). Emmer, a hulled wheat species, has grains that are firmly enclosed by glumes. A special treatment such as parching and pounding is required in order to obtain a clean grain product. This wheat species was usually stored in the spikelets and the grains were released prior to food preparation, probably on a daily basis if used for human consumption.
– *Barley (Hordeum vulgare)* Barley grains from the Middle Iron Age have been badly damaged as a result of carbonization. Most of the grains show distinct characteristics of the hulled variety *Hordeum vulgare*. They are angular in cross-section and have a wide ventral furrow. Some specimens were still enveloped in their husks. In a few specimens longitudinal ridges were observed on the surface of the kernels. Like emmer, hulled barley must undergo a similar process to separate the chaff, which is firmly fused to the grain. Barley grains were found together with chaff remains (rachis internodes). Most of the rachis internodes are long and slender, and as such they have been attributed to the lax-eared form of six-rowed barley, often called 'four-row' barley.
– *Flax (Linum usitatissimum)* The presence of capsules indicates that flax was cultivated and processed locally. Flax could have been grown for its oil-bearing seeds, but was certainly grown for fibres, as indicated by charred fragments of flax fibres twined together from the dung sample (f2796/11) (see scanning electron micrographs, *figs. 73*). Individual fibres had diameters ranging from 10 to 15 microns with a mean of 12.5 microns and were thus significantly close to modern, experimentally charred flax fibres. Whether these are remnants of fine cordage or string could not however be determined as only small fragments were preserved. Nevertheless, these finds are remarkable because they are the earliest direct evidence of the use of flax fibres ever found in the Netherlands. The fibres are one of the end products; the sample from pit f3695/6 provides some indications of processing. They will be more fully discussed in Chapter 3 along with the processing remains from the Late Iron Age/Roman Iron Age.
– *Gold-of-pleasure (Camelina sativa)* Gold-of-pleasure was originally a field weed, found especially in flax fields. From the

10 Work by Westhoff & Den Held (1975) and Schaminée *et al.* (1996, 1998) on recent plant communities in the Netherlands was used primarily for the reconstruction of the vegetational environment. It should be borne in mind, however, that the use of present plant communities for the reconstruction of past vegetation must be done with a certain degree of caution, as recent plant communities may have different species compositions. Anthropogenic habitats – such as arable fields, ruderal habitats and grasslands – in particular might have changed considerably over time.

Iron Age onwards, however, gold-of-pleasure was cultivated on a variety of soils for its oil-rich seeds.[11] One carbonised seed was found with grain remains. The fact that the dung sample contained mainly fragmented pods and seeds could be interpreted as an indication that it was threshing material that was eventually used as animal fodder. The presence of both seeds and pods also suggests that this plant was locally grown.

The location of crop fields

The presence of chaff remains from barley and emmer wheat, and threshing material from flax and gold-of-pleasure, indicates that these crops were grown locally. Experiments conducted by Körber-Grohne (1992) and Van Zeist *et al*. (1976) demonstrated that it is possible to cultivate crops in unprotected salt marsh areas if the area is not flooded by saltwater too often, especially during the seedling stage. Gold-of-pleasure *(Camelina sativa)*, flax *(Linum usitatissimum)*, barley *(Hordeum vulgare)* and oats *(Avena sativa)* could be cultivated with reasonable success even in areas that were occasionally flooded. The harvest of emmer wheat *(Triticum dicoccon)* may have failed if the land flooded. It is not possible to conclude whether emmer wheat was grown within the excavated areas or on higher-lying areas not far to the west and brought back to the homestead for threshing. The extent of flooding is not known, nor do we know how much risk the inhabitants were willing to take.

2.8 Geo-interlude 350 – 100 BC

In recently studied environments, vegetated salt marshes only erode along their seaward margins, known as salt-marsh cliffs, something not applicable to the Broekpolder. Salt marsh ridge erosion could occur if ploughing destroyed protective salt-marsh vegetation, and this might imply ploughing up to the point of erosion. The features and finds do not however show a long period of activity in the Middle Iron Age. Erosion of areas that were certainly not ploughed occurred in the zone where ditches and pits were dug during the Middle Iron Age (in the area of J-K, Plan 2) to the Early Medieval period. Features from these periods were found at the same level, approx. 95 – 100 cm below NAP. On the ridge, quite a lot of the Middle Iron Age layering was eroded, but there were no signs of intensive cultivation. Erosion would seem to have occurred over all of the area excavated, and that is quite an expanse to have been ploughed during the previous period. Sod cutting could be an explanation, but again, it would not be expected to have occurred over such a wide area. In short, the geology and the archaeological traces have not provided us with an explanation for the disappearance of layering from the period from c. 350 to 100 BC.

Layer 2a is a natural sedimentation which was possibly briefly worked as suggested by the presence of ard-marks beneath the layer. Layer 2a was covered by a subsequent deposit, part of which had been taken up into the ploughsoil. Some stratigraphical distinction could be made in the field between features seen at the top of Ib and covered by Ia. There were ard-marks in the top of Ib, over the area of the ridge where the subdivided layer occurred (positions A – K, Plan 2). Layer Ia has been determined to be a cultivated layer – a ploughsoil – and this ploughing disturbed the earlier, Late Iron Age features.

Layer G-Ia is sandy (10 – 20 % lutum) and decalcified, and has very little to no sedimentary structures (e.g. sand laminae). Micromorphologically, Kooistra (2000) determined that G-I underwent alternating periods of oxidation and reduction. Kooistra also determined marine characteristics in layer G-Ib down to a level of 20 cm below NAP.

Shadows of ploughed-out features visible in section in G-Ib were the clearest at the point of the partial farmhouse, which otherwise had only shallow posthole remains. Ploughed during the 1st – 3rd centuries AD, the original Late Iron Age surface was at least 35 cm higher than the level at which the postholes could be clearly seen, which was at 63 – 65 cm below NAP. The habitation surface was thus at least 30 cm below NAP on the area of the ridge (with no correction for subsidence). Off the slope, to the east, features from the Middle Iron Age through to the 6th/7th C AD occurred at the same level. There was very little marine influence in the Broekpolder during the centuries leading up to our era. Embedded in the highest marine sediments off the slope of the ridge, the latest occurrence of *Scrobicularia plana* (at position P, Plan 2) has been dated to 393 – 257 BC (KIA 9488). Only one layer formed atop this last marine deposit before peat accumulation occurred, and this contained seeds indicating freshwater. Layer f750 (tr 29, 1.34 m below NAP, relative position Q, Plan 2; App. 3, tab. 5) contained seeds of the freshwater plant *Ranunculus aquatilis* and an indicator of freshwater marshes (*Alisma plantago-aquatica*). Plants typical of brackish water and marshland are present in the *Zannichellia palustris* and *Scirpus maritimus*, although the latter also grows in freshwater conditions. Settlement samples from features also include freshwater

11 Gold-of-pleasure was found at the Early Iron Age farmstead at site Q in the Assendelver Polders (Therkorn *et al.* 1984). It was concluded from the abundant numbers of seeds and threshing remains that *Camelina sativa* was grown there on local peat. In the Iron Age this plant was also cultivated on peatlands in the Meuse estuary (Brinkkemper 1991). It was also found in the Iron Age settlement mounds in the coastal marsh area of the northern Netherlands (Van Zeist 1974) and in a pre-Roman Iron Age settlement in West Friesland (Buurman 1993).

indicators from the Late Iron/Early Roman Iron Age onwards. Except in the intestinal/dung material from cattle, only very few salt-marsh plants were represented, and these can be interpreted in various ways (see Box: Groenman-van Waateringe). The variety of habitats represented in the intestinal samples from cattle, including salt-marsh plants, will be considered separately in the section on subsistence in Chapter 3, as part of the discussion on 'winter fodder' and the gathering of salt-marsh vegetation.

Samples from the depression over the Oer-IJ channel to the northeast of tr 51 in a remnant stream cutting into the last sandy silts of the channel depression 1.60 m below NAP were also analysed. Freshwater molluscs were present, including *Lymnaea stagnalis, Armiger crista,* and *Bithynia tentaculatas*, as well as water fleas (*Cladocera*), including *Daphinia magna* and *pulex* (Meijer 2001). The immediate area around the Broekpolder is through the above indications interpreted as having become a terrestrial landscape by the start of the first century AD at the latest, and possibly a century earlier (reconstruction, Plan 2).

The Oer-IJ system lost contact with the sea due to coastal

Salt-loving plants without a salt marsh *An indisputable contradiction?*

by Willy Groenman-van Waateringe

Even when the geological data indicate that the environment is no longer under the influence of saltwater, it is still possible to find halophilous plants, i.e. plants that prefer a saline environment. Two entirely different arguments can be put forward to explain this apparent contradiction in the Broekpolder situation.

First, we have the botanical argument. Tolerance of certain ecological conditions differs strongly from one plant species to another. The margin can be extremely narrow or very broad. And even within the parameters for individual species, the growth and vitality of the species depends on external circumstances. Competition between plants is an important factor and the competitive strength of a plant depends on a variety of factors, such as the composition and density of vegetation, the stability of the environment, trampling by man and animal, and grazing.

This brings us logically to the second line of argument. In an archaeological context such as in the Broekpolder, every analysed sample has been subjected to some degree of human influence. And when humans are involved, we can expect all manner of disturbances in the natural pattern of plant and seed distribution. These disturbances can be indirect – unintended, in other words – or direct, deliberately executed. Indirect effects include trampling by humans and domesticated animals, causing damage to or at least altering the vegetation, thus favouring plants that tolerate such activity, and causing the incidental spreading of plants, as seeds or other parts stick to feet, clothes or equipment.

Direct effects include, for example, manuring, weeding and harvesting, all three of which may result in the spreading of plants. Cutting sods, building dikes, irrigation, exploiting natural resources (trees and shrubs) etc. are also factors that can influence the vegetation by disturbing natural developments. But one of the most important factors is the keeping of domesticated animals. Animals not only trample vegetation, they also eat it and excrete dung and urine. The former may contain indigestible plant parts – again some plant species survive chewing and the digestive system better than others – and the vegetation alters beneath and around cowpats because of the availability of different nutrients. The same is true of urine. The practice of moving animals not only to fresh pastures nearby, but also to more nutritious land farther away – and every farmer knows the advantages of brackish pastures with their greater variety of nutrients and the absence of liver fluke, which is bad for sheep – is one of the most important agents in the spreading of seeds. Tables of botanical data do not therefore represent the full picture when it comes to the vegetation in the immediate surroundings of a settlement. They will always, at least in an archaeological context, present a mixture of natural and human-influenced data. How, then, can we nevertheless draw conclusions about the environment around the settlement? How to decide if halophilous plants are there because of the presence of salt marshes nearby or because of human/animal transport of these plants from further away, once we have dealt with the botanical problem of the tolerance of the various species? The answer may be found in the amount and, more especially, in the variety of species present in our samples. If we find a difference in the amount and, specifically, the variety of halophilous elements present – as in the Broekpolder between the Late Iron Age/Roman Age and the Early Medieval period – we can assume a change in the local environment from brackish to freshwater conditions.

barrier formation at the inlet. Flooding with marine water would occur only during major storms (washovers), possibly as infrequently as once every 50 years. The lower-lying areas had certainly undergone changes in their plant communities, probably earlier in the 1st C. Experimental studies by Westhoff & Sykora (1979) on the influence of desalination in a recent salt-marsh vegetation have shown that only two species, *Juncus gerardi* and *Triglochin maritima*, were able to maintain themselves in a grazed area for more than 30 years after desalination commenced. All Armerion species disappeared within 10 years in areas that were protected from grazing.

The decline in marine influence in the Oer-IJ is also correlated to the new connection between Flevomeer and the North Sea, via the Wadden Sea. The Oer-IJ system lost its runoff function from the Flevomeer and the river Vecht. After the closure of the Oer-IJ from the sea, the flow of drainage reversed to the Flevomeer and, because of the longer drainage trajectory, drainage capacity was reduced, causing a rise in the water table in the former estuary. At the micro-level, along the Broekpolder ridge, excavations revealed where bodies of open water had been present along the southern, central and northern ridge segments. The creeks drained to varying extents into the lower-lying areas off the eastern side of the ridge. Adjacent to the southern ridge area, a substantial peat accumulation had formed by the 2nd C AD (tr 22, wood chips on the peat surface, and artefacts: UtC9272). Within the central area, a small pool of water was used for deposits, probably from the mid-4th to the early 5th C (KIA 10003, considering the one-sigma range). Further towards the east, towards the channel depression, peat had accumulated (at point U, Plan 2) by the 6th/7th C (KIA 9493). Deposits were made in the pool off the slope of the northern segment, described in section 2.11, 'Offering site', in the 6th – 7th C. This area of open water silted up gradually, but was never overgrown by vegetation leading to peat accumulation.

These indications suggest that the stagnated drainage conditions led to peat accumulation first in the south of the polder, and from east to west towards the ridge. The ridge itself was never covered by peat, except in the southern part of the polder.

2.9 Late Iron Age/Roman Iron Age to the Early Middle Ages (1st C BC – 6th/7th C AD)

Considering the range of ^{14}C dates, use of the Broekpolder area could have been continuous from the Late Iron Age through the Early Middle Ages and into the 11th C. Some of the dates obtained from settlement features might be after 400 AD, and one is certainly Early Medieval 5th/6th C. However, considering the density of features, and the absence of clear 5th C datings, continuity of habitation cannot be argued. Use for cultivation and grazing may certainly have been continuous, however. Dwellings were certainly present in the area past the mid-3rd century, and possibly into the 4th/5th C (see tr 15), represented in excavated areas indirectly by relatively large concentrations of pottery adjacent to unexcavated areas. While the habitation traces from around 400 BC were found only in the central and northern segments of the ridge, divided by W-E creeks, all three segments had Late Iron Age/Roman Iron Age dwelling areas. The recovered farmhouse plots are spaced about 500 m apart, within their respective ridge segments. There was no natural stratigraphy separating features of this fairly extended period of use. In other words, features have been ascribed to phases on the basis of AMS dates, horizontal stratigraphy and the nature of feature fill, and occasionally through find materials. To summarise, the following traces were recovered from the trench areas:

– *Trenches 27 – 38* A Late Iron Age farmstead plan; finds and features point to later dwellings in the near vicinity, and traces of use in the later Roman Iron Age and Early Middle Ages.

– *Trenches 45 & 49* A probable Late Iron Age farmstead and six farmstead plans of the Roman Iron Age, with accompanying features, dating through to the mid-3rd C, at least, and use as fields in the Medieval period.

– *Trench 15* A Late Iron Age farmstead plan and find concentrations and features also indicating an earlier 1st C dwelling, a partial plan, possibly from the later 1st C, and habitation remains in the adjacent area, dated somewhere between the late 3rd C and the early 5th C.

– *Trench 51* Materials and features from the RIA period, making it likely there was a farmhouse in the adjacent area to the west.

– *Trenches 41 & 48* Part of a field system from the Roman Iron Age and, off the ridge, a pool used as an offering site in the 6th/7th C, as well as a smaller 'pool' feature created by a large hole dug in the 10th/11th C. These trenches are described in a separate section at the end of the chapter (section 2.11).

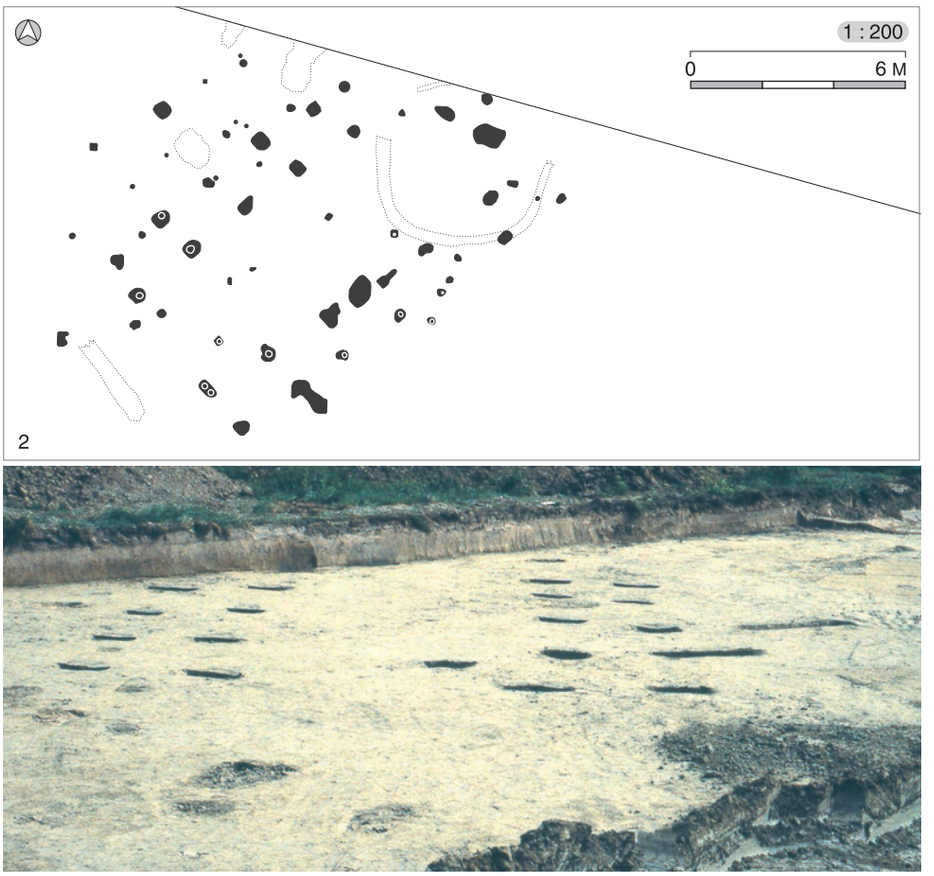


Fig. 12 View of trench 31/32, at the highest level of traces with features visible of the Late (Roman) Iron Age, Early Medieval to Medieval period.

2.9.1 *The central segment: trenches 27 – 40, 47*

The central section of the ridge contained many features associated with cultivation. During excavation the uppermost layer gave a mixed and smeared appearance *(fig. 12)*. Given the disturbed nature of the tops of features, and the soil characteristics, the layer has been determined as ploughsoil over an area used for cultivation for some time, so long that ard-marks were 'polished' away (layer GI, Plan 2). Somewhat off the ridge to the west there were ard-marks under the lower reaches of a layer sealing a number of features that were used to define possible Late Iron Age features. However, the definition of Late Iron Age or Roman Iron Age is very tenuous, as the areas ploughed shifted back and forth across the ridge. Ploughing would have taken up a good portion of layer Geo-Ib, which was originally thicker. Underlying gullies, which sometimes extended further than the extent of the ploughed-out area, were still preserved. Relative dating of the features is based mainly on horizontal stratigraphy.

The farmstead complex was located in the central segment of the ridge, an area still demarcated by two creek depressions



to the north and south cutting across the main ridge. The area preserved beneath the monument is about as large as that excavated, with features. All of this area could have been associated with cultivated fields. Good grazing would have been available off the slope of the ridge to the east and west. The remains of only one farmhouse were recovered. At most, the dwelling would have been inhabited for about 25 years. However, the range of dates for the other features shown on the higher-lying ridge, and interconnecting with those off the eastern field system, extends to as late as 350 AD. Other dwellings of the 1st – 3rd/4th C must lie beneath the unexcavated area of the monument. Some characteristics of the features will be examined, along with something of the chronology, where it is relatively clear. Features associated with livestock and a pool have been dated to the 5th C.

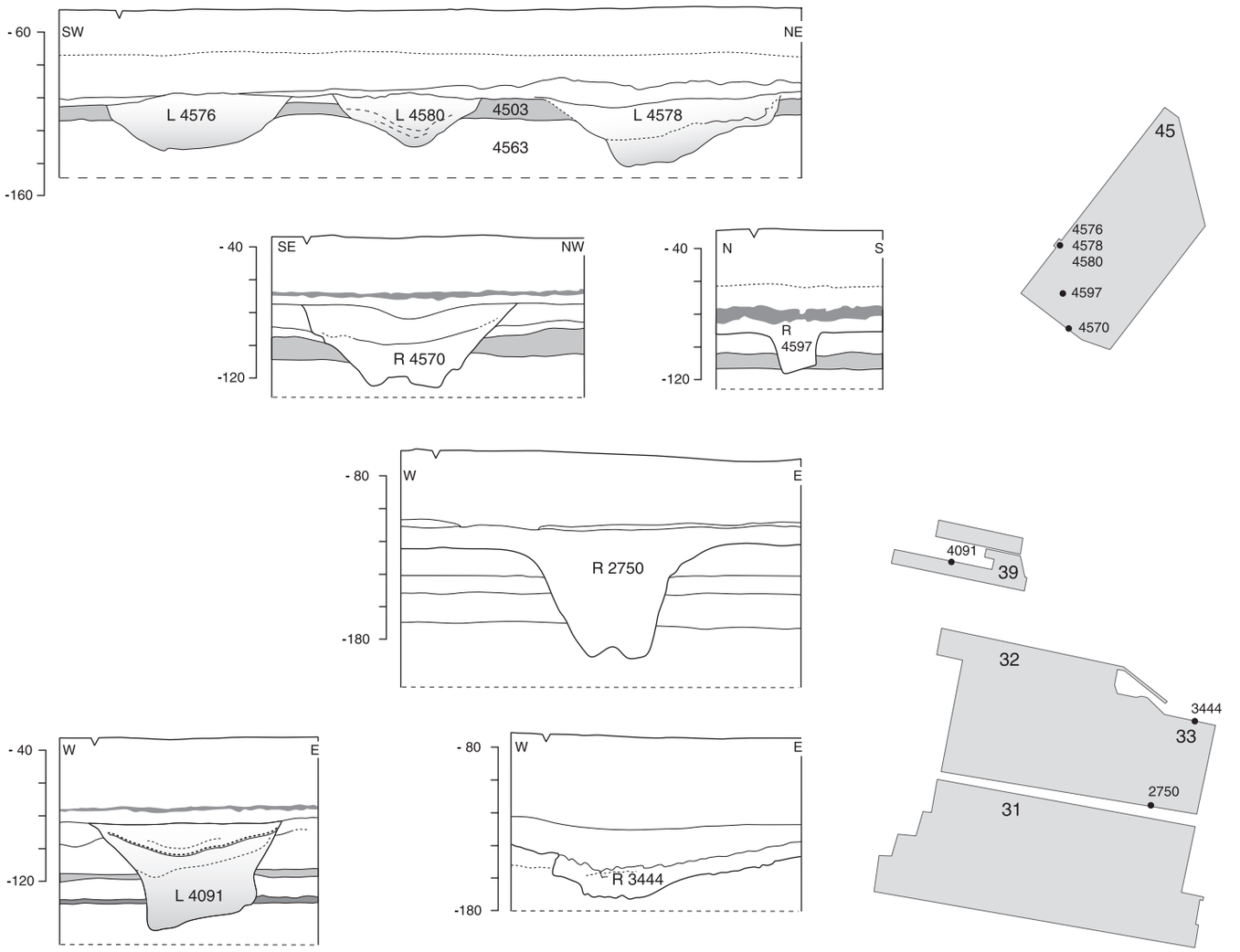
Late Iron Age dwelling

A partial plan of about 12 m of a three-aisled farmhouse was recovered in the north-eastern corner of tr 32 *(fig. 13)*. Postholes of the principle posts as well as stakeholes and postholes representing the wall lines were clear, although actual postholes and postpipes were very shallow as a result of later (Roman Iron Age) plough damage. The farmhouse was 6.20 wide, with side aisles of 1.30 m, and a central aisle 3.60 m wide. The recovered postholes were irregular, as were the postpipes, which extended deeper than the disturbed postholes, which were 7 – 25 cm deep. The irregularity indicates the posts had been lifted after being rocked to loosen them, or even dug out. In other words, the structure had been completely dismantled. No post tips remained. The plan was incomplete, but it is assumed to have been a typical three-aisled farmstead dwelling of sufficient length for sheltering livestock. Stratigraphically, the structure could be contemporaneous with the earliest ditch phase(s), gullies and some of the ring gullies.

Conglomeration of curvilinear features

There was only one area within the central segment where something of a surface was preserved. It was confined to one corner of tr 31, at the intersection of the main levee with the

Fig. 13 Plan of the partially recovered house plan of the Late Iron Age and during excavation.



creek depression to the south. One of the features was similar in shape to the 'wall-ditch' type of structure identified on the other side of the Oer-IJ channel, in the Assendelver Polders (Therkorn 1987, Therkorn & Abbink 1987). However, the characteristics used to delineate sod walls in the Assendelver examples were absent, the ditch here having the characteristics of a naturally filled, open feature. Ditch f977 did however appear to have been filled with redeposited material in the area where the cranium of a mare over 20 years old had been deposited.

This area can in general be interpreted only as a marked area for some activity which cannot be identified using materials of a specific character. The larger, curvilinear enclosure may be contemporaneous, and the shape is also reminiscent of Assendelft examples, in being irregular. The 'curvilinear style' will be considered again in Chapter 3, in relation to traditions known primarily from the other side of the Oer-IJ.

Traces of cultivation and livestock

This section covers the most characteristic features of the central segment that were probably associated with arranging economic space, in the functional sense. This is not to say of course that there is no symbolic aspect to how features were arranged, and why materials were deposited in them. The dug features described below can be interpreted in terms of facets of use for areas of cultivation and livestock management.

Ditches and gullies

The most noticeable features of the segment within the area excavated are those that form a network of ditches and gullies.

Fig. 14 Examples of ditch and gully sections of the Late Iron/Roman Iron Age within the central and northern segment.

These primarily border and cut across the area used for cultivation. Most of the ditches and gullies were of a regular, linear form. The larger ditches were dug on the slope of the ridge *(fig. 14)* and along the W-E creek depression recovered to the south of tr 31. Along the ridge, the earliest is ditch f 2762, which contained a few pottery finds, a quern stone fragment and juniper wood. Along the south was an early ditch f1089 (no finds), 70 cm deep and 1.60 m wide. Feature f932/936 from a later phase was similarly deep and broad and contained a few cattle bones, a pot and quern stone fragments. These ditches would have enclosed the earliest drainage gullies of arable fields, and may have been intended mainly for livestock management – keeping animals to one side or the other –and for providing drinking water. Some of the wider ditches (e.g. f2183 and f932) may have formed enclosures. Ditch f3358 was the latest of the series and was kept open after the re-cutting of primary silts into the Early Medieval period. Here, too, only a few pieces of pottery and bone were found. There were few areas of trample within the area demarcated by these broad ditches and it may be assumed that livestock was kept mainly to the east and south.

The 'narrow drainage gully' is the main feature type in the two hectares of trenches 31 – 33. No neat systems of contemporaneous features can be identified. The only clue as to sequence is the over-cuttings and the fact that some gullies on the highest part of the levee were later incorporated into the more intensively ploughed area. The gullies had homogenous fills and were shallow, usually no more than 15 cm deep. They could easily have silted up within one season. Depending on the wetness or dryness of the year gullies might sometimes have been unnecessary, so none would have been dug. Lengths of gullies were routinely examined for stakeholes in the bottom, but none were found. They were apparently not used for placing lengths of fencing. Three of four 'types' of gully systems identified in the Broekpolder were found in trenches 31 – 33, each possibly signifying a different intent:

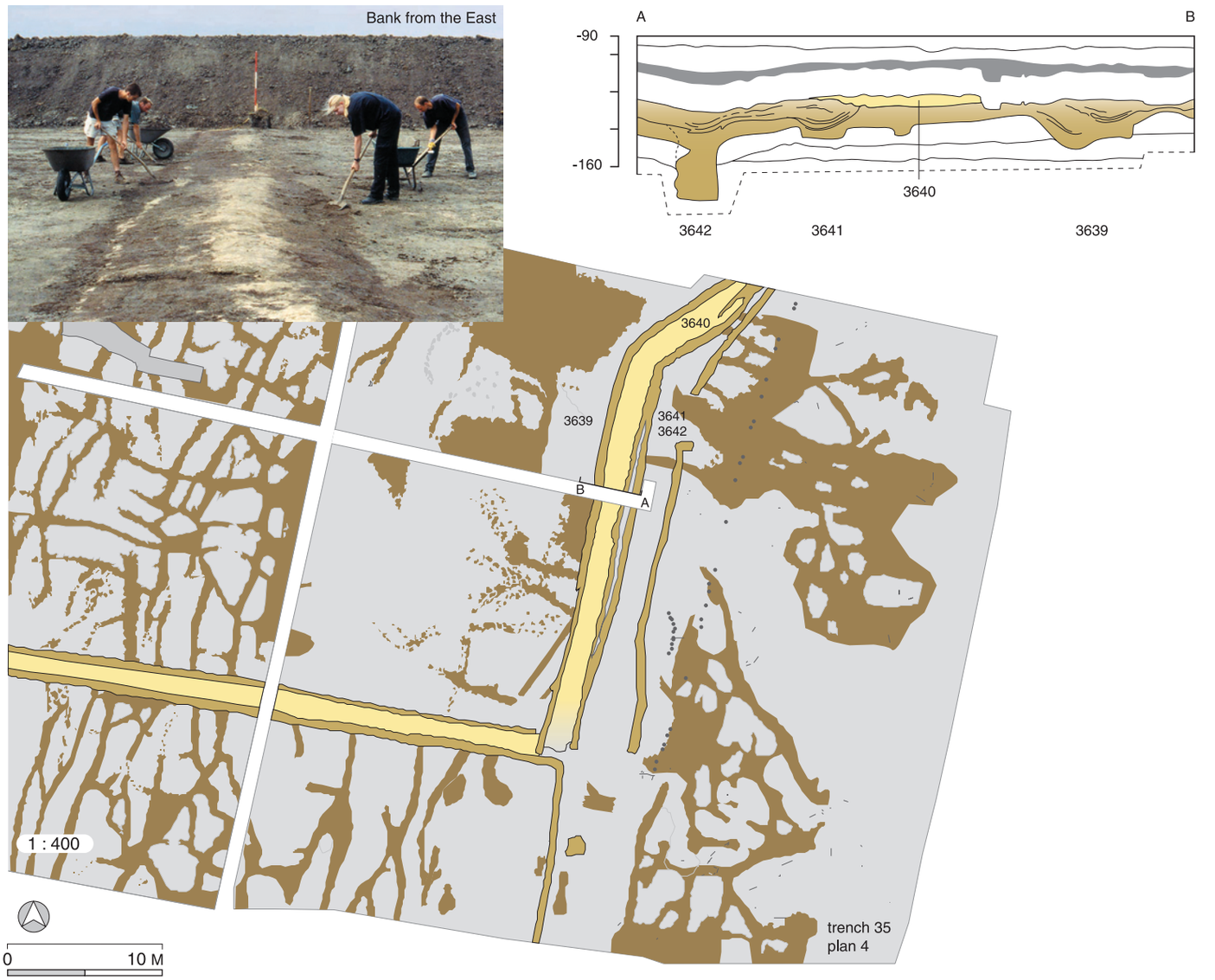
1 *Planned gullies* Two areas contain relatively small plots defined by parallel gullies. Both systems are somewhat off the slope, to the west, of the highest part of the ridge, in the western segments of tr 31 and 32. Both areas seem to have been set out according to a 'plan', possibly motivated by the somewhat lower-lying situation, for which drainage was expected to be necessary. However, the drainage planning might (also) correlate with the species of crop grown. The area in the west of tr 32 with parallel gullies is also surrounded by a multi-sided enclosing gully (f3246, f3077) situated about 10 metres to the west of the dwelling described above. There was also the suggestion of an opening. If it were somewhat symmetrical, the unexcavated area being a mirror image of what was found, an area of 1.2 ha would have been 'enclosed'. As will be discussed in Chapter 3, 1.2 ha is more than sufficient for grain production for the needs of one family with livestock holdings. This enclosing gully was certainly planned. It would seem to have a marking and bordering function. The bottom of the feature was searched for traces of stakeholes, again without result. Its purpose could have been to drain, mark and border (inside: outside). Use of a polygonal shape to surround an area of arable land is unusual for the region.

2 *Gullies dug as the need arose* Shorter and longer lengths of gullies, the vast majority oriented E-W, were not set out in any discernible pattern. They also intersect and are over-cut by similar gullies, whereby the sequence for a small area can be identified (cf. for example the area around f771, mid-trench 31), but extending the effort to larger areas to find neat, contemporaneous patterns – or phases – does not work. The features seem to have been dug on an *ad hoc* basis, not as a 'system' of phases, and the pattern could have been the effect of reacting to short-term drainage conditions. Most features in the highest area are not in line with other stretches further along. Plough damage of a somewhat later date could certainly account for the destruction of original lengths of gullies over the highest part of the ridge.

Given the period of use of this field area of at the very minimum 250 years, the number of gullies dug each year could have varied enormously, and include years where no gullies were dug at all. Gullies might have been dug in certain places in preparation for planting on land still wet from spring rains. After ploughing and planting, heavy rainfall may have left some areas under standing water. These types of gullies function more as sink-aways, rather than for draining water away towards a lower-lying area.[12]

The undifferentiated fills of the large majority of gullies show they had all filled quickly. One effect of a sink-away is that it begins to fill up with sediment as soon as it is dug. Following heavy rainfall and quick infilling within one season, ploughing would also have occurred each year over these infilled features. Instead of first digging gullies, after which

12 On an ethno-historical note, farmers still do this. Kees de Wildt, a tenant farmer, dug gullies similar to our excavated examples after he had reworked and re-seeded the field of the backfilled, excavated tr 31. Standing water in a slight depression from summer rainfall was threatening germination of seeds in this newly sown area. De Wildt dug parallel gullies, not to a ditch, but only through the wet area. This amounts to destroying a planted area while draining the immediate surroundings, in a sink-away fashion.



ploughing was carried out, the entire area could have been ploughed, and then the drainage gullies dug over uneven, soggy areas, as the need arose. This system leads to plans that cannot be divided up into neat phases, even when over-cuttings are clear as they were in the Broekpolder. Assuming planting in rows, the width of the gullies of about 25 cm might therefore indicate the minimum spacing between rows.

3 *Right-angled gullies* These shallow gullies consist of a longer length, up to 144 m, with an extension at a near right angle. One can be classified as a partially ditched enclosure (f3239, f3072), with an opening. Several much narrower features (f2125 & f906, f3061) provide two other clear examples. The latter seem to enclose an area of planned west-east gullies. Even if these features do not nicely enclose areas of other gullies, but seem to intersect and be intersected by the E-W features, they may have been used to mark out and/or separate off different areas for particular crops and/or areas that were to be treated differently to other areas. If these were dug before ploughing, or planting, the 'reaction'-type gully suggested above would then explain the over-cuttings, even by gullies dug during the same season. Both of the clear, L-shaped gullies enclose stakehole clusters in their north-eastern corner.

Fig. 15 The area off the slope, to the east, of the central segment. An area of arable, with low, preserved banks with gullies on either side. Plough soil covered underlying cattle paths of an earlier period (see Plan 4).

4 *Gullies forming small plots* The fourth type of gully was recovered in tr 49 and tr 15, near to farmhouses. These are interconnecting features, forming small (garden) plots. Horticulture is represented by Celtic beans recovered in pits near to the farmhouses (tr 15: f501; tr 49: f4984, f5523), and they were not found in other types of areas.

Banked fields

Cultivation was also carried out to the east, as shown by three strip fields extending off the ridge 120 m into lower-lying areas. The central field had a width of 27 m. Ring gullies f2801 and f3693 are probably somewhat earlier. ^{14}C dates obtained from material from the field system give a range of about 26 – 128 AD (cf. KIA 12279 & KIA 10005). Gullies marked out the fields, and material extracted from the double gullies in tr 34 (f3701, etc.) was used to form a low bank (f3704, etc.) in between, which was preserved to a height of 8 – 12 cm *(fig. 15)*. Remains of a low bank were also found between the double gully f3639 and f3642. At least some areas within the field had been heightened with material obtained from the eastern side as shown by shallow, dug depressions. Cow paths within the field (f3688, f3700, etc., *fig. 16*), intersected by the field gullies, were also sealed by cultivated soil. These cow paths are evidently earlier than the fields.

The new cattle routes contemporary with the banked fields are shown by the paths further to the east along the end of the fields. The depressions resulting from the suggested soil extraction may also have served as waterholes at this time, as there were two areas (f3618, f3631) adjacent to the depressions which had been very intensively trampled by cattle, as shown by preserved hoofprints *(fig. 16)*. The stake row (f3613) is later, possibly contemporary with f4016, which also represents the remains of fencing. These additions date to the mid-3rd – later 4th century (cf. KIA 12281 & 10004) but they were stratigraphically earlier than natural sediments in the small pool to the east containing branches and other materials (f3609, etc.). Feature 3613 was a length of widely spaced stakes, the majority of them willow, but also including oak, juniper and guelder rose *(Viburnum opulus) (fig. 17)*.

Traces of livestock: enclosure and paths

– *Enclosure* An enclosure measuring 59 x 30 m is formed by ditch f2750 (KIA 12277: 40 BC – 124 AD) that was in use between phases of the ditches along the eastern side and some of the gullies on the west. Feature 1128 and the other paths and areas



Fig. 16 Traces of cattle, in the form of paths within the area shown in *Figure 15*. The hoof-prints preserved around a later water-filled depression *(fig. 17)*.

of trample found leading to this enclosure on the east showed clear hoof impressions from cattle.

– *Paths* Cattle paths and standing places were most evident further off the slope, and these trajectories are shown on Plan 4 *(details figs 13 & 14)*. Cattle movements mainly along a N-S trajectory are indicated by the shallow depressions forming paths with hoofprints in trenches 28, 29, 35 & 36 (e.g. f751, f3688, f3700). In tr 29, one broader depression and narrow paths in conglomerate f751 is the only place where a clear W-E direction is indicated, presumably leading to grazing grounds further to the east.The paths under the banked field system and to the east have been mentioned.

One of the paths (f3683; SW corner tr 34), extended up the slope to f3444, and could well lead to the area of a 1st C farmhouse. The cow path was well worn, to a depth of 20 cm. Path f4639 further to the north (in trench 47) represents another well-used route. Also leading up the slope, this cow path is definitely later than the banked field system mentioned above, and could relate to a farmhouse on the ridge dating from the mid-3rd C, and possibly later.

An even later and broader path – a droveway (f2065; *fig. 18*) – included wood remains in the conglomerate of features, and gave a dating of 420 – 620 AD (UtC 9275, one-sigma is the later 5th and early 6th C). Remains of wattle fencing could be represented by horizontal lengths of withies recovered from the depressions to either side of the droveway. Wood lying on the pathway might have been used to raise and/or strengthen the droveway. Further to the east, f548 and f549 are probably a continuation of the feature, and here five stake points were still *in situ*. They were made of alder (3), oak and elm.

Horizontal lengths of wood showed a diversity of species,

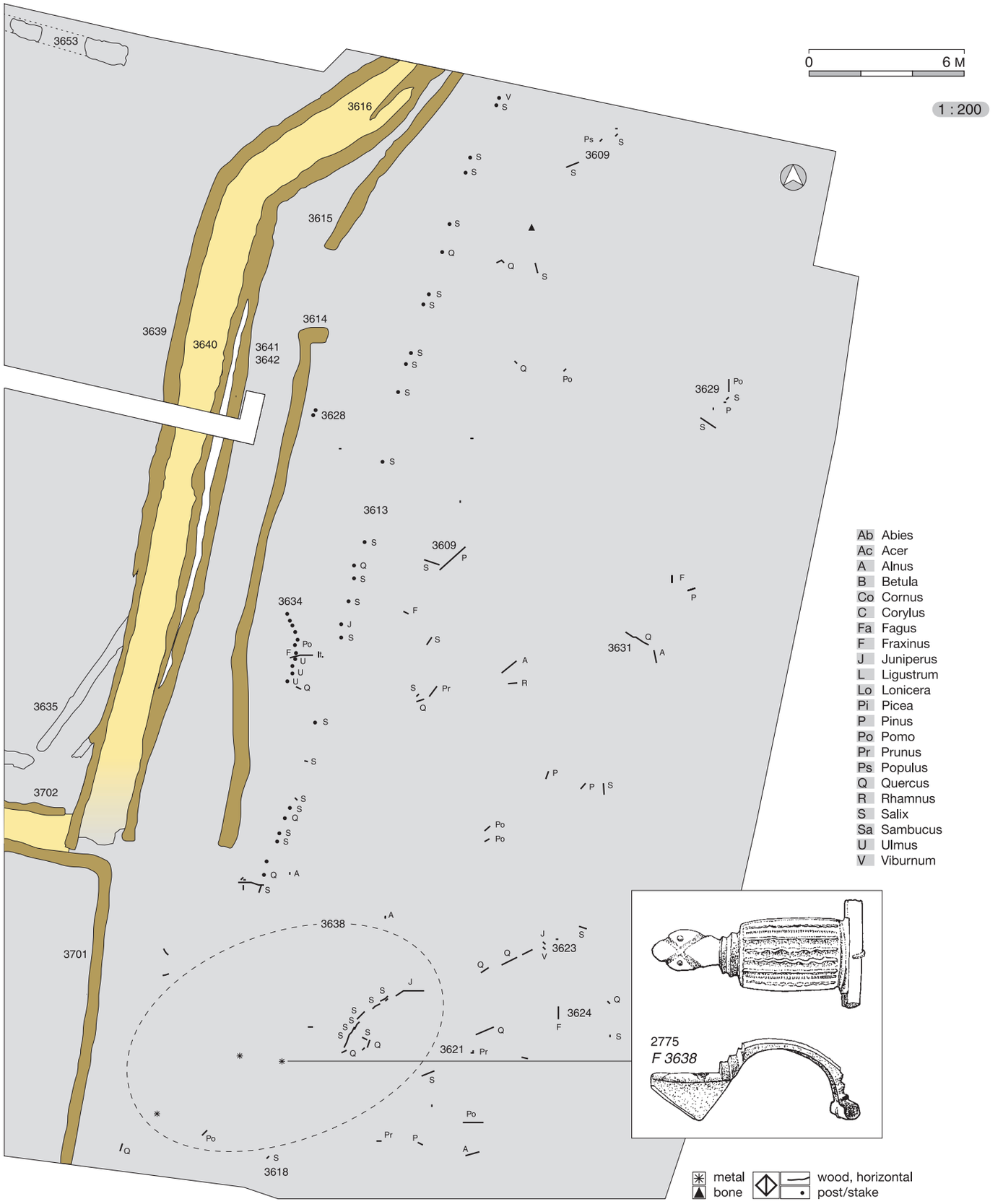


Fig. 17 The fence was added to the banked area in the mid-3rd C. Later a pool arose and deposits were made (see p. 92), including peeled branches and a fibula. The distribution of the wood is shown. The dotted line shows the even lower lying depression which apparently served as an earlier watering hole.

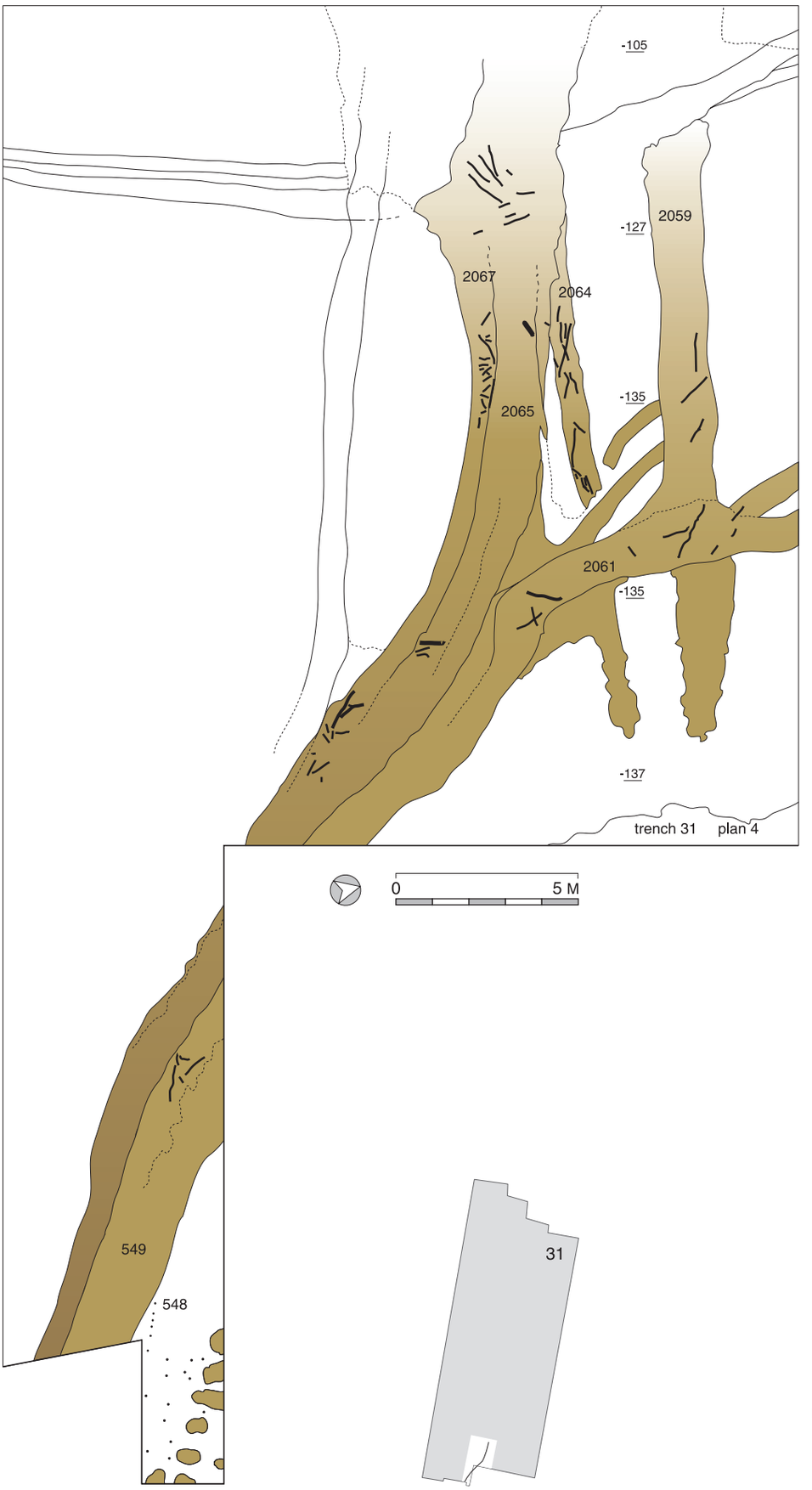


Fig. 18 A drove way with remains of wattle fencing of the Early Middle Ages (see Plan 4).



with willow in the majority (21), followed by alder (14), oak (7), pine (4), maple (3); two each of ash, birch, glossy buckthorn *(Frangula alnus)* and poplar *(Populus sp.)*, and one each of hazel and elm.

Considering the various dates and pattern of earlier cow paths further to the north (f1128), use of the central segment of the ridge was possibly continuous from the Iron Age to the Early Medieval period.

Other features: circular features, pits, human cremations, livestock burials, small pool with deposits.

Circular features

Ring gullies were dug mainly along the eastern part of the cultivated area. Of the nineteen complete and partial circles found, four are to the west and four are to the east of the main zone. The fill of all these circular features in the main area was similar; the two furthest to the east are probably earlier than the field system with banks (see above) off the slope. These two circles had organic fills of plant dust indicating a changing, wetter environment. The dug circles range from about 3.60 m to 5.60 m in diameter *(fig. 19)*.

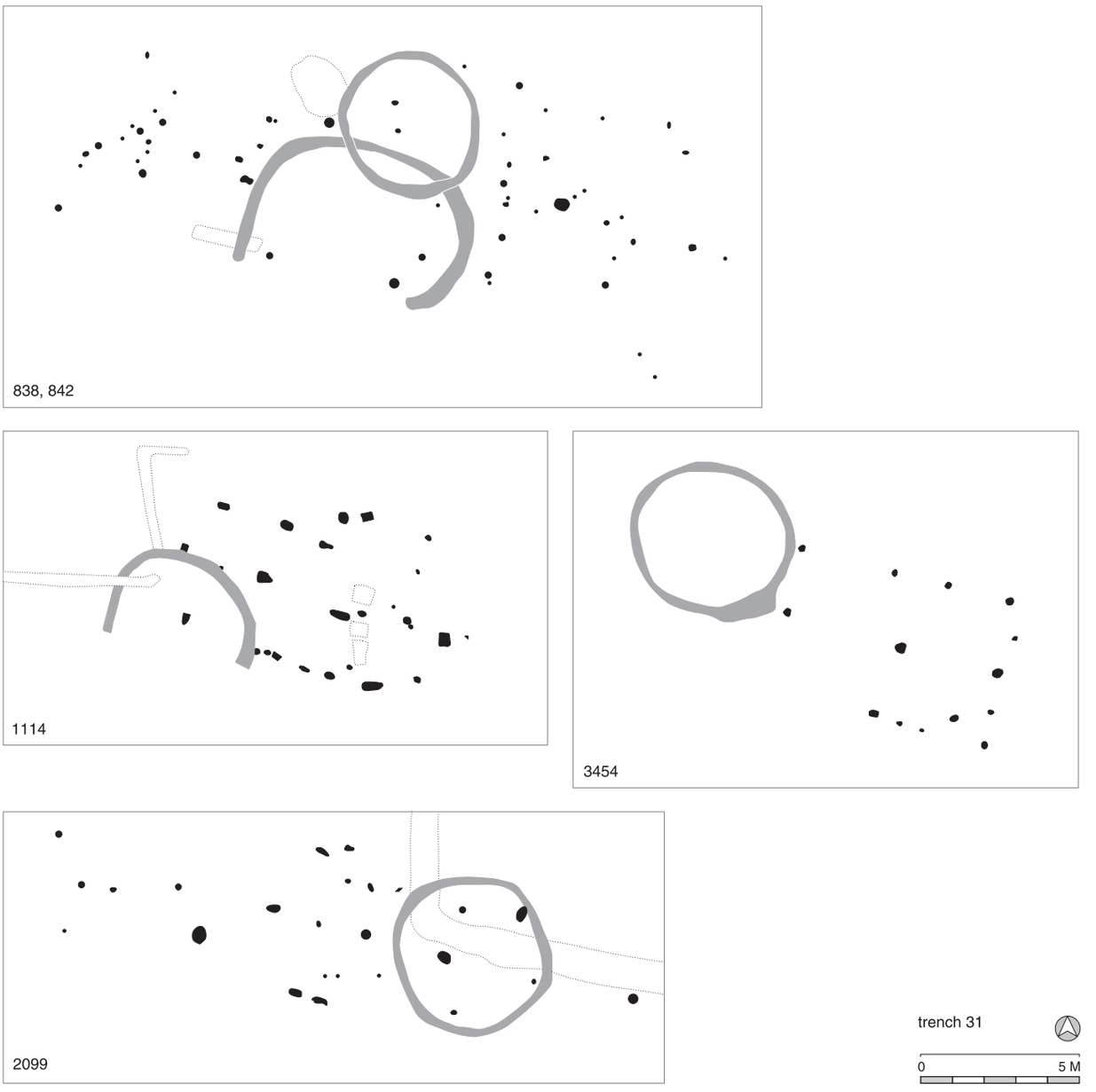
Ring gully features in northern coastal areas have been the subject of debate for several decades. The debate regarding the coastal area of the Netherlands has tended towards trying to define a 'mechanical' function, whereby the earliest put forward was that they were used to surround and drain haystacks. Taking the longer term view, various forms of circles occur within the region, of which these within fields are



but one example. We tend towards a mainly symbolic interpretation of these features. In spatial terms they do occur within the arable area, as do the other features in this section, including the human cremation remains (cf. further 3.5.4).

All of the Broekpolder circles had a clean fill. All of the gullies were shallow, and were bowl- to square-shaped. During excavation, these circular features were examined carefully, in an attempt to define more characteristics of a structural nature, other than the fact that they are dug circles, but without result. Very little was found in the gullies, and there was nothing within the enclosed area. There were no traces of stakes in the gullies; there was consistently a clean, sandy fill, without any distinction between upper and lower fills. Many are incomplete, which could be a result of plough damage. Five however had clear openings: in the east, south-east, west and south-west.

Fig. 19 The circular gullies of the Late Iron/Roman Iron Age.

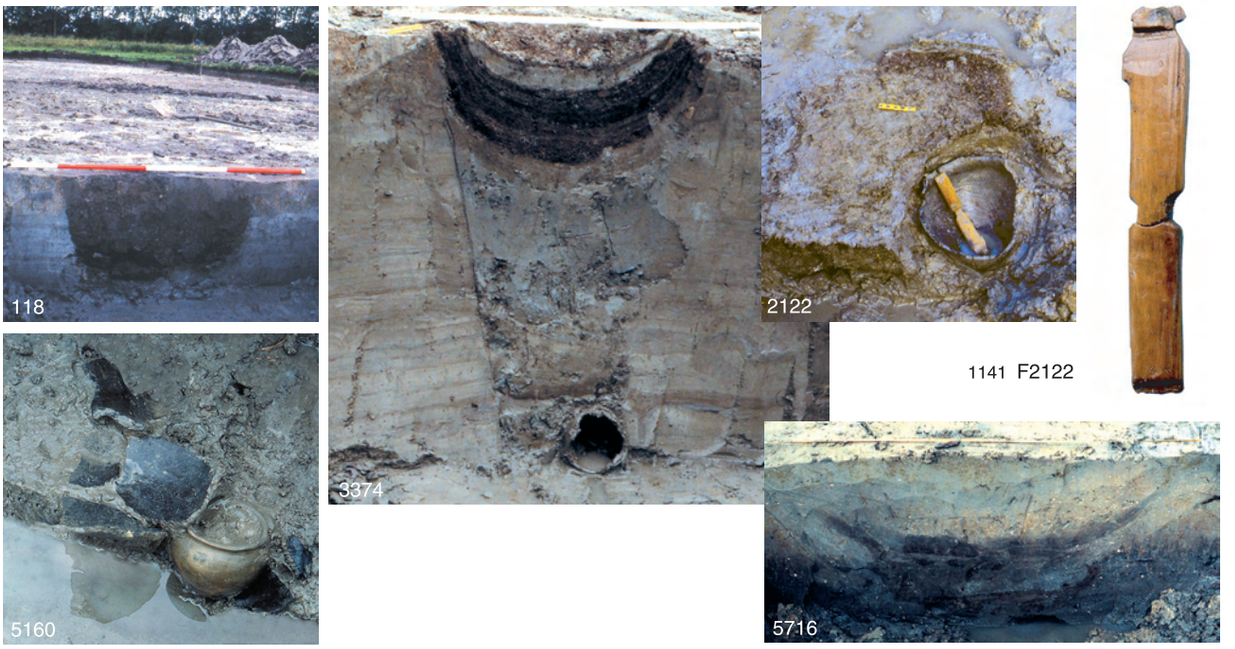


Those on the ridge are set within areas that also have clusters and short lines of post- or stakeholes *(fig. 20)*. In only three or four cases is there a (partial) regular pattern, possibly indicating a structure, maybe for storage. The zone of circles correlates almost exclusively to areas with clusters of post-/stakeholes. To the west of the zone, the only cluster of post-holes is near to a round pit (f3066), rather than a circle.
One circle is close to the position of a contemporaneous or somewhat later cremation (f1116). One has a somewhat later ox burial (f3166) cut into the silted up gully of the circle. Some circles are not associated with anything except gullies which over-cut them. These circular/curvilinear gully features are considered again in section 3.5.4.

Pits

The variety in pit size, depth and contents is certainly greater than recovered for the Middle Iron Age period. Pits of this period deeper than 20 cm are illustrated in Appendix 2a, with the fills, the find numbers and drawings of the materials recovered. Due to the lengthy period of use, it is impossible to

Fig. 20 Circular gullies and context of post and stake-holes (see Plan 4).



say which pits belong to which household generation. The basic variety is however well known for the region, and the most interesting pits were dug, deposits made, and the features backfilled within a short period. Ritual intent and seasonal interpretation might explain the digging and filling of these pits. Only a few characteristics will be noted here to provide an idea of the variety of those features that were certainly dug by humans. The cut-off point of 20 cm was used in the field to screen out a great deal of settlement 'noise'. Features less than 20 cm deep were described and sketched. Obviously, features determined to be postholes were given more attention, but there remain many depressions that show no clear traces of having been dug by humans, that were recovered at depths greater than 20 cm. A study is currently examining the various types of shallow pits not dug by humans. Dogs, for example, have not, as far as we can tell, been considered to any extent as potential diggers of many shallow features, particularly pits with a combination of straight and sloping sides; f5129 is an example of the most easily distinguishable dog-dug section (App. 2a).

Some pits had been dug and remained open, such as the very large pits in tr 31 & 32, including f2123, f2190, f3073, which are 85 – 90 cm deep, with sloping sides and a homogenous, clayey fill. These pits contain no, or very few, finds. Such pits could have served as watering holes; f3073 was in any case surrounded by a trampled depression. Feature 1069 is an example where the sloping, eroded sides suggest that it remained open, though at some time a complete wooden object of hazel was deposited, along with a few other finds up through the fill.

Deposits were regularly made in the bottom of features. Examples from shallow pits, with clear placement of deposits, are the horse bones, including two mandibles in f3534; or f648, with an astragalus from an ox, positioned centrally in the bottom of the circular pit. Somewhat higher up were more fragmented bones, as well as a white quartz pebble and a reddish porphyry,fire-cracked, stone.

Deeper pits, with clear backfills and non-eroded sides, were up to 1.60 m deep *(fig. 21)*. Initial deposits of complete pots were found in f3374, with no other definable materials; in f1156 there was a complete pot with a clear and varied selection of a few other deposits of bone, stone, and wood. Pit f2122 contained a complete pot and a complete wooden object made of ash, but the initial deposit was an incomplete jaw of an ox. The vertically placed branch of juniper in f3375 would appear to have been the initial deposit, around which the pit was backfilled, with only two additional deposits of bone from horse and cattle higher up in the fill, followed by a thick-walled Roman sherd. These pits with complete objects and a few other finds most clearly indicate ritual intent, but they are part of a continuum that extends from completely empty pits, via

Fig. 21 Examples of pits and materials of the Late Iron Age and Roman Iron Age within the central ridge segment.



backfilled pits (e.g. f1096), to those filled with many deposits. Pit f816 is a good example of the latter: it was only 60 cm deep, near circular, and cut into the edge of a somewhat earlier ring gully. The pit contained an array of bone from cattle and sheep/goat, but also part of a bronze object, possibly a knife blade. Feature 1018 was also shallow (65 cm), but packed with bone and pot. The pits in tr 49 will be more fully described, as the sequence of deposits was clearer.

Cremations

Cremated human remains were recovered in pits with other materials but there were also two concentrations of cremated remains. Liesbeth Smits analysed these two recovered cremations (*fig.* 22; Appendix 4). Feature 1116 (fnd 1102) was a segmented shallow pit containing burnt clay and a small pit (20 cm, 25 cm deep), with cremated bone and charcoal which was unidentifiable as to species. Smits was able to determine that the 44 gm of cremated remains collected represent one individual, aged between 15 and 20. Charcoal from the pit gave a broad ^{14}C dating of 1 – 220 AD (UtC 9274; one sigma is 30 – 130 AD).

Another cremation (f1131, fnd 1149) was collected from a layer rather than a pit feature, although considering the area, it certainly could have been a ploughed-out, shallow pit. Represented in the cremated remains were two humans. There was a fragment of the inner ear bone from a prenatal or neonatal infant and another bone could be identified as being from an adult. The combination is not unusual and could represent a mother and newborn/unborn infant (pers. com. Smits).

Small pool with deposits, mid-4th to early 5th C

The general area off the slope of the ridge, which had become quite watery, was used as a place for depositing materials in a period later than the cattle paths and stake row. Finds made here included a complete fibula from the 1st/2nd C, two highly corroded metal objects that were unidentifiable, a 7.6 cm-long iron spike and horse (1), dog (1) and ox (4) bones. Most of the finds, however, consisted of branch lengths (n = 99) varying from several centimetres to over a metre long, including some from juniper and pine. The majority were 25 – 40 cm long. The deposited lengths and wood species are shown in *Figure 17*.

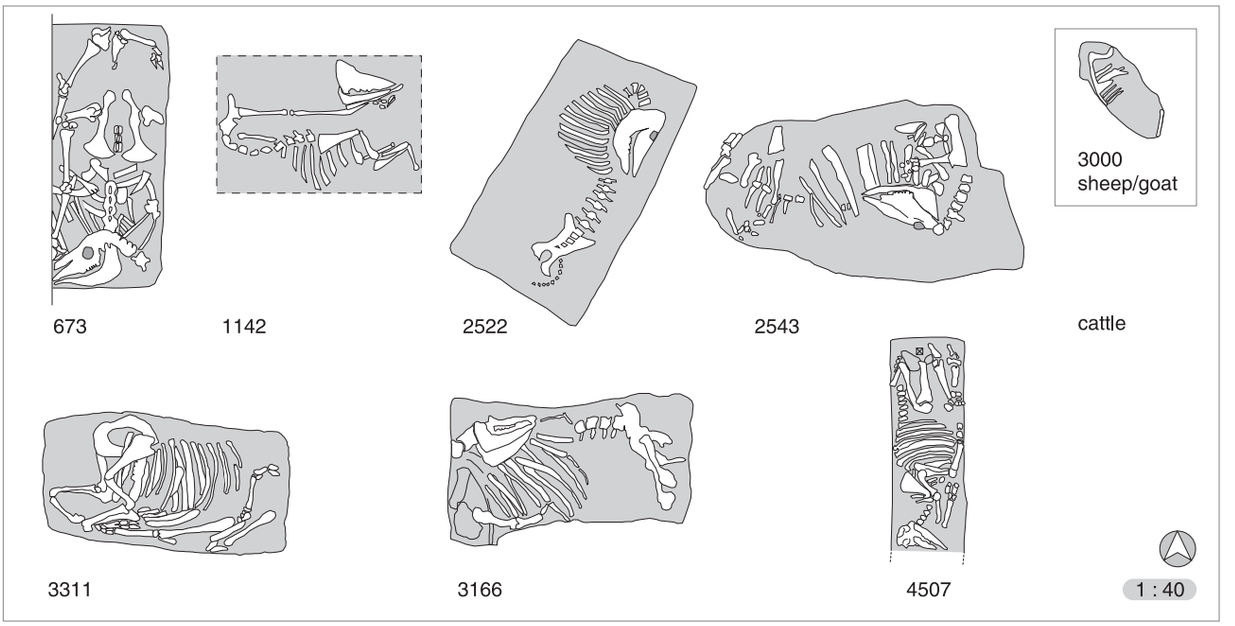
The branches were thrown into the pool after having been trimmed of twigs and the vast majority had no bark. No side twigs or leaves were therefore associated with these branches and if bark was present it was well preserved.[13] One of the branches gave a date range of 260 – 431 AD (KIA 10003; one-sigma is 343 – 420). As will be discussed below in connection with the larger offering site, Roman finds cannot be used to date the time of the deposit. The 1st/2nd C fibula was probably deposited no earlier than the mid-4th C, considering the one-sigma range. Contemporary with use of the pool, and to the west of the deposits, was a 2.5 m length of closely and evenly spaced (25 cm) stake tips and stakeholes (f3634, *fig.* 17). Although much smaller in scale, this feature bears similarities to the large offering site (sections 2.11 and 3.4.5) in terms of the finds, which included metal – especially the spike of the same type as the dozens from the offering site – and branches, particularly in the diversity of the species present. This small, watery focal point would appear to have been used for deposits for only a short time within the mid-4th to early 5th C. It shows evidence of a tradition similar to that concluded for the larger offering site of the 6th/7th C in the northern segment described at the end of this chapter.

Livestock burials

Six burials of bovines recovered from the central and northern segment are considered to be from the Late Iron Age/Roman Iron Age. *Figure* 23 shows the graves and positioning of the animals (cf also Appendix 4). There are also another four burials of cattle that could date to the Roman Iron Age or Medieval period. Those with the more certain dating show no clear pattern, although E-W aligned features, and positioning

Fig. 22 Cremated human remains.

13 As will be discussed in the section on the large offering site, this 'pealed branch' phenomena was also encountered with the hundreds of lengths of juniper at the Velserbroek offering site (Therkorn & Oversteegen 1994, Therkorn 2004).



of the cattle on their right side were preferred. The animals were buried without limbs, and/or elements had been cut off and placed separately in the grave, similar to burials from later periods, where preservation was such as to make observation possible. In contrast to later periods, however, the skulls were present. A skull was also present in f3311, contrary to what the drawing may suggest. It was very poorly preserved. The skull from f3166 may have been somewhat displaced, but this could have been due to subsidence.

The lower leg elements, missing from three of the burials, are most commonly found in pits, and have been connected to divination practices, the astragalus being most widely recognised throughout Europe (cf. section 3.5.3). The heads of buried cattle were generally turned to look over the shoulder (five cases), the exception being the calf (f1142). The burial in f4507 (tr 45, in the northern segment; *fig.* 23) was also a calf, which did not have the turned head positioning. Both calf burials were also similar in having no missing or displaced body parts. The height at the withers (Appendix 4) of one cow (f2543) is large for native cattle, but falls within the range for Germania Libera, at 95 – 130 cm (Teichert 1984). Clearer dating of burials, in general, might yield some information on the selection of large beasts, some of which may have been sacrificial animals. The body of a sheep/goat is also very probably a burial of the period. It had been place in a grave pit with no skull, neck, or legs.

2.9.2 *The northern segment: trenches 45 and 49, 50 and 51 (Plan 5)*

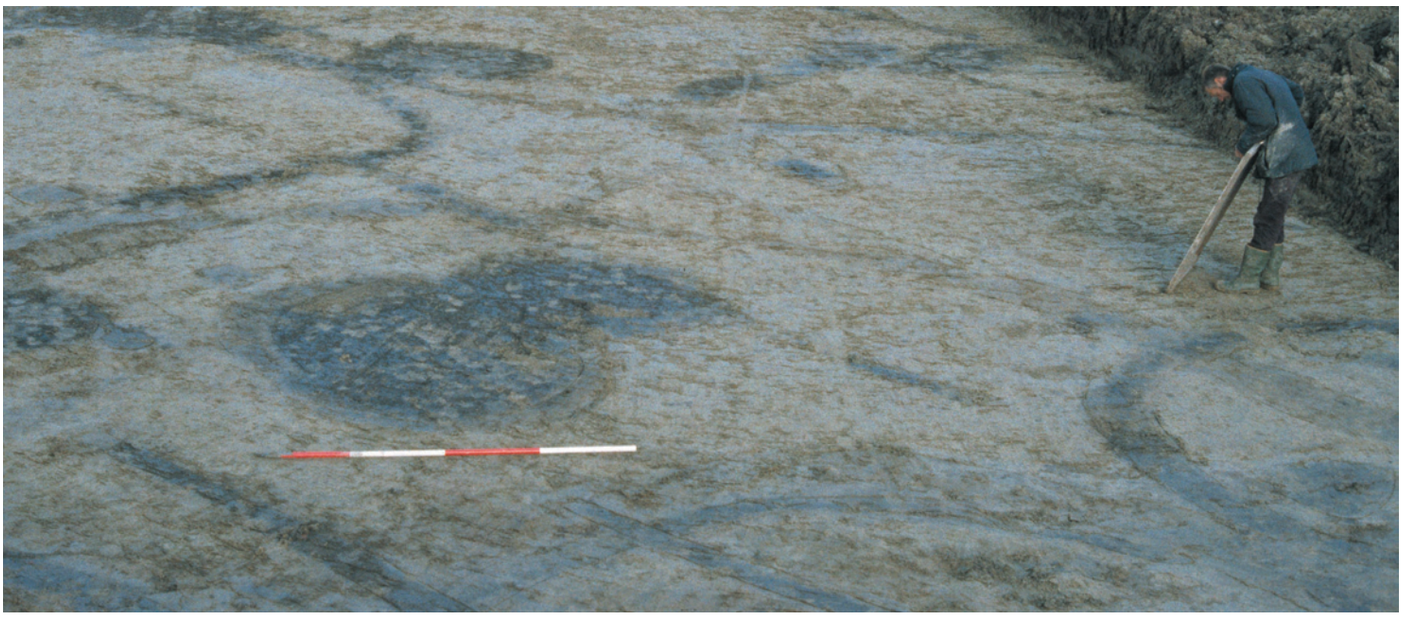
Trenches 45 and 49 were placed to either side of the monument and are the areas excavated in the northern part of the ridge which was separated from the central section described above by a creek. Trench 45 was an area of arable land and contained few features. In contrast, tr 49 showed habitation traces, including six or seven dwellings. Ditches and gullies contained a large amount of sherds, and there were probably small garden plots and a later system of wider ditches. Pits were the most noteworthy feature *(fig 24)*.

As is usual with these types of trenches with extensive signs of habitation, the stratigraphy was muddled, although in most instances the over-cutting of the features was clear. Fifteen datings obtained from various features in tr 49 were of the Later Iron Age and Roman Iron Age giving a maximum range of about 170 BC to 421 AD and a minimum range of about 1 to 244 AD.[14] However, given the earliest type of pottery, the earliest range can be brought forward to about 100 or even 50 BC. The date range could represent habitation by at least ten to twelve dwelling generations.[15] To account for the date range, shifting of the dwelling site rather than rebuilding on the same site must be considered for unexcavated areas to the west, north, northwest and the area under the monument, to the south of tr 49.

Fig. 23 Livestock burials of the central and northern segment dating to the Late Iron/Roman Iron Age.

14 The same features give the maximum and minimum ranges KIA 13671, f5008 and KIA 13674, f4800.

15 Estimates by Van Es (1967), Haarnagel (1979), and Bloemers (1978) were considered (Therkorn 1983, 1987 a & b) in terms of feasibility of dwelling generation in the Oer-IJ region. One important feature in the region is that some houses have posts with small diameters and usually no traces of rebuilding. A 'dwelling generation' – i.e. how long a house would have been used – was suggested to have been 20 – 25 years. The argument was that construction of a dwelling was not particularly determined by the 'available' building materials, but more by expectations of human longevity, as well as generational succession and other social factors. Using posts with relatively small diameters would be an effect of these expectations rather than a condition or limitation imposed by the trees available. Woltering (2000, *passim*) uses a similar estimate for Texel in a more recent extended and detailed study.



Trench 45

The traces recovered for the Late Iron Age through to the Roman Iron Age in tr 45 lay across the monument, 175 m from the southern corner of tr 49 to the east corner of tr 45. There were three pits, probably from the Late Iron Age, with few finds – f4534 containing a pot, one ox bone, and a worked wooden object of oak; f4543 containing a neck vertebra from an ox; and f4263 containing only one sherd. Both f4263 and f4534 had certainly been re-dug at least twice, and were thus similar to some of the Middle Iron Age pits. Dated to the Roman Iron Age, f4321 and f 4297 contained no finds. There were five clusters of stakeholes not forming recognizable patterns. The other features are regularly set out gullies and ditches. The earliest is f4304, less formally set out than the later gullies, with LIA/RIA pottery and bone which indicate a dwelling to the east, under the monument. There was one calf burial, deposited in a gully (f4507; *fig.* 20). It had been skinned before deposit, but all bone elements were present.

House plans in trench 49 (figs. 25, 26)

The relative chronology of the house plans (house plans 3 – 9) found in tr 49 was clear. Materials for ^{14}C dates were chosen as carefully as possible to establish the dwelling dates in something approaching an absolute sense. Twigs or branch deposit were used if available, and then bone from larger, complete elements, and in the last instance anything that was otherwise available. Only one of the ^{14}C dates will be explained away as material from an earlier phase. The sample was of the least desirable type for dating – less than 25% of a small hard astragalus bone – the only organic material in the large pit f4891.

Six of the seven partial plans of farmstead dwellings had traces of a wall line which, together with the incomplete rows of heavier posts, showed that the structures had been three-aisled. Although no exact measurements of the length could be made, as the wall line was not present, lengths of at least 18 m, and possibly as much as 26 m, are represented. Even the minimum length is commensurate with that of typical dwelling/byre farmstead houses for the region and period.

– *House plan 3* The earliest house plan had been the least disturbed by subsequent activity in the area. This plan, and house 4, had a NE-SW orientation, and is different to the later plans. House plan 3 is however similar in orientation to the partial plan found in tr 31 – 33. The long gully, f5193, running along the house and extending to the east shares approximately the same orientation, and as an early feature, it and others with a similar orientation might accompany and form part of the original system (with f5739, f5364) off the slope. Positioned along the house, f5337 could be a drip gully, with an extension further to the NE. If this is correct, it is hard to relate any of the small plots or any other features in this area to the earliest complex. Perhaps the system for cultivation was to the southwest, as was suggested in connection with the one late

Fig. 24 View of trench 49.



Iron Age house in tr 31 – 33, and in the case of this house, contemporaneous features would lie mainly with the monument area.

– *House plan 4* The house plan in the western corner of the trench has a somewhat more E-W orientation than plan 3 and was intersected by later traces. It may have followed plan 3, this next generation staying within the plot set out originally, and again any contemporaneous field system would be to the (south)west. Some of the broader ditches (f5178, early phase f5751) to the east, with the same orientation, may have been dug during this time.

– *House plan 5* House plan 5 has a near E-W orientation. Postholes in plan 5 were over-cut by a broad ditch f5726, but two postholes belonging to the house cut into pit f5719. Wood from this pit gave a date range of 44 BC to 79 AD (KIA 13679). The house ditches are along both long sides of the plan, while the one on the south (f5720) has a clear opening and indicates the position of the farmhouse doorway.

– *House plan 6* The dwelling had an E-W orientation and entrances through the long sides are marked. The date range, 45 BC – 116 AD (KIA 12286), was obtained from pit f5521 dug into house plan 6, which had therefore been dismantled by the early 2nd century. As with house 5, a wide ditch intersecting the house plan, with an earlier and later series of gullies, interconnected with the wide ditch. The long grave-shaped pit f5521 had a small round pit in the bottom in which a horse's head with the lower jaw missing had been placed.

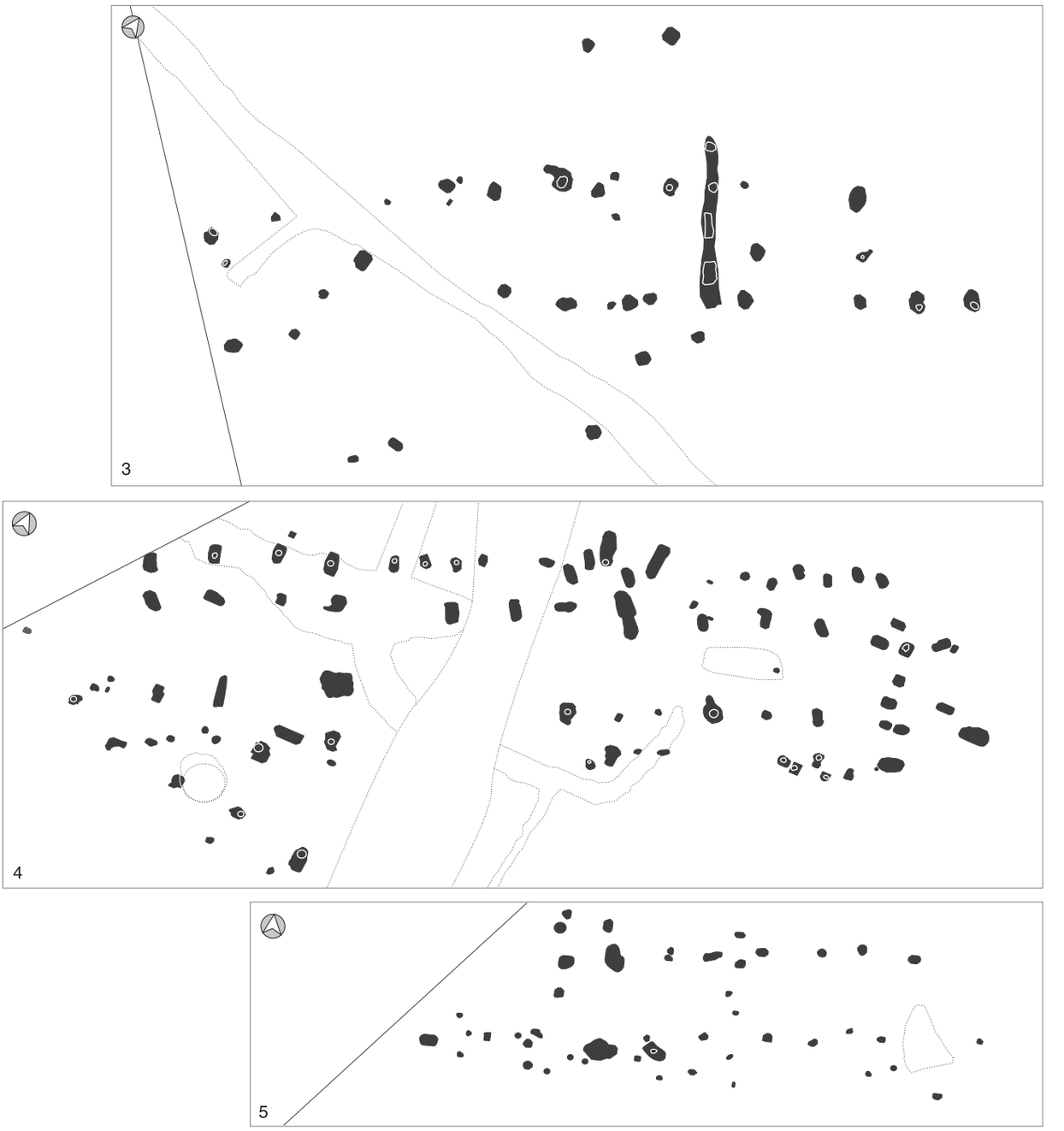
– *House plans 7 & 8* Two partial plans may be represented in the overlapping features. *Figure 26* shows how the postholes might be separated into two dwellings. However, it is certainly also possible that only one house is represented, with many repairs in the form of replaced principle posts and/or struts supporting original elements. There may also be traces of another type of structure disturbing the pattern. It was unclear. A posthole/small pit (f4994) with a possible foundation deposit consisting of a quern fragment, and bone from bird, sheep/goat, and cattle has been dated to 79 – 239 AD (KIA 13672).

Lengths of house ditch or drip gullies were present (f4800, f4836, f4838-4840) along the southern and northern sides of the posthole conglomeration. An opening along the western short wall is suggested by the break in the gullies on the same trajectory as the possible house ditch. There were numerous materials along the southern side, including bone and pottery. About a quarter of a human thigh bone was also found. A bone from f4800 gave a date with a range of 244 – 421 AD (KIA 13674). This, and the posthole/pit (f4994) dating, suggests that the house was from the late 3rd C.

A large pit, f4891, had been dug through the house plan, and the feature sequence of over-cuttings determines that the pit is later than ditch f4800, with at least a mid-3rd century date. Whether or not the ditch accompanies the house, it was over-cut by features predating pit f4891. The only organic find in the pit was the dated bone fragment (< 25%), giving a range of 28 – 132 AD (KIA 13673). This cannot be reconciled with the horizontal succession of features and the bone must be assumed to be older material in a pit with an actual date in the mid-3rd century at the earliest. The ditch and gullies along the southern side of the dwelling form an opening, and to the west they intersect f4758, with a date range of 129 – 320 AD (KIA 12289).

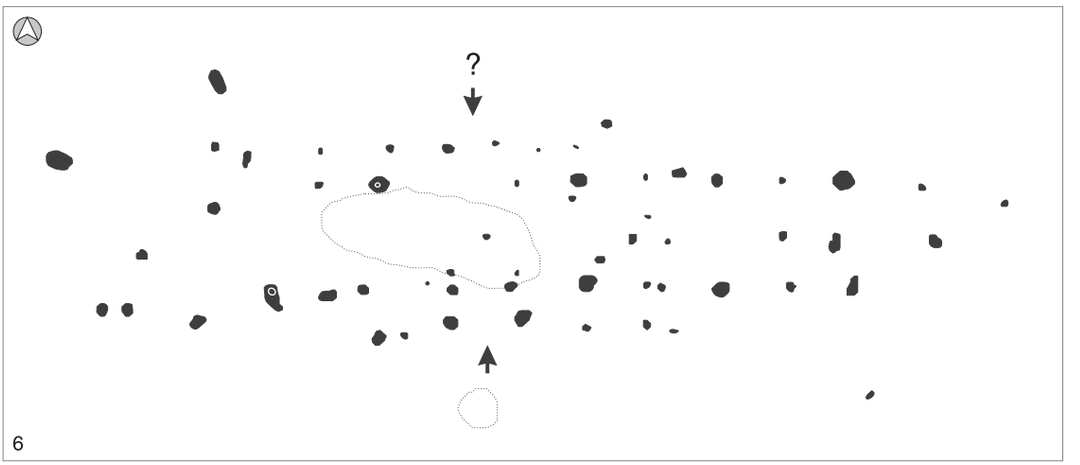
– *House plan 9* The very partial plan furthest to the north of the excavated area had a possible drip gully underlying a ditch interconnecting with the wide but shallow depression f5589. If this is a dwelling, only one wall stake is represented, but the 3 m between the principal posts across the width is similar to the width of the central aisles of dwellings in this region.

Fig. 25 The positions and sequence of the house plans recovered within tr 49 of the Late Iron Age and Roman Iron Age.

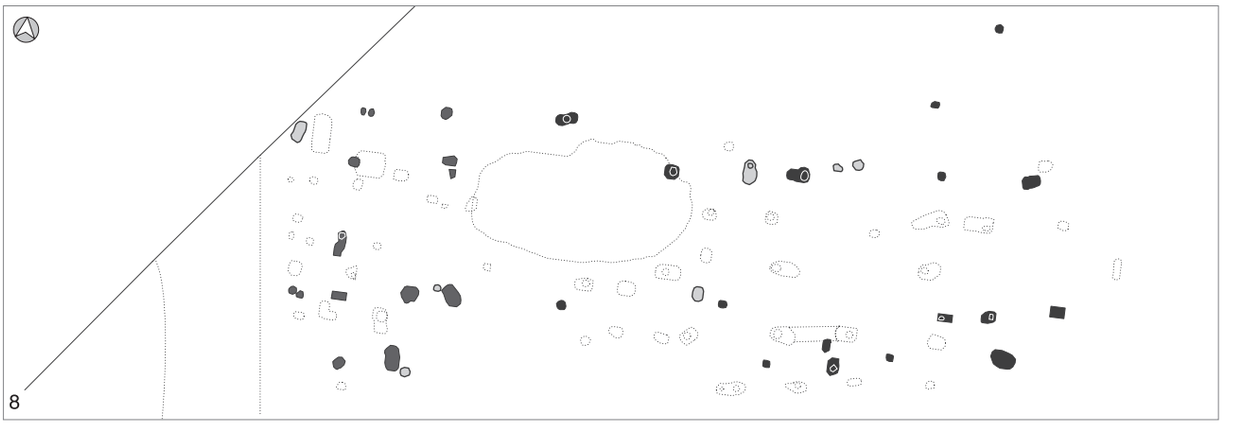


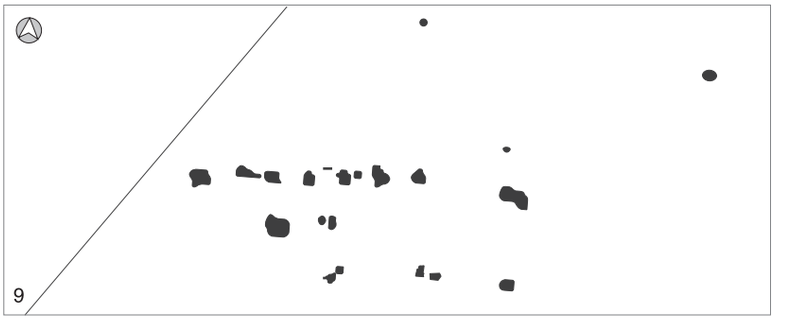
If it were not for the Early Middle Ages represented in the offering site, one would be quite satisfied with the number of dwellings in tr 49. However, considering also the minimum range found by ^{14}C dating, the number of dwellings in tr 49 does not correlate with the number of generations represented if habitation was continuous. The range of the dwelling dates within tr 49 is from the 1st C BC to the mid-3rd C AD. Even if f4800 is not a house ditch accompanying house 7/8, there must be an adjacent dwelling, in unexcavated territory, to accompany the numerous materials in the feature. The date range could represent ten to twelve households. Thus, if habitation of the area was continuous, three to five dwellings are not represented in tr 49, using the maximum of 25 years per dwelling generation, from 50 BC – 250 AD or 1 – 250 AD.

Fig. 26 House plans 3 – 9 recovered in tr 49 of the Late Iron and Roman Iron Age. For positioning within tr 49, *see fig. 25*.









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Dwellings and garden plots

There are no good indicators for dwelling plots connected with the house plans in tr 49. Although the wide, E-W ditches appear to form house plots, they are later, and they had little material in them; they are described below as part of a Later Roman/Early Medieval field system. Early features are present in the southern corner, bordered during use by the later ditch f4495. While three 'types' of drainage system have been suggested for the central segment of the ridge (cf. 2.9.1), the fourth type is most clearly present here in the southern corner of tr 49. Interconnecting gullies form a system enclosing small, squared plots. 'Garden' plots may be the best interpretation, and a few Celtic beans *(Vicia faba var. minor)* were indeed recovered from features in the area (cf. 3.3.3). These gullies could have served as drainage down the slight slope to the east, or to retain water around the small garden plots.

The clearest interconnecting gully system seems to have been followed by a number of pits, then ditches, and by one pit (f5151) cut into a ditch. Three pits were dated in this corner: f5159 to 49 BC – 68 AD (KIA 12287); f5160 broadly to 110 BC – 53 AD (KIA 12288, one sigma 51 BC – 18 AD); and f5241 even more broadly, to 31 – 208 AD (KIA 12290; one sigma is c. 75 – 129 AD). Given the 'dolium' type of pottery, and the two hollow bases found in f5241, the later part of the range is more likely. Only f5160 contained a Roman sherd (coarse ware), but it was in layer 2 of this feature, so it is not possible to say with certainty if it is primarily associated with the pit digging and filling, or with a re-digging operation.

Pits here would in any case seem to be later than the small gully system. Some were intersected by the wider ditch system, including pit f5171, which contained a large sherd of Roman smooth-walled pottery with a manufacture date of the 1st to the mid-2nd C. If the wider ditches represent a 'phase', the small plot system had fallen out of use by the later mid-2nd century, and larger ditches were being dug here. Feature 4473, with Roman imports, seems to be an enclosure type of ditch and could relate to the pit phase. The form is reminiscent of the 'curvilinear style' noted in trench 31 – 33, and although the shape might suggest a wall-ditch structure, where sod walls were set into the ditch (Therkorn 1987a), the ditches showed characteristics of having been open, given their eroded sides, bowl-shaped bottom and natural silts. It also contained quantities of finds, including pottery and bone, which are atypical of wall-ditch structures.

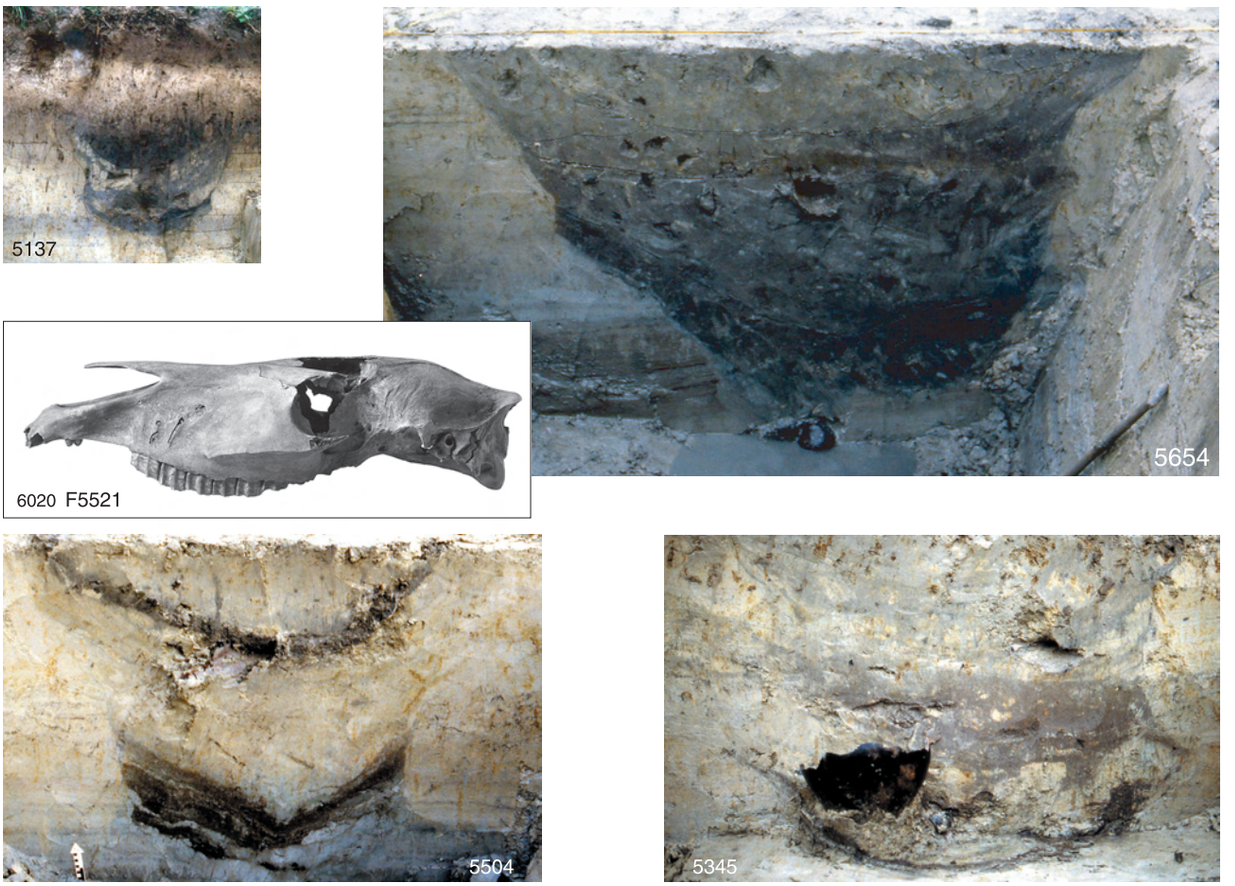
The gullies of the interconnecting type in the corner of tr 49 could have been associated with dwelling plans 3 or 4, or the house plans could be to the south, under the monument. To the north of f4495, a later feature, the gullies were also mainly of the interconnecting type. They extend over house plans 3 and 4, and may indicate how plots shifted from the east to the west as the dwelling location shifted to the west. House 5 could have an area of (garden) plots to the east and/or along the south side. The same would apply to house plan 6, with plots set out over the earlier house 5 and to the south. Equally, the same might also be true of house 7/8, with plots over house 6 and to the south. The only area with a very dark, humus-rich build-up – an actual layering – with organic inclusions and very small sherds was to the area to the south, over part of house plan 7/8. This is the latest trace of layering within the excavated area and a progression of farmhouse construction can be assumed to have carried on to the west for some generations, possibly into the 4th century or continuing even into the 6th century, considering the dating of materials from the offering site (cf. 2.11).

Using an abandoned house plot for small, cultivated plots would obviously have its advantages in terms of enriched soil, especially in the area of an earlier byre. It is also a method of symbolically recalling an earlier generation of inhabitants and their dwelling, in terms of continuity and subsistence.

The type of small plot gully system recovered in the southern corner of tr 49 was not found in trench 31 – 33. They contained only the (very) Late Iron Age house plan, with a NE-SW orientation, and no later three-aisled dwellings. The trajectories of the droveways suggested more dwellings had been preserved to the north, under the monument. If land use around the dwellings was patterned as has been suggested for tr 49, and as was general in the Broekpolder in the Roman Iron Age, the absence of interconnecting gullies could be associated with the absence of farmsteads in tr 31 – 36. Long, linear gullies and circular gullies were associated with arable farming in tr 31 – 36. There were no ring gullies in tr 49, but it did contain house plans. If this is a pattern, it should be possible to predict where dwellings are, if features are from one period, on the basis of these few characteristics, and even from the type of gullies dug.

Pits: trench 49

Pits are the other general type of feature present in the areas excavated on the northern ridge segment. They had quite a



varied content, and were in many ways similar to those described for the central section. However, while some large pits could be identified as having been open, suggesting water abstraction, no such distinction could be drawn for features in tr 49. The pits in general had multiple layers and in some instances were clearly backfilled after deposits had been made (*fig. 27*; Appendix 2a).

f4766 1.10 m deep. This pit was clearly re-dug once, and the newly created round shaft backfilled. Materials were recovered from the initial layer of the original pit. These included five branches of hazel, and one of oak. A worked oak tenon had also been deposited, as well as skull and body parts from a calf. Wood was also recovered from the higher fill of the re-cutting: a worked hazel branch, and unworked branch lengths (one each of alder, hazel, oak and *Prunus sp.*), charcoal made of ash, and rootwood from a beech tree. There was one sheep/goat neck bone (axis), cattle bones from the body, legs and skull, and a horse molar. Pottery was well represented in the form of large and small sherds, and there was a fragment of a flat clay object, usually designated a 'baking plate', and two fragments from two pierced clay objects.

f4825 20 cm deep. In the lower layer, this very shallow feature contained a quartz stone, possibly a whetstone, and a small piece of pumice, sherds, and bone fragments from pig, cattle and horse. The top layer contained sherd material and bone, mainly from the skull of sheep/goat, pig and cattle.

f4891 1.10 m deep. The pit had clearly been partially re-dug once or twice. The original lowest layer had clearly been backfilled, and the only material recovered was a broken ox astragalus and pottery. Higher up the pit contained only sherds.

f4959 25 cm deep. A deposit of one horse molar.

f5137 40 cm deep. An enormous amount of pottery of various

Fig. 27 Examples of Roman Iron Age pits of the northern ridge segment.

sizes and shapes was packed into this pit. Most of the bone material as well as the pottery was incompletely registered by layer within the pit. There were in any case fragments of bone elements from two dog forelegs, neck and leg bones from sheep/goat, part of a pig jaw and various bones from cattle, from the skull, body and hoof.

f5151 55 cm deep. This pit was re-cut at least once. Pottery and bone were deposited in the bottom of the original pit. A complete ox astragalus formed part of the initial deposit, and somewhat higher in the backfill were fragmented cattle leg bones, a lower leg bone and rib from a horse, and two near-complete small pots. Cattle bones, including a partial horn-core, were also found in the higher layer, as were large sherds from a jar. The layers in the re-cutting contained only two cattle bones and some sherds.

f5152 45 cm deep. There were no materials in the lower extent of this shallow pit; higher up were broken bones from cattle (skull, leg and body), a lower leg bone from sheep/goat, and a foot bone from a bean goose *(Anser fabalis)*. It also contained numerous sherds and half of a spindle whorl, fashioned from a native sherd.

f5159 1.00 m deep. Possibly dating from the Late Iron Age, this pit was the only one to contain a burial. It was of a small, 7 – 8-month-old dog, about 30 cm at the withers, laid out on its left side. The dog had been placed high up in the fill *(fig. 28)*. Deposits in the bottom of the pit included ribs, vertebrae and shoulder blade from cattle, and more fragmented cattle bone from the skull and legs. There were also deposits of two planks of ash and some beech bark. Smaller sherds were also included. A partial leg bone from a horse had been deposited under the dog burial. There were a few cattle bones (partial skull, leg, body elements) above the dog.

f5160 1.50 m deep. The pit was possibly re-dug once or even twice, the latest being represented by layers 1 – 3, and the earliest by layers 7 – 9. The lowest layer contained mainly cattle ribs and vertebrae, but also jaws from a calf and an older bovine, and the base of a large pot. Layer 8 contained only two sherds. A round worked section of an alder trunk, 27 cm in diameter, had been placed next in the pit. One surface of the block had been worked by a gouge to produce a lowered area and, assuming a connection with the remains of flax processing, it could be that the block was used for braking (cf. section 3.2.4). A 74 cm long plank of alder with a round end was also deposited.

The layer covering the wooden objects contained bones from cattle (vertebrae, ribs and leg bones), one sheep/goat leg bone, and a few sherds, including the base of a large pot. Leg bones of at least two sheep were the main deposits in the next layer, with a calf skull fragment and a few sherds, but also a complete small vessel, in what was possibly the bottom layer (f5160/6) of the re-cut pit. In the next layer, many elements of at least three sheep had been deposited, and parts of skulls from at least six animals (some of the vertebrae and ribs could not be identified beyond sheep/goat). The bones were accompanied by a stake and a plank made of alder, a piece of *Prunus sp.*, and three willow branches. There were a few sherds, and also a complete small pot with a handle, on the side, with its mouth opening to the south-southeast.

Another large wooden object of alder had been placed on this layer (f5160/5), over the complete pot just mentioned. The wooden object had probably been complete when deposited, and damage shown was caused during excavation and by rot. Shaped as a thick plank (91 cm long by 36 cm), it had a rectangular hole with rounded corners cut out of it. Other deposits in f5160/4 included large sherds from large pots, an alder postpoint, an alder branch, cattle bones from the leg and ribs, and a sheep/goat vertebra. Layer f5160/2 had possibly been disturbed by a second addition to the pit fill. It was present around the sides, and contained two worked willow branches, a quern stone fragment, and bone elements from cattle (vertebra, leg, and single molar) and a vertebra and bone from the jaw of a sheep/goat. In layer f5160/3 a willow branch had been deposited with bones from cattle (all parts), pig (leg bones), sheep/goat (body and lower leg) and one horse bone – a near-complete vertebra. The highest layer (depression f4958) was that containing a Roman sherd (coarse ware) and horse bone.

f5169 1.40 m deep. There was only one find in this re-cut pit, a fragment of a quern in the highest level.

f5171 65 cm deep. The base of a Roman, smooth-walled pot was the only material found.

f5241 1.90 m deep. The initial layer (layer 7) contained bovine and sheep/goat leg bones with large sherds. A large concen-

tration of bones from two sheep (13 – 16 and 5 – 7 months old) was deposited next (layer 6) with one molar and a rib from a bovine, a little pottery and a cinder. In layer 4, a seven-month-old pig and a horn from a bovine had been deposited along with many large sherds, part of a lid, and a spindle whorl. Higher up (layer 3) were parts of a horn from a sheep, leg bone from a horse, a fragment of a bovine vertebra and jaw, and lower leg bones, including complete astragali from a pig and a bovine, large sherds and a game counter. Leg bones, ribs and skull parts from cattle, one horse bone, and a pig mandible were found higher in the pit (layer 2), with large sherds, slag and a complete bowl. There were only two sherds and one bovine vertebra in the topmost layer.

f5342 40 cm deep. There were no materials in the lower layers. In the highest layer, finds included pottery and fragmented elements from the body and legs of cattle, and also three complete deciduous incisors, and one bone from sheep/goat.

f5343 85 cm deep. Initial deposits were an ox astragalus placed with a shoulder blade, over pottery, including a Samian sherd. Higher up was another ox astragalus and two footbones (horse and pig), pottery and a porphyry stone.

f5345 1.15 m deep. The top of the pit was rectangular, but it was round lower down. Initial deposits included a jaw from a dog and a partial tibia from a sheep/goat. The next layer contained bones from horse, cattle and sheep/goat and a spindle whorl made from a native sherd. Large sections of pots had been deposited in the subsequent fill, along with bone fragments from cattle and sheep/goat. Part of a human skull (occipital, probably from a male) was in the topmost fill.

f5347 80 cm deep. The initial fill contained a lower leg bone from a horse, a fragment of a bovine cranium, a spindle whorl made from a shaped pot disc, and a few sherds.

f5363 75 cm deep. There were no materials in the lowest layer. Above that, the pit contained a single molar from a sheep/goat, a clay game counter, several sherds, and unidentifiable rib fragments higher up.

f5417 1.10 m deep. This pit contained a deposit of a near complete thigh bone of a young swan *(Cygnus spec.)* and a partial bovine humerus.

f5418 2.20 m deep. Much of the top of this pit was not seen, and the drawing of the top layers is a reconstruction; no finds were recovered from most of the top layers. The bottom of the pit contained a small complete pot and large sherds from two different pots. Other deposits included bone, one each from a goat, ox, and sheep/goat, as well as mussel shells and a stick *(Prunus avium)* with a burnt sharpened end. These finds were in a peaty matrix, and topped with a further backfill of peaty sods. The sod layer contained another small complete pot, placed with its opening to the northeast. It was deposited with large sherds from at least four different pots. The accompanying bone material included a leg bone from a horse, a leg bone from a duck, a rib from a medium-sized mammal and four fragmented cattle bones from the skull, lower leg, shoulder and rib cage.

f5443 35 cm deep. The initial deposit was a complete foot bone from a calf; there were also four sherds.

f5474 1.40 m deep. Feature collapsed before being drawn. Pottery was found in the lower layers and the highest layer contained the inner-ear bone, part of a jaw and a foreleg bone from cattle, and a partial pelvis from a young sheep/goat.

f5504 1.10 m deep. There were only three native sherds in the various layers. High in the fill was a Roman Samian sherd with a concentration of bone. Complete bones included a neck vertabra from a horse, pelvis from a dog, and astragalus from a bovine; more fragmented bone included the ribs and upper leg from cattle and two sheep/goat bones from the lower leg.

f5506 1.20 m deep. A substantial oak post had been placed at an angle in the initial layer, under a layer with sods. Materials higher up (in a possibe re-cutting of the pit) included large sherds.

f5523 35 cm deep. There was only one fill and this contained sherds from various pots as well as fragmented sheep/goat and cattle skull parts, ribs and leg bones, and a complete bovine lower leg bone. There was also half of a vertebra from a large fish, species unidentifiable.

f5524 40 cm deep. A small pit, similar to the above in having a single fill, but also containing fragmented cattle (skull, neck, foot) and sheep/goat (neck, leg) bones, and native sherds.

f5521 60 cm deep. At the bottom of the pit a small round pit 60 cm in diametre had been dug in which the complete cranium of a stallion had been placed, with its nose to the SSW. The two back molars had been pounded back inside the upper jaw, to a level below the level of adjacent molars. The wear on them was similar to those adjacent, and the positions of these two back molars cannot be considered pathological. Use of single horse molars as deposits is usual for the region, and the position of these may have been the result of an attempt to pound them through into the skull cavity for extraction. They still both remain firmly embedded in the jaw, however.

A worked length of willow had also been deposited. The entire pit was backfilled, and only in the top were there fragments of bone and pot, probably from the subsided habitation layer.

f5545 no drawing. Few data were recorded on this pit, but materials deposited included many sherds, a quern stone fragment and fragmented cattle bones from the legs, skull and body.

f5577 55 cm deep. The pit was dug and backfilled without recoverable deposits in the bottom. Possible subsidence of habitation layers could account for the very fragmentary finds of ox bones and a few small sherds in the topmost layer.

f5581 60 cm deep. The lower deposit consisted of a horse molar and lower leg bones from sheep/goat and ox, native sherds and Roman coarse ware. Smooth-walled import ware, and a metatarsal and neck vertabra from sheep/goat were found with redeposited material.

f5590 70 cm deep. No recoverable finds were deposited in the clean redeposited backfill, except in the top, which may be a subsided habitation layer, with bone fragments from cattle and sherds forming most of a single pot.

f5641 1.10 m deep. No materials.

f5650 55 cm deep. No materials.

f5651 75 cm deep. In the bottom of this pit was a small sherd and a rib fragment. Higher up, fragments of an ox vertebra and shoulder blade and a large sherd had been deposited.

f5654 2.75 m deep. The pit was certainly re-dug once, and possibly twice. Most of the pit was nearly 2 m deep, with a deeper pit at the bottom, 40 cm in diameter, dug down a further 80 cm, somewhat NE of centre. This extension was backfilled immediately and then a complete black-burnished pot placed upside down over it. A worked branch (tenon?) from a beech tree and sherds from at least four different pots, and bone, were deposited slightly higher. The bones are a selection of one element each from a horse (tibia), goat (tibia), sheep (jaw) and ox (pelvis). The pit was backfilled with sods, and finds of two partial pots, and sherds from at least six other vessels, with bone from a horse hoof, a tibia from a sheep/goat and smaller fragments from ox.

The southwest side was reopened at some time, and backfilled, after a near-complete pot had been deposited, with its opening to the southwest. Subsequent backfill layers included bone from cattle and sheep/goat and sherds from at least nine different pots.

f5693 1.25 m deep. Sherds from two pots, half of another pot, a quern fragment, and a foot bone from an ox had been deposited in the bottom of this pit. It was backfilled to about halfway and the remainder of the backfill contained deposits of an ox rib and leg bones. The last deposit was a lower jaw from a horse, a stallion. The lower jaw is not from the stallion represented by the complete cranium in f5521.

f5695 1.35 m deep. The initial deposit was a centrally placed small, complete pot laid on its side with the opening to the east, a quern fragment and eight bones from cattle, mainly younger animals. In the next layer a short, worked hazel peg and a sherd had been deposited. Pottery and one sheep/goat bone were included in the next layer; and in the following layer there were five bones from cattle and one from a sheep/goat. There was also a yew stick.

f5719 2.15 m deep. The lowest deposits were a worked hazel branch, a post made of alder, and two cattle tibia. Cut sods were placed to cover the deposits, and on these were placed a polished ox astragalus, a sheep/goat lower jaw, a worked alder branch, and sherds from at least two pots.

f5721 1.10 m deep. This pit contained only one sherd, in the bottom layer.





f5732 1.20 m deep. The feature collapsed out of the section, and no drawing could be made. Layering consisted of alternating clean and mixed backfill. A human cranium had been deposited about 40 cm above the bottom with a calcaneum from an ox, a femur from a sheep/goat, an alder stake, and pottery.

f5733 1.10 m deep. Fill similar to f5732, but without recoverable deposits.

f5734 depth not recorded. A horse rib and a few sherds were the only materials.

f5735 1.85 deep. Only three sherds were found in redeposited material.

f5772 55 cm deep. No materials.

Later Roman/Early Medieval features in tr 49 and field system in tr 45

The wider ditches of tr 45 are late and could have been dug during the later Roman Iron Age or even in the Early Middle Ages. Ditches with very few materials within tr 49 represent the last phase of dug traces, but they cannot be dated with certainty. Trajectories of earlier gullies and ditches were re-dug, so the features were in any case not completely silted up. Feature 5262 may belong to the phase of habitation in the area, as a number of materials were recovered, including large sherds from the Roman Iron Age. However, it was broadened, and deepened in the eastern half, making it similar to f5589. The ditches are in any case late, with very few or no materials, which is a good indication that farmhouse plots were situated elsewhere. Ditches f5533, f5534 and f5537 contained no finds. The Roman Iron Age gully with pit f5654 dug through it (f5589, to the east of f5654) was widened and deepened to 80 cm at some time, connecting to ditch f5532 running along the ridge. The bottoms of both ditches were at the same level, 1.50 m below NAP. There was one sherd in f5589 and one iron spike (fnd 5999) in f5532 of the type so characteristic of the offering site, with the same large, rounded head and square shaft. Ditches f5552 and f5553, both 50 cm deep, were later, and most likely connected with f5751. None of these ditches contained deposits.

Although the dating of this system is uncertain, activities are represented which may have been contemporary with use of the offering site in the 6th/7th C and 9th/10th C. The large spike in f5532 binds the two areas by a very characteristic find. There was also a dog burial (f5338) dating to between the 10th and 12th C (*fig. 28*; KIA 12293).

Early Medieval botanical remains

The main period of Late Iron Age/Roman Iron Age samples will be examined in section 3.3.3. Soil samples analysed from the offering pool deposits are Early Medieval, and indicate something of a settlement habitat, as well as crops grown in this northern segment of the ridge (App. 3, tab. 8 & 9). The only cultivated plants were flax *(Linum usitatissimum)*, represented by capsule fragments and a single seed, and gold-of-pleasure *(Camelina sativa)*, represented by a capsule fragment. Other possible food plants in the samples were hazelnut *(Corylus avellana)*, and elderberry *(Sambucus nigra)*. The presence of flax capsules suggests that this crop plant must have been locally cultivated. There are also species in the samples that are weeds associated with spring-sown field crops

Fig. 28 There were two burials of dogs in the northern segment. The Late Iron Age dog was included in a pit (f5159) with other materials; the other, of the Early/High Medieval period, is a grave.



(Polygono-Chenopodietalia), including *Solanum nigrum*, *Sonchus asper*, *Sonchus arvensis* and *Stellaria media*. These were found in low numbers and low sample frequencies, however. Weeds considered characteristic of autumn-sown cereal crops *(Secalietea)* are present, including *Agrostemma githago* and *Raphanus raphanistrum*, but again in very low numbers of seeds and frequencies. The Bidention weeds, such as *Ranunculus sceleratus* and *Bidens tripartite*, mainly require wet, nitrate-rich soils, and one would certainly expect these to have grown near a settlement.

Trenches 50 and 51 (Plan 7)

Trenches were dug to the north of tr 49 in the lower-lying area. There were few prehistoric traces, limited to six lengths of gullies containing no materials. Trench 51, further to the north, was placed over part of the higher-lying extension of the salt-marsh ridge (see AHN map, *fig.* 1 and Plan 2). A farmhouse in the near vicinity was indicated by the numerous pottery sherds in the gully system, and the system itself may reflect (garden) plots similar to those in tr 49.

There were also six pits dating to the period, very similar to those recovered in tr 49. These trenches also contained a horse burial.

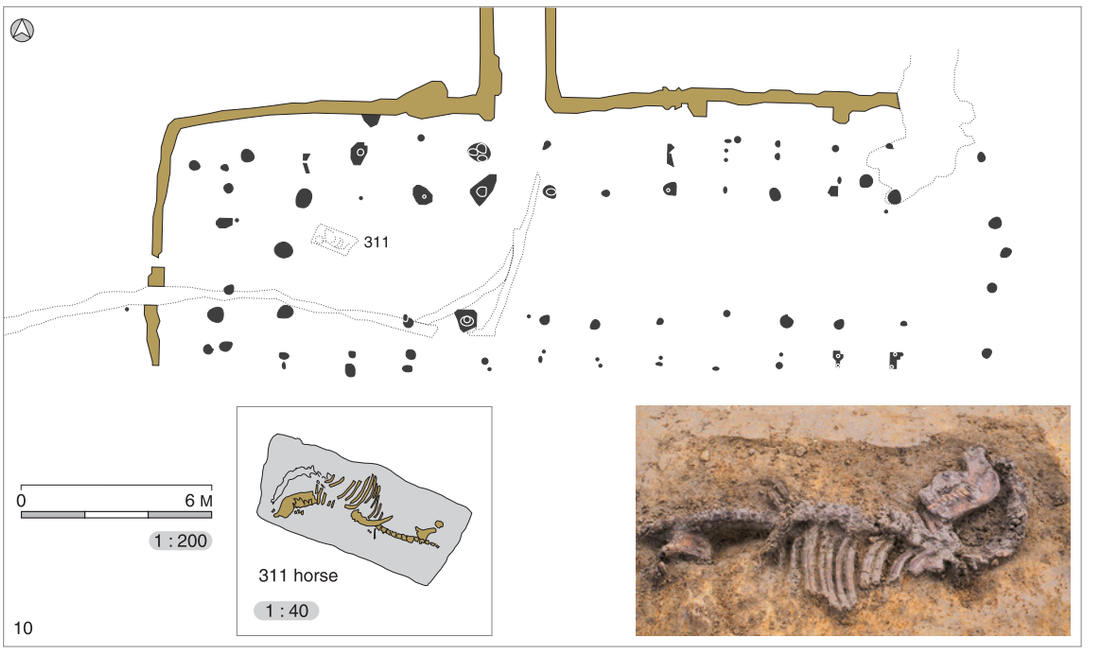
f5716 1.10 m deep. There were clear sods in the backfill, and deposits of numerous horse fore- and hind leg bones, including lower leg bones, and a single molar; skull and leg bones from cattle; one of the few pieces of yew found (a short stick); and two stones (sandstone, quern stone) had also been deposited.

f5718 65 cm deep. The initial deposit was a wooden object made of ash, incomplete at 24 cm long. It has a 'phallic' shape, which may encompass the meaning, and/or it could be something resembling a tenon. The highest layer contained small sherds and two small fragments of ox rib and humerus.

f5772 45 cm deep. No deposits.

f5786 90 cm deep. No materials were found in the lower

Fig. 29 View of trench 15 of the southern segment during excavation.



layers. Higher up, fragmented cattle bones, including a skull fragment and a near-complete lower leg bone, as well as a complete lower leg bone from a horse, a fragment of quern stone and one pottery sherd had been deposited.

f5790 90 cm deep. Among the initial deposits were a complete pig rib and a skull fragment from an ox; higher up were complete elements of a shoulder blade and a single tooth from an ox, a willow branch and one sherd. More pottery was found higher up, as well as fragmented cattle bone, and a lower leg bone from a horse.

f5793 depth not recorded. This pit contained a lower leg bone from a horse and a fragment of pelvis bone from an ox, plus three sherds.

f5804 Not drawn. Possibly Medieval. Very poorly preserved horse burial, animal older than 4.5 years.

2.9.3 *The southern segment of the ridge: trenches 1 – 26 (Plan 7)*

Trenches were dug in the area in the south of the Broekpolder during the first year of the project. These were used for establishing the quality of the stratigraphy, the nature of low hillocks within one field, the possible trajectories of prehistoric creeks and an area with a duck decoy known from historical maps. One dwelling site was found (tr 15; *fig. 29*); this will be discussed first.

Dwelling site in trench 15

A three-aisled farmstead dwelling, oriented almost exactly E-W, with a length of 25.80 m and a width of 6.80 m, was excavated in tr 15. It is by far the clearest plan encountered in the polder *(fig. 30)*, which may be due to how it was dismantled. An oak post-point (f333), with no outer rings, yielded a date of 170 BC – 70 AD (UtC 9260). The one-sigma range narrows probable dating down to the 1st C AD, and considering the older inner growth rings of the post-point, and the absence of decorated sherds in the drip gully, the house is likely to be from the early Roman Iron Age, rather than the Late Iron Age.

The recovered plan showed few signs of rebuilding in the form of the replacement and addition of posts and it may be that the double wall stakes, for wattle walling, were an original feature. In four instances on the southern side, the principle posts were still present as post tips, probably broken off during the dismantling process. All four were of oak. The double stakeholes marking the wall-line were spaced from 1.60 m to 2.20 m apart, and these must represent the more deeply spaced verticals of wattle walling. They are also very regularly positioned across from the principle posts.
The principle posts across the width are regularly staggered,

Fig. 30 The house plan recovered in trench 15, part of the southern segment (house number 10; cf. Plan 7). An extra post and the burial of a horse mark the dismantled house site.

suggesting that cross-beams were fastened to the sides, rather than the tops.[16] They are also somewhat more widely spaced, longitudinally in the western end, presumably the dwelling end, varying from 1.80 to 2.20 m apart, as opposed to the eastern end, where they were spaced 1.60 to 2.00 m apart. The spacing at the entrance was 2.20 m on the north side and 2.40 m on the south side. The entrance is most probably at the point of division between the dwelling at the western end, and the byre at the eastern end. There is an 'extra' posthole at the dwelling end that may have been for the ridgepole, or it may have been added when the house was dismantled (see below). One unusual feature for the region is the form of the dug drip gullies, which were most probably situated under the position of the roof overhang. The dug gully may only have been present around the north and west. There was no sign of a similar feature along the eastern short wall. Although narrow gullies are found in the region along the wall line, extension of the gullies to form a bordered entranceway has never been found. There were also enough stakeholes in the bottom of this bordered entranceway to show that wattle fencing had been set into the gully along both sides, up to the entrance of the farmhouse.

Bone elements were found at the corners of the gully as 'threshold' deposits. On the west side, the position was marked with three cattle leg bones; on the east, it was marked with three teeth, two from sheep/goat and one from an ox. The gullies bordering the 1.60 – 1.80 m wide entranceway contained pottery.

Usually farmsteads in the region had opposing entrances in the long walls, only – assuming that this was the case here – the southern long wall entrance did not have a similarly marked path leading up to the doorway. The farmstead was bordered on three sides by a house plot ditch which had been re-dug, and had shifted entrances to the small fields situated to the south. Stratigraphically, the period of the dwelling is also represented by the few lengths of gullies found on the creek levee in trenches 10/11, to the northwest of the dwelling. Part of the remainder of the farmstead complex was found to the south. Features included field gullies. There was one circular gully and post settings that may have been contemporaneous, or somewhat later. The group of three postholes (f298) contained remains of oak posts. The setting of f410 and f411 also contained remains of oak posts, five in total. These postholes with post remains were up to 50 cm deep. As with the postholes in the vicinity of the circles in trenches 31/33, the features are clear, but not regular enough to suggest (granary) structures.

House site re-marked with horse burial

A thin flood layer covered the dwelling plan. The same layer had ard-marks to the north, but the dismantled dwelling had not been ploughed over. Two postholes from the dwelling were also seen at this level – i.e. in the top of the layer covering the house. One is the 'extra' post and the other was one of the roof supports. It could be that these two posts had been left standing, or that the 'extra' one was added after the roof support had rotted, as markers of the house site after the structure had been dismantled.

A young stallion (f 311, *fig. 25*) was buried one metre away, the grave pit cut into the layer over the house, at a near central position in the dwelling area of the dismantled farmhouse. The grave pit was very shallow and the bone was in poor condition. However, it is certain that the legs were not buried.[17] In combination with the stratigraphy and the one or two posts left visible after the house was dismantled, the horse burial could have signified a re-marking and re-emphasizing of the physically dismantled and abandoned dwelling position.

Signs of later dwellings

A later dwelling was indicated to the north of tr 15. There were numerous materials in ditch f275. The date range obtained is broad (UtC 9259: 120 BC – 70 AD), but the one-sigma range makes it probable that these features, and the possible farmhouse to the north of the excavated area, are from the 1st C AD. The fill of f275 was very humus-rich, almost peaty, and thus different from the sandy clay fills of the stratigraphically earlier features. A cow path came in from the east between f458 and the end of f275, towards the north, in the direction of a suspected farmyard in the adjacent, unexcavated field.
The closely spaced stakeholes (f509) on the southern edge of trench 15 and a few larger postholes with no post remains (f498-500; f503-513) might represent the corner of an even later dwelling, possibly an eastern end wall. Pits with an iron-stained, humus-rich fill are considered contemporaneous and, if this is so, the dating from pit f488, containing Roman imports, gives a range of 69 – 235 AD (KIA 14280, the one sigma range is 82 – 134, 162 – 168, 201 – 206 AD).[18] Pits in the area were up to 1.20 m deep. The usual array of wood and bone had been deposited. Pit f457 contained Roman imports, a spindle whorl and nine 'game counters' made from shaped

16 See for similar staggered spacing of some of the Assendelver houses: Therkorn 1987b, 186 – 188.

17 An even later burial of an ox, at the eastern end, could also mark the homestead position. The dating is uncertain, and it could be Medieval, judging by skeletal size; samples from both the horse and ox burials submitted for ^{14}C dates yielded no results (Utrecht).

18 The first dating, a 'twig' obtained from f488, is one of those which was checked, as it was late 5th to mid-6th C (KIA 10010), and within the range of the other erroneous dating (KIA 10002), which was definitely from a root-type piece of wood. These dates are taken to refer to willow roots growing into features, rather than dates for the features themselves.

sherds, while f488 contained five counters, and f501 one. Three game counters were recovered from layer f454.

The very find-rich layer, f454, covered pit f488 and the features along the slope. A ^{14}C dating of a bone from this layer indicated later use of the area, and probably a house in the near vicinity to account for the numerous finds. The date range is 264 – 430 AD (KIA 14279). The one-sigma range is 389 – 429 AD, so the late 4th/early 5th C would be more probable. Pottery in this layer does not appear essentially different to that of earlier centuries, but pottery from the 4th – 5th century in this part of the Oer-IJ region is not well understood.[19] The complex could overlap with the dating of the cow path feature (f2065) in tr 31 and would thus indicate use of the southern segment during the 4th C or later. It also contained Roman import pottery and, as with the fibula deposited in water (see p. 60), the dates do not coincide with ^{14}C indications. This also applied to the offering site (2.11). The manufacture dates of Roman imports do not date these features.

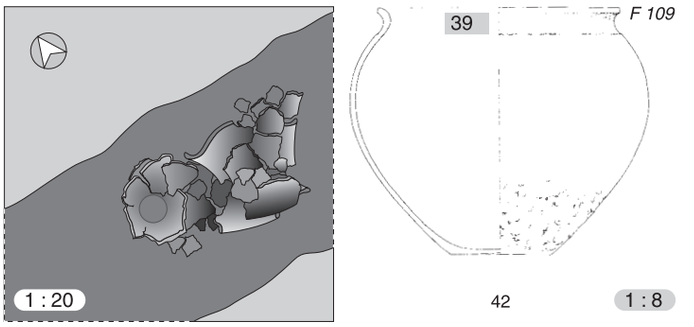
During the project, the area adjacent and to the south of tr 15 could not be excavated any further due to the presence of a municipal soil repository, and has since been destroyed for the housing estate. Unfortunately, we cannot draw any conclusions on the spatial details of activities carried out within this segment of the ridge during the little-known and ill-understood Late Roman Iron Age/Early Medieval period, which certainly appears to be represented here.

Other traces in the southern segment: trenches 1 – 26 (excluding tr 15)

Trenches 1 – 6 were dug through low mounds visible in the field. They were all found to be what remained of the original layering, whereas the surroundings had been dug away to about 75 cm below NAP, leaving hillocks up to 30 cm higher than the field surface. Prehistoric traces were however recovered, and the fill type and NAP level allowed us to estimate their date.

Features in tr 3 are probably from the 1st – 2nd C. An early drainage ditch was older than part of an enclosure. The curved feature was a substantial ditch (f7), of which one terminal was seen, with a large posthole at the bottom. The ditch enclosed an area of trample (f12), with hoof impressions. There were no finds. Trench 6 had features of pits and ditches, also probably from the 1st – 2nd C. Again, they contained no finds.

The area of tr 7 – 12 was excavated to examine the presumed levee of a creek enveloped by the winding Medieval field ditch still in use as the modern field ditch. The side of the creek was seen and the creek depression was partially excavated in tr 7 – 9, where a deposit of post-Medieval horse bones was found in the highest level (KIA 10008). Prehistoric traces on the sandy creek levee were found in tr 10 – 12 and consisted of ard-marks from the Early Iron Age and gullies at a level and with fills indicating the Late Iron Age to later Roman Iron Age. Only one of these gullies (f109) had a deposit: a near-complete pot, deposited as sherds (fnd 42; *fig.* 31). This pot is a clear exception within an area with no materials in ditch features. Pit f85 contained three unidentifiable bones.



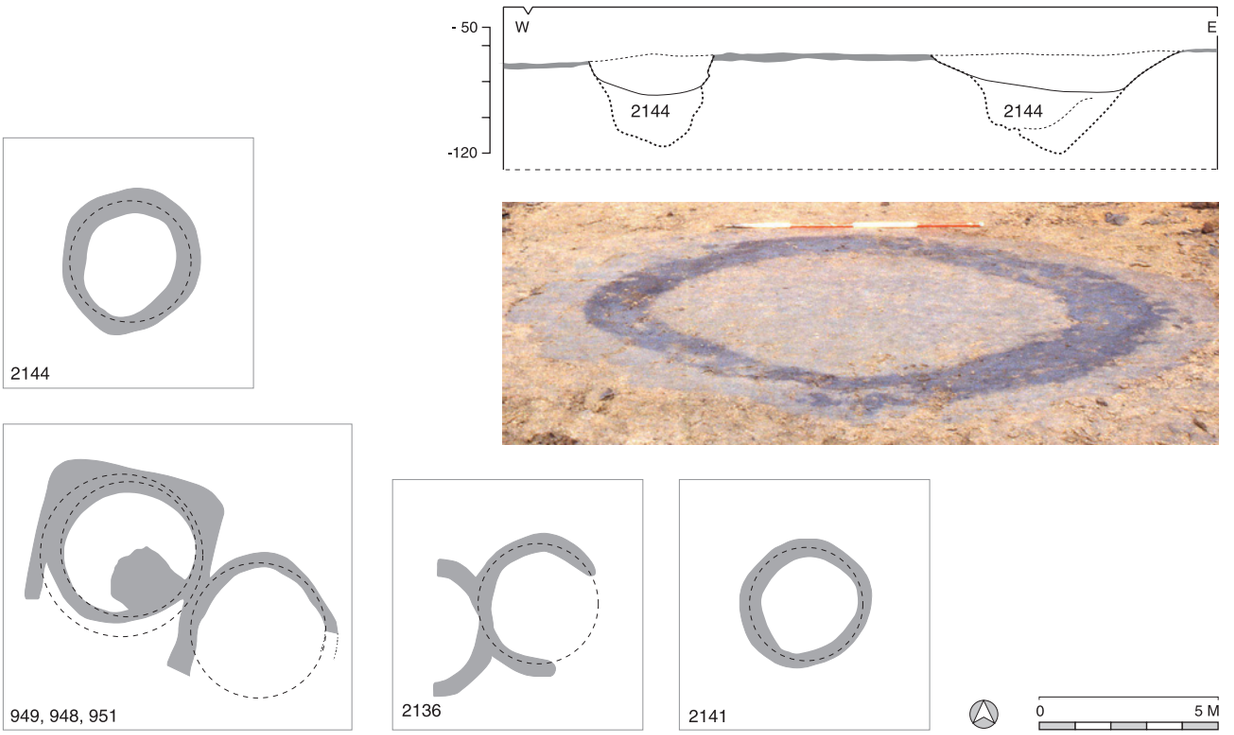
The irregular shape of the field ditches was checked for hidden prehistoric creek positions in trenches 19 – 21. Wood deposits were found in a probable creek bedding (tr 20) but could not be fully examined.

Trenches 17, 18, and 22 – 26 were dug in the area determined by De Roo as peat (cf. Chapter 1). This conclusion was indeed confirmed. Aside from checking the junction between the creek found in tr 7 – 10 and the Oer-IJ channel depression, the purpose of these trenches was to determine the date of peat accumulation and its use. An oak object deposited in f425, found in tr 18 and lying in peat, was dated to between 80 and 330 AD (UtC 9272), but this can be narrowed down to the mid-2nd to mid-3rd C when the one-sigma range is considered. The same deposit included other worked wood and wood chips of pine, oak, alder, ash and hazel. The wood chips are certainly associated with woodworking here or nearby and the concentration is therefore different from the small watery places with deposits interpreted as signifying ritual intent (see p. 60, pool; offering site 2.11).

In both tr 18 and 22, trampled areas, 'spade' marks and lumps of cut oligotrophic peat were found on reed peat, indicating oligotrophic peat extraction. Roman Iron Age period sherds were found at the same level as Medieval sherds. The landscape had evidently been altered by peat

Fig. 31 A complete pot recovered within a gully of field system where no other materials were recovered (f 109; cf. Plan 7).

19 Fourth-century pottery is not well known in the region to the west of the Oer-IJ, but is common in the Schagen area 31 km to the north, on the other side of the Oer-IJ (cf. Abbink 1999). Fourth-century and later sites and native pottery characteristics for the period have simply not yet been distinguished properly (cf. box by De Koning, this vol. Chapter 3).



cutting, and although the remains were clear, it is not possible to draw conclusions as to use and the sequence of events in this area because of the small extent excavated. There is in any case ample evidence, again, for regarding peat areas as interesting sources of information.

2.10 Later Medieval to Modern traces *(Plans 7 & 8)*

Later Medieval to modern period traces were recorded but will be described here only briefly. The normal array of field ditches and pits were present, as well as animal burials. There were only slight indications of Medieval dwellings in the Broekpolder, but materials of the 9th/10th C and later were present in a few features. Medieval and later finds have been catalogued by Jan de Koning and commented on by Jan Besteman, and are shown in Appendix 8.

2.10.1 *Field system*

The only indication that a farm plot had existed was the combination of features along the southern area of tr 31 (plan 8). There were large circular ditches *(fig. 32)*, whose function is unclear, as well as short lengths of ditches, clay pits and possible watering holes. The conglomeration of features may indicate a farmhouse to the south. By this time, the creek in the central segment had filled with heavy clay sediments and the area was more or less level. The dating of the more general field system, still present within the Broekpolder at the time of the project, is uncertain due to it having been continually open, and thus regularly cleaned. The early creek system, dating to the Bronze Age, was most interestingly fossilised in this system, as described in 2.2.

2.10.2 *Animal burials and bone concentration*

Animal burials and one bone concentration are considered here. The drawings of the animal burials are shown on Plan 8, and in *Figure 33* (cf. also Appendix 4). Some connections to outbreaks of disease and buried livestock are also mentioned (cf. box). Since modern ploughing destroyed the latest stratigraphy in one field with the highest number of burials, there is uncertainty as to dating. Some burials were ^{14}C dated, while attempts to date others were unsuccessful.

Cattle burials

Five cattle burials may be from either the Roman Iron Age or the Medieval period, but thirty cattle burials can be dated to the Medieval (13) and post-Medieval (14) period, with three cases falling into either. Eighteen of the burials were found within the central segment (tr 32/33), and here dating by

Fig. 32 Circular features of Medieval date, all recovered within the central segment.





stratigraphy was complicated by recent ploughing, in particular, which had destroyed the layering from the Medieval to the Modern period. The distribution pattern of the burials was mainly connected to trackways running in an easterly direction (Plan 8), and there were burials in the low-lying area to the east.

Two ^{14}C datings were obtained from cattle burials in the central segment, f 3313 and f3386 (KIA 10007 & KIA 10006), which could be from the 20th C, though the one-sigma ranges indicate the later 17th or 18th C. A date was also obtained from f4343, in the northern ridge area, with a range of 1480 – 1630 (KIA 12282; cf. intestinal content, section 3.3.3).

Animal burials and disease

'Cattle plagues', *runderpest* epidemics, have been recorded for the periods 1714 – 1720, 1744 – 1754 and 1768 – 1784. The cattle burials could be related in part to these, and earlier unrecorded epidemics. The second wave was characterised by rapid spread of the disease. Death rates of up to 80% were noted in Noord-Holland. Farmers could lose much of their herd within a few months. By the second half of the 18th C measures were imposed in order to stop the spread of the disease by curtailing imports, imposing quarantine, and issuing ordinances on animal burial (Hespe 1997). In the 19th C laws were enacted concerning the treatment of cattle infected with pneumonia, foot and mouth disease, and tuberculosis. In 1867 the following rules were published in the *Staatsblad*:

'… all cattle at farms with infections must be killed; the hide must be cut deeply, covered with a prescribed amount of quicklime; the cattle must be buried in an isolated area, in a pit with prescribed dimensions, especially the depth, and covered with a certain amount of earth; the burial must be fenced in; and protected against theft of hides or meat' (Van de Vaart 1993).

For anthrax, rules included burning the carcass, burying in a safe place defined as fenced, surrounded by ditches or plaited with stands of trees *(geriefhoutbosjes)* (Bergman 1996, 1997). Through to the 18th C, like the plague contracted by humans, disease in cattle was interpreted as a punishment by God for the sins of humankind. The death of animals was seen as a harbinger of epidemics affecting people. The secularization of medicine, from 1650 onwards, went hand in hand with the assumption that diseases could be mastered by prevention, but a religious solution was not ruled out, and prayers remained an important medium for God's protection. Less legitimised practices continued in the battle against the perceived evil: stone scrapings were deemed effective at the entrance of churches or at the base of pillars; copper artefacts were used to stave off disease; and rings with precious stones were believed to have curative powers. Places such as Egmond Abbey, 12 km to the north of the Broekpolder, which were not touched by the diseases, were thought inviolable because they were holy (Noordegraaf 1988).

The manner of burying cattle in the Broekpolder does not demonstrate any patterning: nearly all orientations and manners of deposit occur. However, the deposits of other materials in the post-Medieval period are worth noting. In light of information from texts, the objects placed with the burials can be interpreted as having been placed there for protection.

Fig. 33 Two examples of post-Medieval cattle burials.

There is no clear patterning in the orientation of the pits, the positioning or the age of the animal in the Medieval and post-Medieval cattle burials. There was however a fairly consistent practice involving absent or displaced elements. Of the 25 features where we are certain that disarticulation is present or absent, only three bovines were fully articulated, with no missing parts. In six cases, elements of the skull and legs were entirely missing. There is variation in these burials, ranging from two cases where the skull and all four legs were not deposited, to one burial where only teeth were absent and, in one case, an animal whose tail had not been buried. In 14 instances, the legs or lower legs had been cut off, but they had been deposited in the grave. Of these, five cases also included displaced skulls.

While we must certainly consider the possibility that legs (and skulls and necks) might have been cut off for convenience sake, to facilitate transport, there is a fairly consistent practice concerning the lower legs. Cutting off the lower leg, only, and placing it in another position within the grave would not seem to be associated with efficiency of burial. It is also a tradition well known from the prehistoric period from sites in the region, although not very evident in the probably earlier burials in the Broekpolder. Five of the Broekpolder Medieval/post-Medieval cattle burial cases show the distinction of lower leg removal, rather than the entire leg.

A few materials accompanied six of the cattle burials and conscious placement might certainly be considered. While stray sherds could be an explanation in two cases, iron objects and the white pebble might indicate a clearer apotropaic intention (see section 2.10.3 below on rubbing posts). Why these animals died is open to question and, given the difficulties in dating, trends will not be explored any further. Disease is certainly a possible cause of death, and various outbreaks of cattle plague have been recorded (see box).

Other animal burials

There were three other animal burials from the Medieval to Modern period and a concentration of horse bone.

– A dog (*fig. 28*, f5338) had been buried in the northern segment (tr 49), and was ^{14}C dated (KIA 12293) to either the Early or High Medieval period.

– The central segment off the ridge (tr 28, Plan 8) contained the burial of an 18th C horse (f544; UtC 9064), which had missing hoofs.

– An earlier deposit, located in the southern segment and dated to the 15th – 17th C (KIA 10008), consisted of bone from an older horse. It was in the western, excavated end of the depression over the prehistoric creek (f23, Plan 8). It was not possible to excavate the entire concentration, but bones were spread over an 8 m^2 area. They had been deposited in a fragmented state and represented a large proportion of one animal.

– A partial sheep burial (f3104) is possibly very late. It was recovered from near the wall line of the modern structure (2.10.5). It was missing various parts, including the skull. It was drawn (Plan 8), but not further analysed.

2.10.3 Duck decoy from the 16th/17th century in tr 24

The field name *'de Vogelkooi'* and a water-filled depression of what remained of a pond indicated a duck decoy in the southern part of the polder. This could be the decoy for which regents of the St. Elisabethgasthuis in Haarlem had requested permission from the Prince of Orange in 1582. The location of *'de wycker- en Saaendelver'* mere is specified.[20] The depression over the pond, about twenty metres in diameter, could not be drained during the excavation, and only the part on the western side was excavated *(fig. 34)*.

A 30-metre segment of one the 'pipes' (f518 – the revetted ditch leading from the pond to the trap – was excavated in detail. At the junction with the pond, the pipe was three metres wide, but towards the end of the excavated area it narrowed to only two metres. In the last phases the revetting planks were still present, up to four planks thick in places, held in place by vertical posts. Rows of posts along the sides show where the screens of reed and netting were fastened. Remains of both netting and reed screens were found at the bottom of the pipe, under a clayey fill also containing Medieval, 18th and 19th century materials. Feature 521 was 13.5 m of another arm, with a similar construction of planks and posts for screens, and layering with similarly dated finds infilling the pipe. The wood species used for posts in the decoy included oak, ash, spruce/fir, elm, and willow. Root systems from the accompanying stand of trees *(kooibos)*, all willows, were also recovered.

A ditch between the pipes might have been part of the earliest phase of the decoy. Feature 522/523 was 90 cm deep and 2 m wide. It contained a complete pot that had been placed upside down and covered with reed mats and branches.

20 We are indebted to Mr. P.J.C.M. Janssens, an active member of the Heemskerk Historical Circle, who provided us with this information.

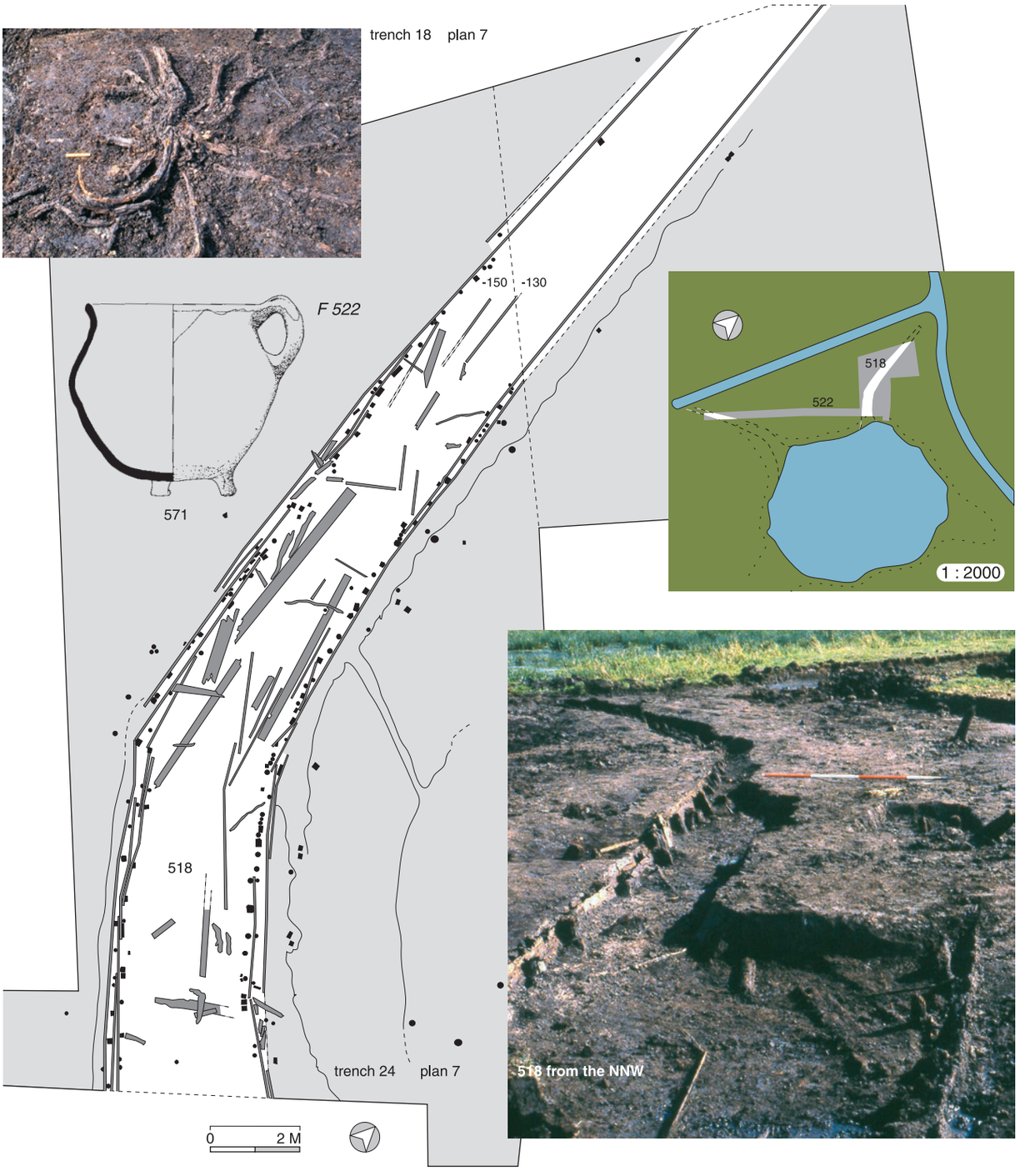


Fig. 34 Details of the duck decoy, parts of which were excavated in trenches 18 and 24, of the southern segment.

2.10.4 *Other late features*

Three types of feature are discussed in this section. Features interpreted as retting pits were recovered in the central segment, pits with deposits in the southern and central segments, and the remains of two interpreted rubbing posts in the central area.

Short ditches used as retting pits (Plan 8)

A late linear feature (f3369), 30 – 35 cm deep, in tr 33 contained deeper areas representing four rectangular pits. The pits were dug 20 – 35 cm deeper into the bottom of the ditch. One of them, f3383, had a bundle of flax at the bottom *(fig. 35)*.

Duck Decoys
(Eendenkooien)

Decoys were first constructed in the 14th or 15th century in the form described here. They were a Dutch innovation. Catching wild fowl had been difficult, but the use of decoys made them available as food to many, and wild duck became common fare. The word 'decoy' is of Dutch derivation, defined in English by 1625 as 'a pond or pool with arms covered by network or the like, into which wild fowl, especially ducks, are lured and there caught' (OED). Wild ducks were lured onto the pool, and into the side arms by decoy ducks trained specially for this task (OED, 1651). The 'decoy man' was the keeper of the decoy. The method spread from the Netherlands throughout Europe. Payne-Gallwey (1886), for example, wrote a treatise describing in detail the history, construction and use of decoys in Great Britain.
Remco Lotte (1999) was involved in tracing various aspects of the decoy partially excavated in the Broekpolder. An important source was an issue of *Zuidhollands Landschap* 19/1 1990, the magazine of a regional nature conservation group, devoted entirely to various facets of duck decoys in the Netherlands, including the growing interest in those remaining as features of a past landscape.

Decoys were set within stands of trees in the neighbourhood of marshland habitats frequented by wildfowl. They could be from 1 ha to 12 ha in area, but on average they covered a total of 2 ha, of which about 0.75 ha was the pond surrounded by a stand of trees covering about 1.25 ha. By 1550, there was an ordinance against making any noise within 500 *roeden* (1884 m) of a decoy. Registration began after 1600, and an estimated 100 – 150 decoys existed in the province of Noord-Holland between 1600 and 1700 (Janssen 1990, 16).
The pond and 'pipes' (the ditches radiating out from the pond) were usually dug. There were usually four pipes, but examples with up to seven are known. Screens of reeds approximately two metres high were set up around the perimeter of the pond and along the sides of the ditches, which were covered by netting, with traps at the end. Wild ducks were caught once or twice a day, in the early morning and in the afternoon. They accompanied dozens of semi-wild ducks when they returned to the decoy pool after their nightly feed in the wild. Another

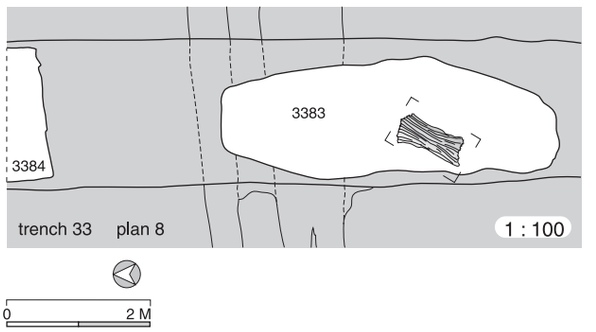




Fig. 35 A segment of the ditch within trench 33, with a deeper pit f3383, containing a bundle of flax (see Plan 8).

The flax stems were 85 cm long and the flattened mass was 30 cm wide. A date was obtained from these stems, placing them somewhere in the early 15th to early 17th C (KIA 10001). The entire feature could be associated with flax processing, and the pits could be the remains of retting pits. They are relatively shallow for retting, but a method has been historically recorded whereby flax in shallow pits was not weighted down with sods, but left for a while in the field, as part of the retting process, and then placed in shallow water, where the bundles were turned occasionally (cf. Dewilde 1983, 203 and 3.2.4.

The series of aligned linear pits or segmented ditch (f2933) further to the east may have served a similar purpose. These five rectangular pits, with a total length of 48 m, varied from 18 m to 4 m long, and were 65 – 70 cm deep. The fill was similar to f3369, indicating a similar dating.

Pits: High Medieval to Modern

It is known that popular cultural traditions continued into the 20th century. Group festivities such as erecting maypoles or holding field processions are well known. At this time, we know of no written sources on popular culture in Noord-Holland noting pit digging. On the Veluwe, however, pits were dug and backfilled to bury cattle placentas, while those of mares were hung in trees (Gewin 1925).

The pits described below have wood and metal deposits in

group of ducks, tame, had their permanent home at the pool, and these 'decoy ducks' were also, and importantly, accustomed to the presence of the 'decoy man'.
Ducks take off into the wind, and the multiple pipes of the decoy were necessary to take advantage of different wind directions. After choosing the arm, and hidden behind the reed screening, the decoy man threw food onto the water of the pipe. He called to the decoy ducks, and they moved into the arm to feed with the wild visitors. Once the wild ducks swam past the bend they, but not the tame ducks, were startled by the decoy man into flight. Taking off into the wind, and towards the only apparent exit, the wild ducks flew up under the nets and along to the trap at the end of the pipe, the keeper closing the trapdoor behind them.

Families who had acquired land rights could build duck decoys, which were always in the vicinity of marshy areas. If a member of the local nobility, the church or another institution owned the land, rights of use could be tenanted out. The profession of 'decoy man' often stayed in a family for generations, and conveyed considerable status.
The profession also had a somewhat mysterious character, certainly when it came to the secrets of the trade, and each decoy man had his own methods. In addition to capturing wildfowl, the decoy man's job was to provide brooding facilities and feed for the tame ducks and to keep the decoy in good repair. The annual catch from a decoy varied enormously, and could range from fewer than 1000 fowl to more than 3000. Most wildfowl caught in Noord-Holland were sold on the Amsterdam market.

The status of 'wild ducks' became a contentious issue. A decoy was such an effective way of capturing wildfowl that there were protests, particularly from Scandinavian countries, that the Dutch were taking more than their share of this wild migratory resource. This controversy, and a reduction in the amount of surface water resulting from land reclamation, led to a decline in the number of decoys during the 19th century (Lotte 1999). In the province of Noord-Holland, the number fell to thirteen registered decoys (Janssen 1990, 16). Those still surviving are mainly used for ringing wildfowl to keep track of their movements.

common, and most had been backfilled. Certainly, the last pit described here was dug within living memory, but the tenant farmers questioned, some of whom had generations of family history in the area, were not forthcoming with any information and denied having knowledge of any pits dug in the Broekpolder, for any reason.

Feature 3679 (tr 34) was a large pit, 2.70 m x 6.50 m and 1.40 m deep, which had been re-dug at least once, if not twice. It had silted up naturally in very watery conditions. The fill was organogenic, but also contained herbaceous material. Two vertical oak posts, approx. 1.70 m long, and a short length of willow, were supporting a plank (85 cm x 35 cm) made of pine. On the eastern side of the plank was the lower half of an Andenne ware pot, and on the other side there was a complete sheep/goat rib and one willow branch. These accompanied the one certain re-digging of the pit. Higher up (in 3679/2), in the silts of the second re-digging, was half a horseshoe. The Andenne pot dates to the 11th – 12th C.

There is a similarity with the large Early Medieval pit, f4468 (see 2.11, tr 48), in that this pit had a partition. Feature 4468 has been interpreted as a source or well due to the proximity of the earlier offering site context. A similar interpretation for this later feature is less clear, and the number of deposits is certainly minimal. The surrounding surface and sloping sides of the feature were not disturbed by cattle hoof impressions, so f3679 is unlikely to have been a watering hole.

– *Pit f125* (tr 15) was 1.25 m in diameter and1.20 m deep with a fill including redeposited turf sods. A deposit at the bottom consisted of a heavy iron fitting – 6 cm wide, 1.5 cm thick, and 63 cm long –placed on a 28 cm long branch of oak to form a cross. The date of the pit would fall somewhere between the 15th and 19th centuries.

– *Pit f546* (tr 27, on plan only) was round, 2.80 m in diameter and 1.40 deep. Placed in the form of a cross on the bottom were an oak beam, roughly 80 cm long by 15 cm square, and a complete, 38 cm long iron stake with a revolving eyelet of the type used for staking a bull while grazing. The iron stake was in perfect condition. The pit had been backfilled with redeposited sods and hay/grass. The date is uncertain, but most likely falls in the 18th to 20th C.

– *Pit f707* (tr 31, on plan only) was 3 x 3 m at the bottom and 2.50 m deep. It had nine vertical and two horizontal posts, one

of which was spruce or larch (the others were not sampled), a near-complete ox rib, and bent but complete hubcap from a car, make not identified. The pit had been backfilled with redeposited sods. The dating is somewhere around the mid-20th C.

Rubbing post remains (Plan 8)

Farmers were still erecting standing posts in their fields throughout the historical period. These types of features are few and far between, however, and certainly not randomly spread through the different sites of the region. As with many functional explanations, one wonders, if they were so functional, why are traces of these posts not found in all fields used for grazing? Those recovered in the Broekpolder were within the central segment, where the cattle burials were found. Rows of standing posts associated with the offering site (2.11) also revealed late, historical period dates. The marking of places in this flat landscape is a subject for further study as part of the long-term perspective on land use in this area. Feature 3712 was a pit in trench 37, used as a 'posthole' for a standing whale bone, 52 cm long. The pit was oval, 45 x 30 cm, and only 8 cm larger than the bone. It was clear the whalebone had been worked along at least one side, and rammed further into the ground than the depth of the dug pit. The bone was a lower jaw, most probably from a bowhead whale, *Balaena mysticetus*.[21] The identification was based on the size, the structure of the bone and the form of the inner side of the jaw, which had a very flat surface. In his *Natuurlijke Historie van Holland* (1769), Franq van Berckhey described the tradition of standing whale jaws upright in pastures:[22]

'In many places one can see posts which are called… rubbing posts… (schurken, schurkpalen, schuifpalen) standing in the pasture: they are for the cattle for rubbing up against when they itch… One can see them everywhere around Haarlem, Amsterdam, in Kennemerland and in the rest of Noord-Holland. They differ in appearance from place to place: in some areas of our country one uses so-called "whale ribs", although really whale jaws, set with the thickest end into the ground like a post and rammed down. Most are painted with white and black stripes, some also with green and white, or red with white stripes, each according to his choice. These whale jaws are less susceptible to rot in the ground than wooden posts…'

The paint would seem to suggest some symbolic interest in these standing bones. The remains of the whale jaw in pit f3712 showed no trace of paint.

Feature f2127 (tr 31) was a post-pit with deposit. The pit was square, 30 x 30 cm, 44 cm deep, and had been lined with four lengths of planks, 18 cm long, of pine and fir. The remains of a post about 25 cm in diameter was recovered from the centre of the pit. It was made of larch or spruce. Seven small lead plates, six with clear signs of having been stamped, and 15 iron nails each 6.5 cm long, complete and with only one slightly bent, had been deposited in the western side of the pit, between the post and plank. There was also one red-fired sherd of pottery or brick, 9 cm².

The largest of the lead plates is 2.9 cm square. All could be cut down stamped lead seals for weatherproofing the heads of nails *(trotseerloodjes)*. Such seals usually have some kind of shield form (cf. Steijn 1981), and complete examples smaller than 4 cm are unknown.[23] All seven of the deposited examples had been square cut. The partial date for one of them – 177* – is in line with the dating of these objects mainly to the 18th C and later. However, they had been used, and may thus have been deposited decades after they were manu-





Fig. 36 Some of the modern rubbish found infilling – backfilling – ditches in the area of the duck decoy.

21 Thanks are due to Dr. P. J. H. van Bree, Zoological Museum, University of Amsterdam, for making this identification.

22 Our translation. Quoted by Van der Kuijl (1993) in a work collating information on these types of bone during analysis of the three pits grouped together and containing similar remains at the Velserbroek offering site.

23 Pers. com. Steijn (correspondence June 4, 1999). Thanks are due to Mr. P. Steijn for examining the drawings of the finds, giving his advice, and bringing literature on the subject to our attention.

Nails are interesting

The iron nails of *dira Necessitas* – goddess of destiny, mother of the three Fates – have been compared by Williams (1969, 125 – 6) to Death and seen as symbolising the end of human efforts, whereby the connection is made with the Roman custom of the pontifex maximus driving a nail into a wall to mark the year's end. The origin of this practice is usually regarded as Etruscan, where nails and fate (and fortune) were associated with Nurtia/Nortia (cf. Simon 2006).
Nails are also associated with curses. Roman period curses inscribed on lead tablets are known as defixio, 'for it was intended that the person cursed should be 'bound' or 'fixed' to his evil fate, and words of constraint are commonly used' (Merrifield 1987, 138). Although Merrifield does not mention it, the nail holes driven through recovered examples (also in Roman-influenced contexts in Britain and on the continent) could be another way of driving the point home, literally 'fixing' with nails, and fixing the fate of the cursed (as dira Necessitas fixes men's fate). Watery contexts and gods' shrines, pits and tombs are the contexts mentioned.
Later, as Merrifield (1987, 163 – 175) describes, pins and nails are known from numerous 17th and 18th C deposits in England, as well as textual recipes for making up charms against witchcraft, which include urine, pins, needles or nails with salt. These deposits, sometimes with additional materials including felt hearts pierced with pins and nail clippings, have been found sealed in Bellarmine jars, and later in various types of vessels. They are found deposited in watery contexts, associated with buildings (usually beneath thresholds), and in pits. This type of deposit has a primarily eastern distribution in England and Merrifield considers the use of these particular vessels as deriving from a practice in Suffolk; they are not, for instance, found containing similar deposits in the Netherlands (Merrifield 1987, 173). Not using a vessel to contain the finds would lead to numerous deposits of the same nature being 'just another nail and/or pins'. Such finds are also known from later contexts such as those recovered at the Velserbroek offering site in the same area as small pits containing horseshoes (Therkorn & Oversteegen 1994, Therkorn 2004). Aigremont (1909) cites an ethnohistorical, 19th C use of nails from southern Germany whereby a person could be hexed by driving a nail through their horse's hoof print. Ethnohistorical practices involving pounding nails into special trees and also in doors to effect one's own healing process are known in the Netherlands (Kuipers 1976, 12; Schuyf 1995, 81 – 85).
Many nails/spikes were recovered in the offer site (2.11) and they will come up again as well in Chapter 3 as an attribute of Thor.

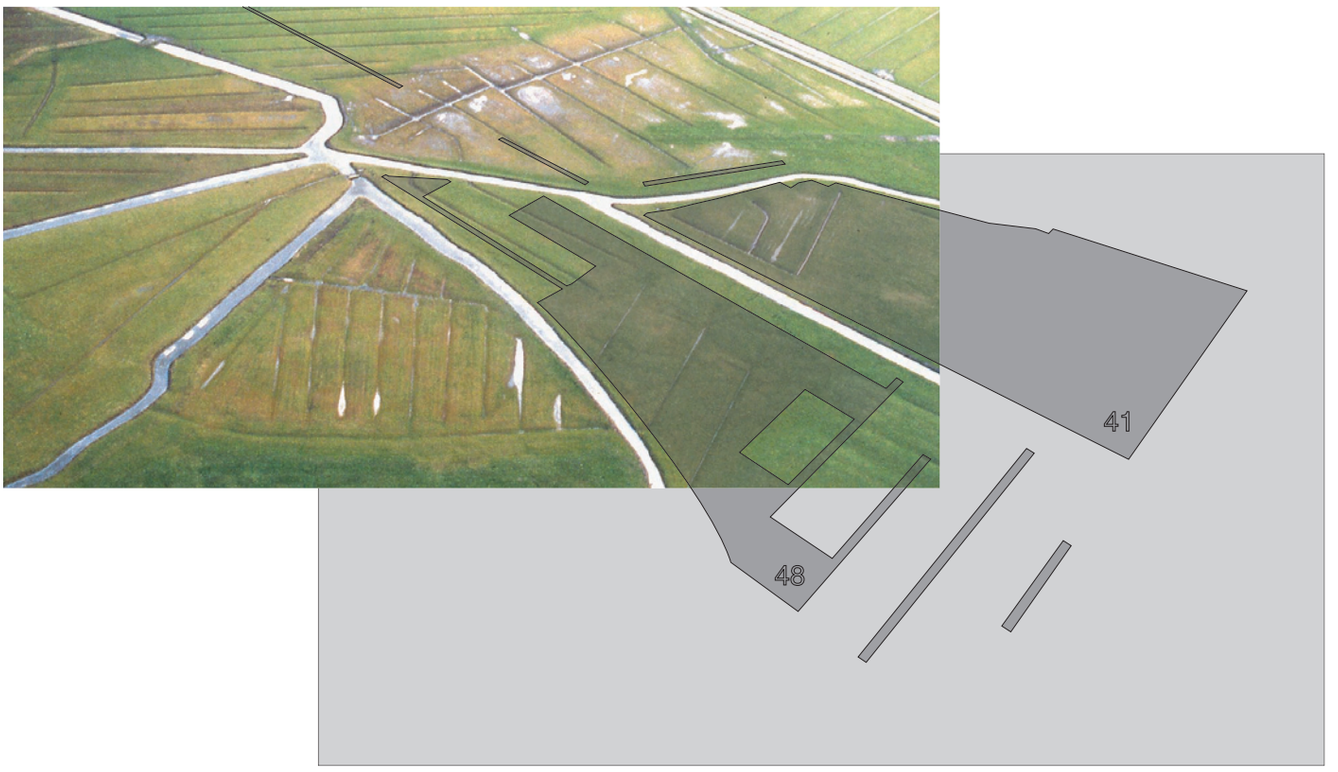
factured. The rust on the surface and the nail hole through at least one of the examples may even indicate a secondary function, or be an argument against *trotseerlood*. They are in any case made of lead, which is probably where the meaning should be sought. Lead used as amulets is known from texts of the Medieval period onwards, and amulets were not only worn by people and livestock as a defence against illness, but also placed at various points such as springs, crossroads, trees, at various places around the home, and in the cattle byre (cf. Meany 1981, 12, 36, 249).

This solitary post, assuming it was once above ground level, may well be the remains of another rubbing post. The combination of seven lead seals, iron nails and wood from evergreens is certainly not arbitrary, and can be interpreted within popular belief. At this late date of 18th C or later, an apotropaic intention is likely, combined with the erection of a post at the site of pastured livestoc. 'Nails' and single posts will be more fully discussed in 3.4, for the long term (see box above).

2.10.5 Other modern traces

– *Redeposited rubbish* Dozens of small glass bottles, many complete, and other materials ranging from metal objects to shoes were contemporary with the infill of a ditch. When the ditch was filled the rubbish dump extended to the side. This dump of mid-19th to mid-20th century material had quite a diverse character, some of it having 'antique value' *(fig. 36)*. The tenant farmers and older family members were asked about a rubbish dump, but no one could (would) provide information about who might have dumped material here. Recent finds were mixed with the oldest material, redeposited from a source closer to Beverwijk, to the west, where rubbish had been accumulating for about a hundred years.

– *Remains of a building* Plan 8, tr 32, shows the outline of a small house that had been torn down only two years before the start of the project. All registration was stopped in connection with the presence of asbestos in this area, which had been broken up and ploughed under.



2.11 Offering site

Early Medieval to post-Medieval period (Plan 6)

2.11.1 *Introduction and summary*

Trenches 41 and 48 include an area that has been interpreted as an 'offering site' due to the nature of the materials deposited. Before the start of excavations, the spot was considered important because it was low-lying and the pattern of ditches was seen as an indicator that an offering site might be present (Plan I; *fig. 37*). Both the survey (RAAP) and trial trenches (ROB) discounted this area of the Broekpolder as being uninteresting. An ROB trench cut through the offering site *(fig. 3)*. It was recovered as a two metre wide feature during excavation, but it was shallow, so the find-rich sediments had not been disturbed or recognised.

The two trenches, tr 41 and tr 48, separated by a modern ditch disturbing deposits and features, covered about 1.6 ha. The area was mainly open water, used during the 6th/7th C AD as the site of deposits. Later, by the 9th/10th C AD, a large, dug open water feature in tr 48 had become the focus of activity. Dated features are also present from the 17th/18th C. Trial trenches 42 – 44 in the adjacent field – across the field ditch to the east of tr 45 – held few finds and it is assumed that almost all of the offering site has been recovered and excavated.

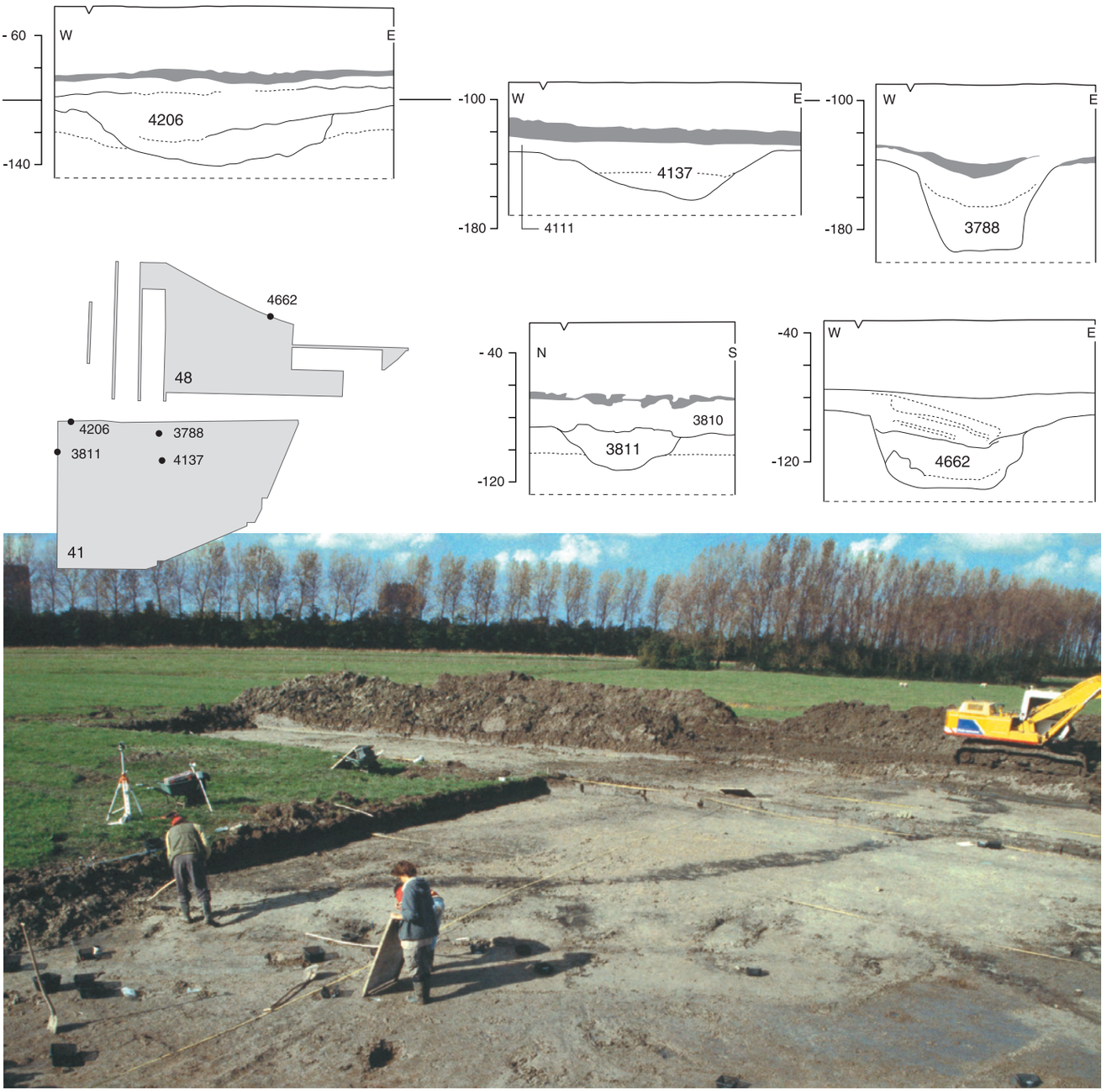
The various possible interpretations of northern European offering sites have been a subject of debate since the 19th C.[24] There is enormous variation in the number and variety of open water deposits. By the 1950s, Behm-Blancke (1957) had postulated five categories of sites for Danish and North German votive deposits, the smallest scale, attributable to 'Familial and tribal sacrifices of the village, consisting of spring *Bittopfer* and autumn *Dankopfer*. followed by better distinguished typologies of sites in years after.[25] Offerings within areas of open water were not distinguished in Noord-Holland until the late 1980s, and at this moment the Broekpolder area is only the third to have been excavated to any scale in the region.[26] In contrast to more northerly areas, they could all be attributed to use by one family throughout a number of generations.

The dating of the Broekpolder offering site does not rely on Roman import finds. At this point, the interpretation is that Roman and other materials were deposited in the 6th/7th C, an outcome indicated by ^{14}C dates. An early Medieval context for Roman materials is regularly encountered but the subject certainly warrants further investigation, as an aspect of the past in the past (cf. Bradley 2002). In line with ongoing work in the region and theoretical perspectives discussed briefly in

Fig. 37 The area excavated of the 'Offering site' off the slope of the northern ridge segment. The outlines of trenches 41 and 48 are projected onto the aerial photograph, taken from the northwest *(aerial photo Willy Metz, January 1998)*.

24 Hagberg (1967) supplies the most complete discussion of the history of interpretation, with extensive referencing, and he also cites many relevant classical and later texts on the practice. Müller-Wille (1999) and Kok (2008) provide syntheses, with extensive referencing of later publications on offering site excavations.

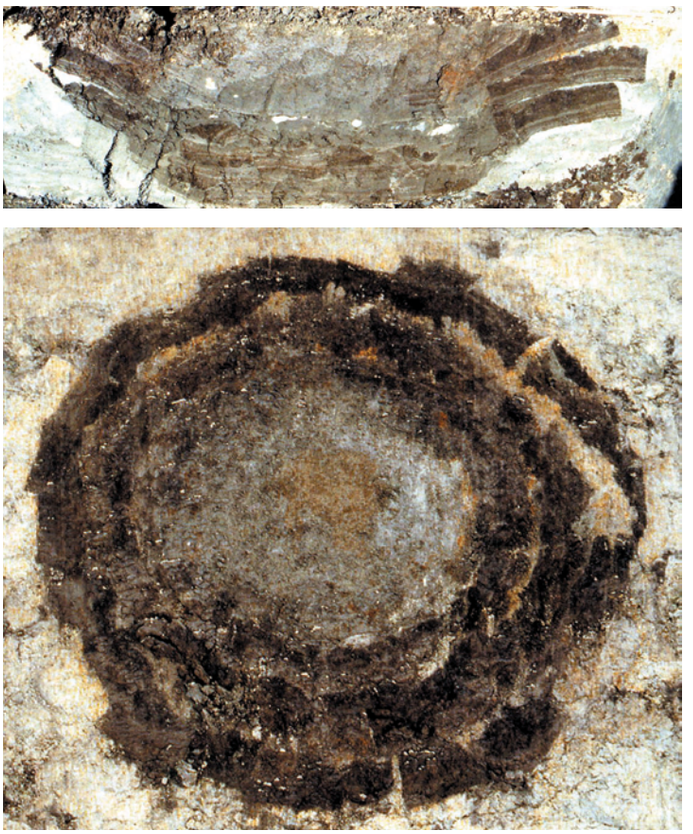
25 At the time, the Behm-Blancke's other categories were:
II Great tribal offerings at central sacrificial sites.
III Boat sacrifices, as an act of cult worship in order to obtain greater military esprit de corps
IV Special sacrifices *(Sonderopfer)*: clothes, etc.
V Human sacrifices. See Kok (2008) for a summary of later schemes and their efficacy in interpretation.



Chapter 1, the general interpretation of the use of the pool focuses on signs of ritual which, at one level of interpretation, is seen as structuring time within space. A seasonal explanation along lines put forward for pit deposits may also apply generally to the use of offering sites. Use of pits for deposits in a settlement space, or open water to the side of farm plots, may have alternated over the long term. Pits seem to have been dug in this segment of the Broekpolder ridge into the 3rd C AD (tr 49) at least. Whether or not there was continuous use of the area through to the 7th C is unknown. The short period of use of the very small pool for deposits in the central segment and the dating of the droveway there (2.9.1) could be an indication for the 4th/5th C, and a somewhat earlier use of open water than the dating of the larger offering site in the northern segment of the Broekpolder would suggest. The focus is on neither the finds from the pool nor on the

Fig. 38 Examples of gully sections within trenches 41 and 48. One of the bordering gullies (f4137) to the offering site is visible in the photograph, taken from the east.

26 One of the other two is to the north of the Broekpolder, at Uitgeesterbroekpolder 18, the other is to the south at Velserbroek, site B6 (Therkorn 2004). See Kok (2008) for other sites which may also have been offering sites in the Oer-IJ region.



dating, however, but rather on the various distributions of materials, in an attempt to define the sequence of use and structuring of place. Due to the apparent alignments formed by wood and suggested clusters as 'lines' of materials to the southeast, the actual timing of ritual activity is posited as having been September and November. The finds relevant to and most characterizing the pool deposits consist of iron, mainly nails, and stones, which could be characteristic of a deity such as a Donar/Thor figure (see also 3.4.5).

2.11.2 *Features on the ridge and in the border zone*

Trench 41 on the ridge contained few features as was also the case in the trial trenches to the north in tr 48. The stratigraphy was straightforward, consisting of a dark humus-rich soil (at approx. 75 cm below NAP) atop ridge sediments of homogenous sandy clay and clay with sand lenses. There was no sign of cultivation except for a confined area of E-W plough marks. The N-S gullies and two 'circles', one with an opening to the east situated in an irregular enclosure with openings, are of the Late Iron/Roman Iron Age or later. One ox burial (f3834) was from the Medieval or post-Medieval period.

The features at the border zone between the higher ridge and open water consisted of ditches and gullies which were at times under water, as seen in the fills and signs that the effect of water had blurred the definition of the edges at the top of the dug features *(fig. 38)*. They were dug in succession, the earliest being located in the southern area of tr 41. The over-cuttings and variety of lengths, with clear ends, suggest that they mark and provide openings from the edge of the ridge to the water-filled pool. The latest series in tr 41 is the clearest, and these snaking forms do not correlate with the border zone contours, but are assumed to have been intentionally 'drawn' in the landscape.[27] The ends of the earliest were cut away by later phases, so it is uncertain where the first opening was located.

The remains of a short length of curved gully, f3826, are certainly one of the earliest features. It contained a concentration of bones from an infant, one of which was dated to c. 68 – 232 AD (KIA 14282). The recovered elements of the 3 – 7-month-old infant were rib fragments, the right clavicle, and parts of the right arm from the shoulder blade to lower arm. There was also one neck vertebra and two teeth. The deposit was recovered as a concentration of bones, and the elements are not the remains of a burial disturbed by later features.

Other features dug along the creek depression and along the side of the pool postdate this deposit: a small pit (f3789) containing a partial pot was intersected by one of the later gully phases. A well (f4153), with a stacked sod lining, was contemporary with the most recent and longest snaking ditch feature, which was connected to the well by a short run-off gully. The well had filled naturally, and contained only two short alder sticks. This was the only sod-lined pit, of the type usually designated as a well, found in the Broekpolder excavations *(fig. 39)*, but it was very shallow.[28] Clearly, the intent was to keep this feature open.

The connection with the few gullies in trench 48 was disturbed by the modern ditch, although the gullies on the north side of tr 48 seem to carry on the pattern, curving round to the east. A schematic representation of the dug gully succession is given in *Figure 40*, with the suggested succession of openings to the area of open water. Later features include pits, some with animal burials, though many contained nothing at all, and they cannot be assigned to a period with any certainty. They are confined to the intermediate zone, and do not occur below the contour line 130 – 140 cm below NAP.

Fig. 39 A sod-lined well, f4153, in section and plan, found in tr 41.

27 The offering site at Velserbroek-B6 (ibid.) also displayed the snake form in a series of banks.

28 As remarked in connection with other types of pit, sod backfill was regularly recovered (see fig. 9), but never in this type of 'organised' fashion.

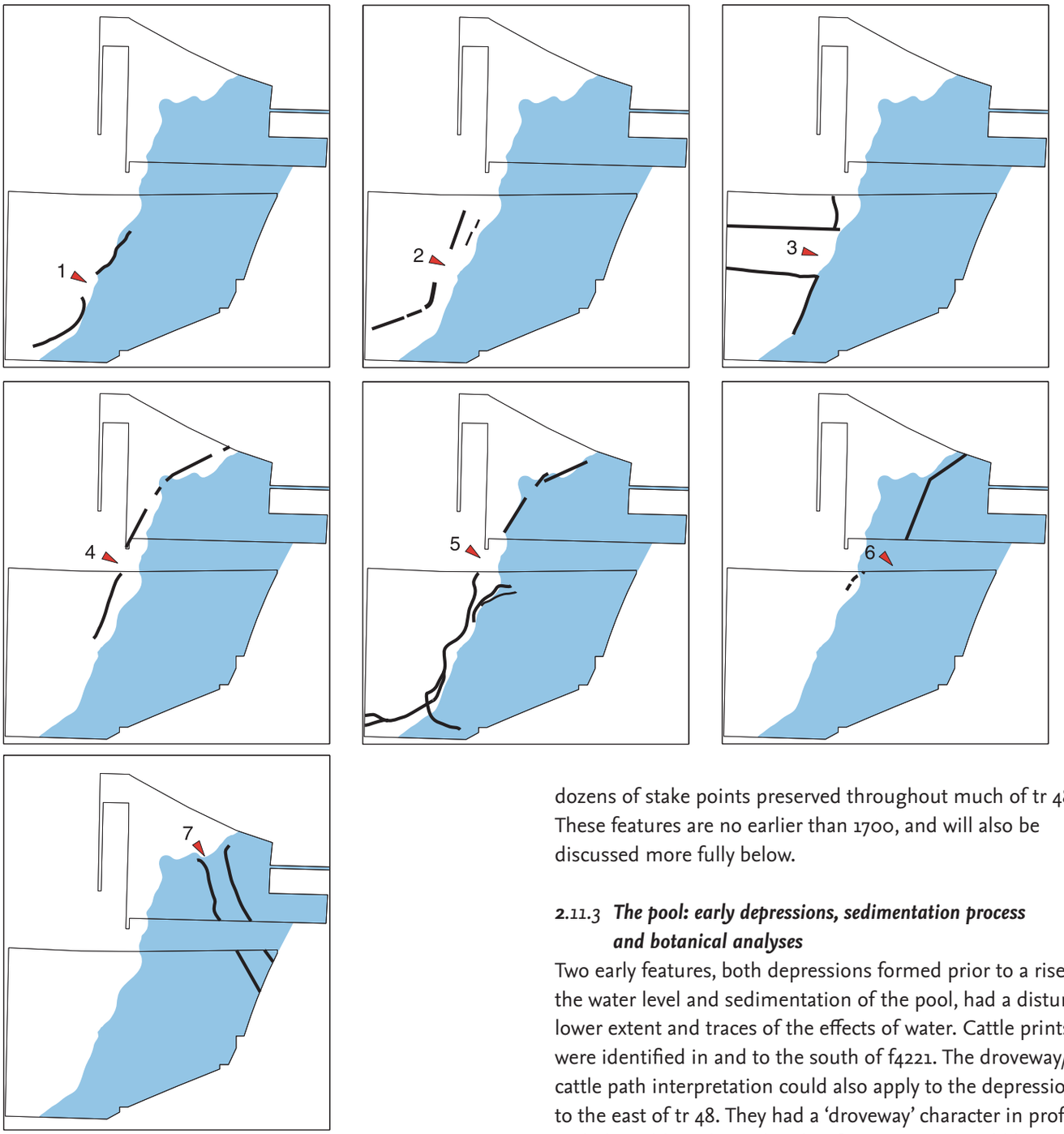
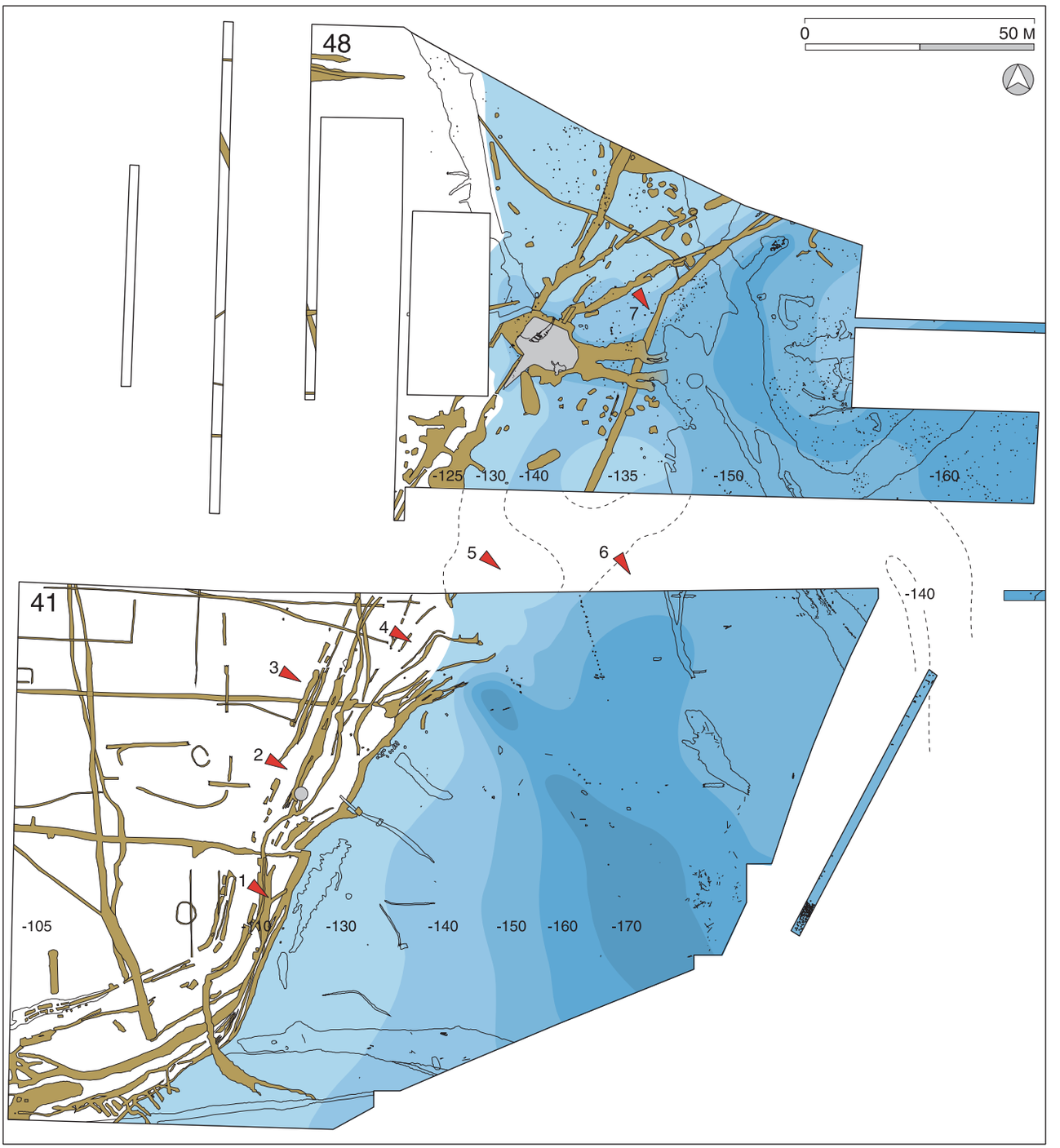


Fig. 40 Schematic suggested phasing (cf. Plan 6; *fig. 41*) of the gullies at the border of the ridge and pool. The openings to the lower-lying watery area (shaded) are indicated by arrows.

The large 9th/10th C pit feature (f4468) is also in this zone, and will be discussed at length below. By the post-Medieval period there was a less defined intermediate zone, as seen by the most recently dated features representing a stake row, with three pits at the end containing deposits (f3774, etc.), and dozens of stake points preserved throughout much of tr 48. These features are no earlier than 1700, and will also be discussed more fully below.

2.11.3 *The pool: early depressions, sedimentation process and botanical analyses*

Two early features, both depressions formed prior to a rise in the water level and sedimentation of the pool, had a disturbed lower extent and traces of the effects of water. Cattle prints were identified in and to the south of f4221. The droveway/cattle path interpretation could also apply to the depressions to the east of tr 48. They had a 'droveway' character in profile and plan, although no clear hoof impressions could be identified. If this area had first been used for channelling livestock to and from grazing areas, it would have displayed traces similar to those found on the eastern side of the ridge, in trenches 28 – 30, 34 & 35, dating to the 1st/2nd C. They predate the pool and the sedimentation process, and could



well be dated to the Roman Iron Age, contemporary with farmstead plans such as recovered in tr 49.

The southwestern corner of trench 41 was at the outlet of the freshwater creek cutting through the ridge, coming in from the west. Levees of the creek, and the creek bedding itself, are nicely preserved within the area of the monument. A small depression had formed at the outlet of the creek on the edge of the larger depression over the earlier Oer-IJ channel. An oxidised peat layer was found in trial trenches 42 – 44, but it cannot be dated with certainty. There was in

Fig. 41 Contours of the pool area, in centimetres below NAP.

any case no trace of peat accumulation in the pool area (tr 41 & 48), and this small area remained an open water feature throughout the Medieval period. Sediments were sandy, though mixed with very humic lenses by the 6th/7th C, and were wholly organogenic by the 11th C.

When sedimentation of the depression began, the open water area apparently silted up very gradually (Plan 2, section 1). There were no soil horizons or vegetation lenses indicating drier periods. Three distinctions were drawn in the collection of finds spread through three 'layers', though the transition between them was gradual. The collection of materials could not be narrowly defined as to 'layering' due to this diffuse upward progression from slightly sandy to the more clayey and humus-rich matrix of the pool sediments. Horizontally, the further to the east, the greater the humus content and degree of iron staining. The general distinctions drawn in the find collection were as follows:

f4112 The top of channel silts, grey-blue clayey sand, was somewhat disturbed and had finds embedded in the upper 5 cm. This was the surface up to the Roman Iron Age. In tr 41 bits of black burnished pot were found in this layer, but were noticeably absent from the next layer.

f4111 The general layer of pool sediments consisted of light-coloured, clayey sand with sandy wash lenses with a higher humus content to the east of tr 41. These sediments contained the materials described below, but there was no clear differentiation between this layer and the higher reaches, which gradually became homogenous, medium humic sandy clay, to silts with more organic material (plant dust). The 17th/18th C features were incorporated into this progression.

The contours of the lowest reaches of layer f4111 are shown in *Figure 41*. In the earliest stages of use, there would have been at most 70 cm of water in the deepest area. At periods when there was less water in the area, it would have been confined to a basin at a level of 1.40 – 1.45 m below NAP. The water level fluctuated and two worn paths (f4140 & 4136) at right angles to the gullies may have been used to reach water during drier periods. Both features had disturbed, trampled sediments in the bottom, but individual footprints could not be identified.

The dating of the wood and the depth of the sediments indicates the progression of sedimentation. In the deepest area of the pool, a 7th C dating (KIA 9999) came from a length of wood in concentration f4192. This was at a depth of 1.64 m below NAP, which indicates that, since the beginning of sedimentation and the earliest period of use, only 3 – 4 cm had accumulated in the deepest area of the pool. To the north, in tr 48, the lowest-lying sediments of the pool bedding were only 1.30 – 1.53 m below NAP. By the 10th C, the depression had silted up to the 1.30 m level and there was no longer a well-defined pool. Standing water would have been shallow as there was still a difference of 20 cm between the ridge and the general area to the east. The large pit feature dated to the 10th C was filled with water and the shallow dug gullies leading to it, with standing posts, were at a level of about 1.30 m below NAP. These features had filled with homogenous plant dust sediments, indicating open water at this level as well, as least during part of the year.

Environmental conditions were similar throughout the period when the pool was in use. Generally speaking, the plant spectra indicate a slow-moving to still freshwater environment, with some seeds interpreted as intrusive and brought along with creek sediments from eroded earlier deposits of the salt marsh. The sediment indications for habitat are given for the 6th/7th C and the 9th/10th C, the periods that have been best defined for the features in these two trenches.

The botanical samples analysed from the pool area indicate a similar watery environment (Appendix 3). A sample from a depression (f3819) in the southwest of tr 41 was filled with the equivalent of layer f4111, admixed with eroded material, with both an earlier dating and an Early Medieval date. The plants in the sample represent different environments. Species that are characteristic of the Ruppion maritimae, *Ruppia maritima* and *Zannichellia palustris* ssp. *pedicellata* grow in highly saline to slightly brackish water, with only small fluctuations in the water level and little current (Westhoff & Den Held 1969) and these could only come from displaced, eroded material from the creek cutting through the salt marsh ridge, redepositing earlier sediments, with earlier landscape indicators.

Conditions in the pool were suitable for freshwater plants and freshwater marsh vegetation, as indicated by the presence of *Alisma plantago-aquatica*, *Sparganium erectum*, *Oenanthe fistulosa*, *Sium erectum* and *Myosotis scorpioides*. The aquatic plant assemblage is characterised by both brackish and freshwater plants. Some species such as *Ranunculus aquatilis* and *Lemna* sp. are obligate freshwater plants primarily

growing in stagnant or slow moving, shallow water. Other species, including *Potamogeton pectinatus*, *Potamogeton pusillus*, *Myriophyllum spicatum* and *Hippuris vulgaris* occur in freshwater, but also in slightly brackish water. A sample from depression f3800, 6th/7th C, further from the stream bed, indicated plants characteristic of a freshwater environment. These plants are the most noticeable, in terms both of number of species and of abundance of seeds (App. 3, tab. 9). Many of them represent freshwater marsh vegetation (Scirpo-Phragmitetum) such as *Alisma plantago-aquatica*, *Oenanthe fistulosa*, *Sium erectum*, *Eleocharis palustris/uniglumis*, *Schoenoplectus lacustris* and *Carex riparia*. This vegetation would have been present around depressions where freshwater could accumulate, such as the pool. The presence of *Ranunculus aquatilis* indicates shallow, stagnant or slowly moving freshwater. Other aquatics such as *Potamogeton pusillus*, *Ceratophyllum demersum*, *Hippuris vulgaris* and *Myriophyllum spicatum* are usually expected to have grown in freshwater. The presence of *Zannichellia palustris* ssp. *pedicellata* and *Ruppia maritima* might suggest brackish conditions, but again cannot be used to type the conditions. These species were found in a depression, thus in sediments with an admixture of older material.

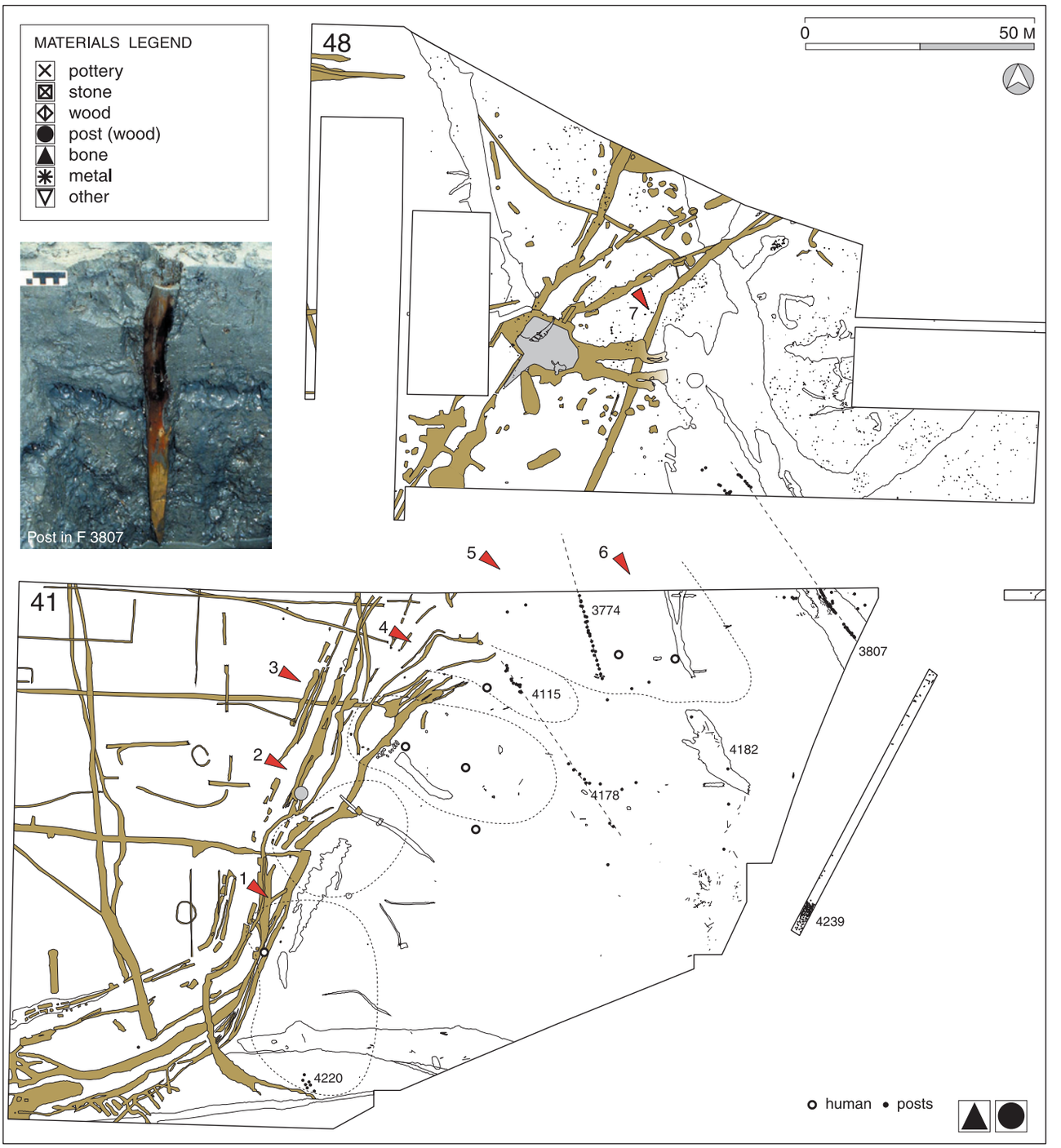
2.11.4 *Remnant rows of stakes in the pool*

Features have been described in the intermediate zone of gullies interpreted as having been dug to provide successive openings to the pool *(fig. 40 & 41)*. There are also concrete features of remnant rows of stakes pointing to some kind of structuring within the area of open water. From the south to the north, from the earliest use to the latest, these remnant rows have a similar orientation, not always associated with the contours of the pool, but mainly showing an orientation towards the SE. As with the sequence of gully digging, the most recent have the clearest remains. Remains of rows of stakes in the pool itself might be associated with a structuring of the border zone and contemporary with each of the suggested openings.

In *Figure 42* stakeholes and *in situ* stake points are shown from south to north:

– in the southwest of tr 41 there was a double row of stakeholes (f4220), in which one stake point of beech remained.
– two stakeholes, and a third with remains of a stake (oak, f4180), may be part of the line of six stake points (f4178) of willow and one of privet (Ligustrum v). A willow stake *in situ* gave a dating of 596 – 657 AD (KIA 18804). Horizontal lengths of willow lay next to the broken points. There was also wood lying horizontally further to the southeast.
– a row (f4115) of six willow stake points and one of beech may have been part of a row represented further to the southeast with two stakeholes and a stake point of ash. Even further along, in trial trench 42, was a dense cluster of dozens of stakes, f4239. Alternatively, row f4115 could also be in line with f4178 mentioned above.
– two stake points, of alder and oak, very near to opening 5. Further to the southeast, there was a pair of stake points of Picea and oak (fnd 3656, 3657).
– feature 4182, with a date range of 539 – 652 AD (KIA 9995), was a depression containing embedded horizontal wood and other finds. There were two stake tips within the depression, of willow and alder, and two stakeholes somewhat more to the south.
– further to the northeast lies f3807, a row very well represented by stake points and stakeholes. One of the stakes gave a date range similar to the above, at 533 – 641 AD (KIA 9998). A concentration of materials and wood (f3800, KIA 9997) in the depression to the west and adjacent to the stake row also gave a similar dating. There was a row to the other side of the modern ditch, in trench 48, as well as materials considered part of the same cluster.
– to the west of f3807 there was a W-E row of three stakeholes.
– the large pit f4446 included rows of posts and stakes, oriented generally SW-NE *(fig. 58)*, and will be described more fully below.
– feature 3774 is a post-Medieval row of stakes, aligned NNW-SSE, with three pit features at the SSE end. Although the date (KIA 10000) had a considerable range, the stratigraphy suggests that the earlier part, around 1700, is most likely.
– dozens of stakeholes and a few stake points were found in the eastern area of tr 48 (f4688). The one stake ^{14}C dated gave a range of dates (KIA 16856). Given the stratigraphy, the earlier part of the range in the 18th C, is most likely.

Many of the horizontal lengths of wood recovered from tr 41 had a point, created by one clear chop mark. Some could certainly represent elements that were originally standing, pushed into the pool bottom but which had become dislodged through the effect of water and/or had been pulled out. Of the



partial rows still *in situ*, only short stake points were present, and these were the remains of broken-off tips. As successive openings were created over time, new stake rows could have been set out after older ones had been broken down. The rows will be considered as forming alignments (see 3.4.5).

The clusters of materials might be associated with the structuring of the border zone by gullies and the remnant stake rows within the pool, and can be interpreted as representing successive generations of use.

Fig. 42 Positions of human remains within the offering site and the remains of stake-rows.

2.11.5 *Deposits in the pool area*

Human remains

In *Figure 42,* human bones are also shown, which may represent something of the generations of users. Seven deposits of human bones were recovered from tr 41. As mentioned above, bones from a child, recovered as a gully deposit from an early feature identified along the border zone area of opening 1, have been dated (KIA 14282). Also near higher ground, at the NW end of the path depression across from opening 3, a partial human jaw belonging to a young man was found in a shallow pit. Other human bone elements were recovered from the pool sediments. The knee-cap (fnd 3159), a complete patella, was the most northerly of the human remains.[29] The dating (47 BC – 121 AD KIA 14281) is much earlier than the time of deposition, considering the Early Medieval materials and other dates obtained from this area. This is an aspect requiring further research, but it ties in with growing evidence of past traditions and curatory practices for materials and, as discussed below, is also applicable to Roman materials. The six human bone deposits – thus including the deposit of child bones – could, as a distribution pattern, each be correlated to one of the clusters of other finds, and to the structuring of the pool by openings and stake rows. A pattern of reserving human bone for depositing in the pool area is also implied.

In combination with the openings, dug successively, the patterning of 'succession' towards the north can be incorporated in an interpretation of the first six clusters whereby successive human generations deposited generational markers of human bone for each new area used. The seventh area does not have a human bone deposit, which could be an effect e.g. of the modern ditch disturbance or altered traditions. Given the stratigraphy, with only a few centimetres of pool sediments between the earliest and latest deposits, the idea of a new family or farmhouse generation connected with a 'new' cluster and opening in the offering site seems a plausible way to account for the clustering of deposits, and the continued use of the pool.

The average lifespan of a farmhouse is generally estimated to have been around 25 years in the prehistoric period, with an implied connection to generational succession, which is also likely given the shifting nature of farmhouse location. If the same applies to the Early Medieval period, 175 years would be represented from the first to the seventh area in the progression from southwest to northeast, in a continuous stretch lasting seven generations. However, the dates of the stake rows are somewhat at odds with this suggestion. Those taken from the row of stakes in openings 4 and 7 and the horizontal branch from area 6 suggest a shorter period of perhaps as little as 65 years.[30] If the use of areas 1 – 3 was similar, a time span of 120 – 150 years may represent the duration of use of the pool.

Wood

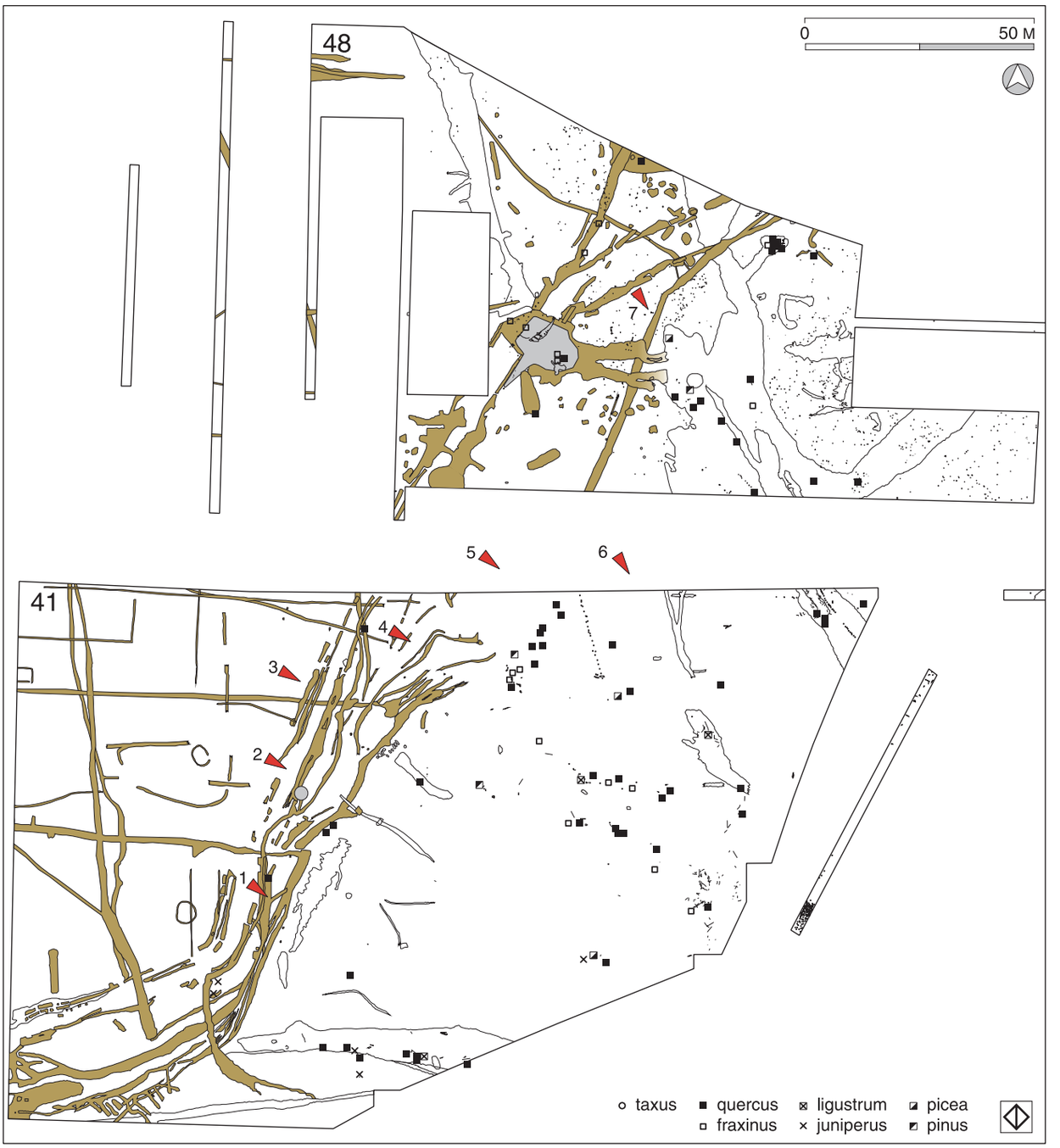
Apart from the stakes *in situ* mentioned above *(fig. 42)*, wood was also recovered as lengths of branches, pealed lengths with worked ends (such as the elderberry 'staff', fnd. 3983), longer lengths with one sharpened end, short lengths of beams and planks, and two complete objects *(fig. 46)*.

Although the pool was fed with water from the creek coming in from the west, and wood might have drifted along with the current to the location from which it was recovered, much of it seems to be related to clusters of other types of materials. Alder and willow was most likely available in directly adjacent areas, but these species have a distribution in the pool similar to other species – such as oak, ash, and the evergreens – which were certainly not growing in the immediate vicinity *(fig. 43, 44)*.[31] While some of the horizontally positioned wood could be parts of broken down stake rows, others could be deposits in themselves. No materials were found to suggest that wood was weighted down with sinkers (possibly stone) fastened with some material such as leather or sinew, to contain or to tie the finds to a particular spot.[32] Flax rope or other plant material would have been preserved if used for fastenings.

Another aspect to take into account is the importance attached to wood precisely because it does float. The best example from northern texts is that cited in Chapter 1, from the *Eyrbyggja Saga*, one of the instances in Scandinavian literature where wood from one homestead was thrown overboard to float to shore as a method of divining where the next should be built. Humans in myth depicted as logs floating to shore (in *Völuspá* of the Poetic Edda) is also a well-known example of meanings attached to wood, and is bound to 'World Tree' symbolism. It cannot be assumed that keeping all or some of the wood in the same position was always, or ever, the intent. More detail will be given below on the individual finds of wood (see also detail plans, Plan 6).

29 Onians (1991 [1951], 174 – 186) drew attention to these bones in the context of attributions of the seat of (male) seed and to the association with (re)generation in texts in the Indo-European languages, but with the focus primarily on the clear classical references to the knee.
The bone is in itself 'seed'-like and a certain visual analogical association with plant seeds, and plant regeneration, might also be appropriate. It may even be the underlying basis of references cited by Onians. Patella (kneecap) finds from any animal are underrepresented in general within the region and, when found, have been deposited in a special context (Therkorn 2004).
The only human remains at the Velserbroek offering site were thigh bones (Therkorn & Oversteegen 1994).

30 There are various possibilities. Stakes within a row could have been replaced within a generation, whereby the earliest range of f4178 is late, or using the latest of the range of f3897, a generation could be added to the period of use.

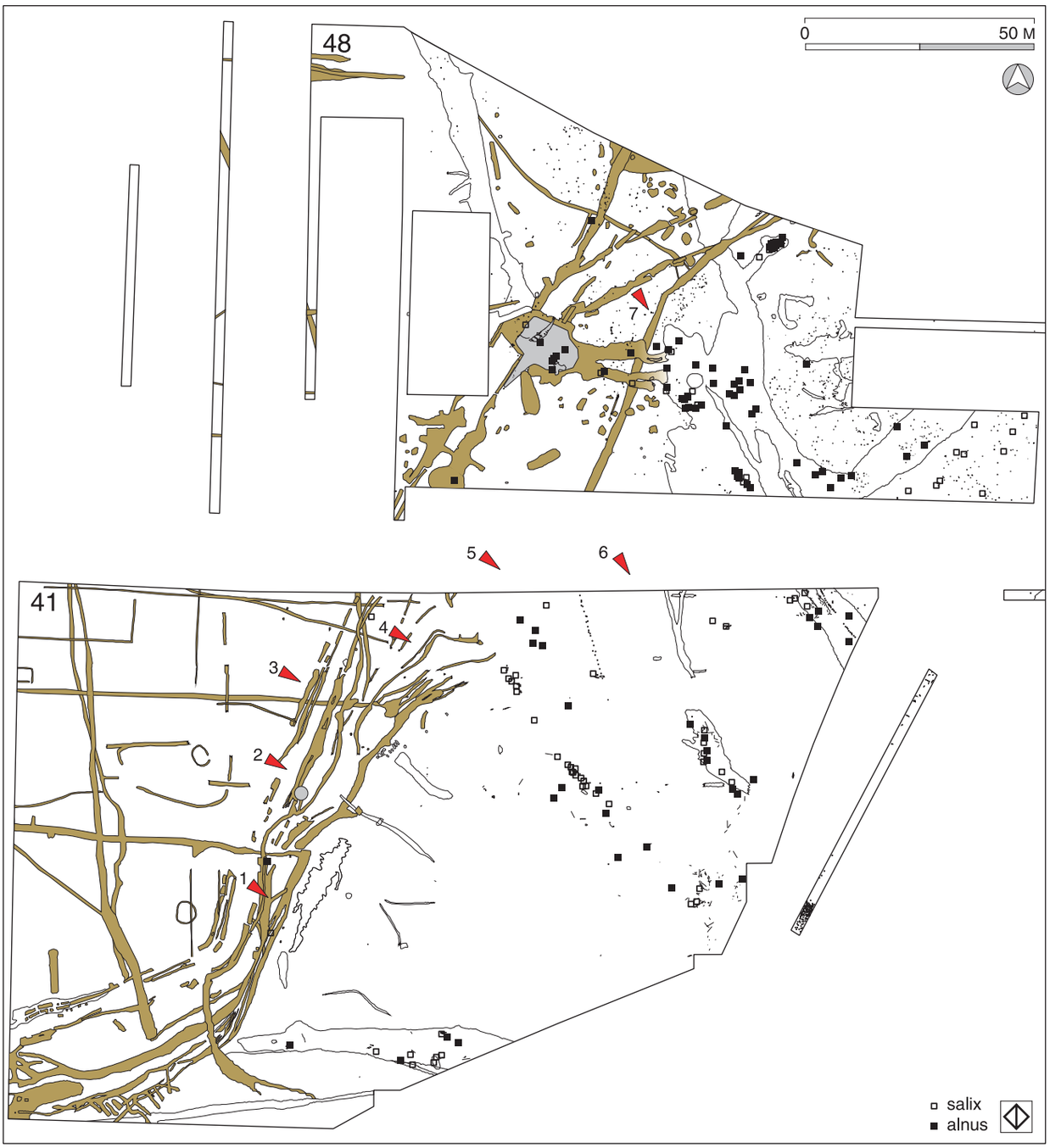


The wood finds of oak and ash and the evergreens are shown in *Figure 43*. Among the horizontally recovered wood lengths, the species which would not be expected as naturally occurring wood in the immediate area included oak, ash, and the evergreens (pine, juniper, yew, privet and spruce). Spruce was not a naturally occurring species until the historical period, though it does occur in the region as worked wood, and is present at sites from the Roman Iron Age onwards. The distributions of these species most clearly show the SE orientation across from suggested openings 3, 4 & 5. Also noteworthy is the group of three across from opening 2: a length of oak 45 cm long with a worked end; spruce, also worked; and, a short length of juniper. There were no stakes *in situ* across from entrance 3, although there are short horizontals of mainly oak and ash, extending out into the pool area. Comparison with the next figure shows short alder lengths also along this trajectory.

Fig. 43 Wood: oak and ash, and the evergreens.

31 Oak and juniper were also the species most commonly found as definite deposits at the Velserbroek offering site B-6 (Therkorn & Oversteegen 1994). Beech is found infrequently in prehistoric contexts in the region.

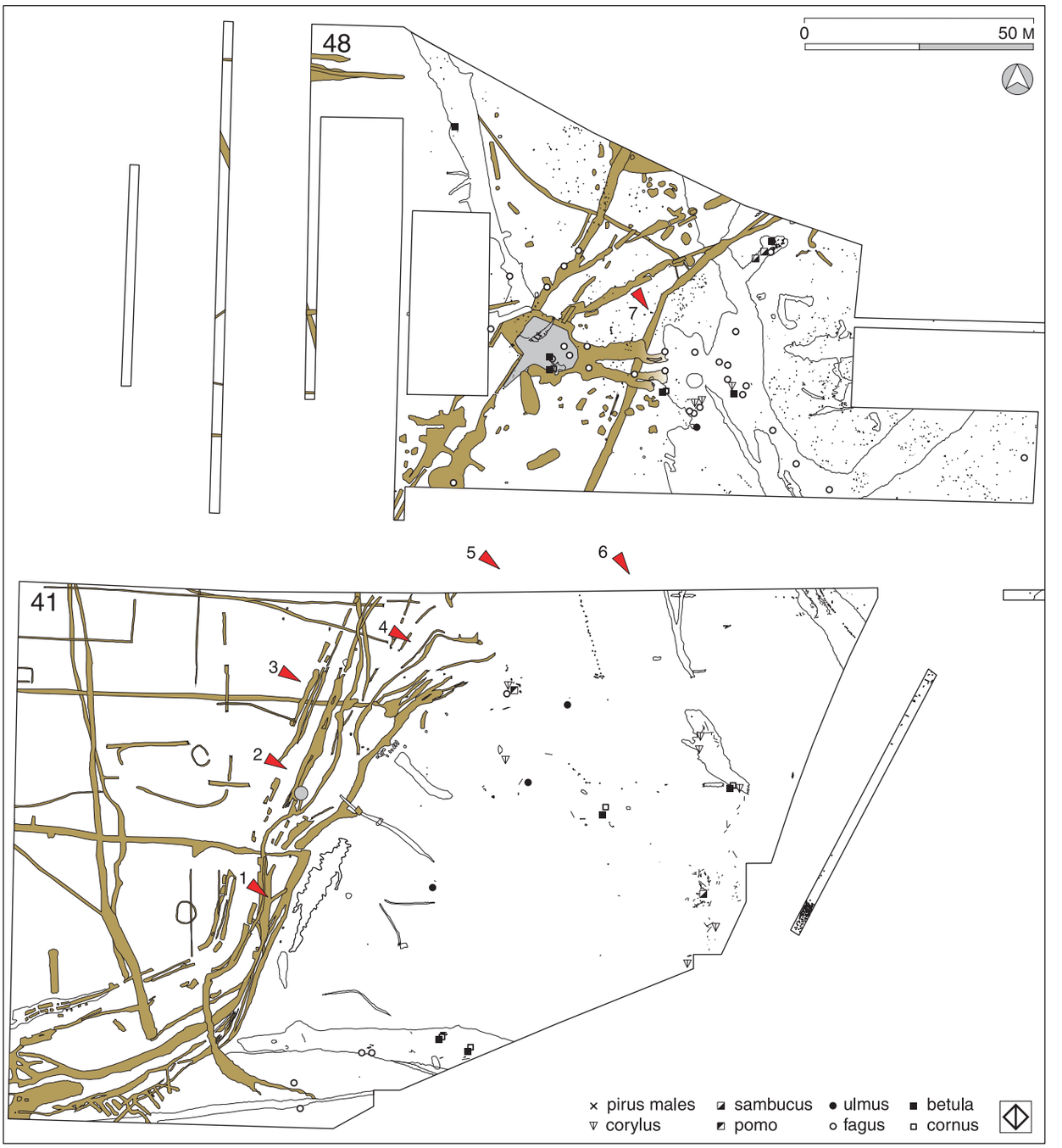
32 Fresh oak sinks in water, in contrast to other species, according to Brinkkemper (1991, 43 citing pers. com. Francis Pryor and Maisie Taylor).



Wood of willow and alder is shown in *Figure 44*. Suspected opening 5 clearly has scattered horizontal finds forming a pattern. Alder and willow are also present to some extent, but in a more diffuse distribution. Willow was certainly used for stakes, as seen by the broken-off points still in place. If stronger wood had been used, these species may have been less likely to have broken off when pulled, or broken and/or worked loose by the effect of water. Willow and alder could be overrepresented as stakes.

In *Figure 45*, the remainder of the wood is shown. These are the infrequently occurring species, though more are shown in the details of f3800/f3807 and f4182 on Plan 6. In this figure, the wider distribution across the entire area might reflect tradition. Elm was recovered only four times, but is very evenly distributed. One noticeable combination is the cornel and birch pairs *(Cornus and Betula)*. There were only seven finds of birch, but six of these were found with the six lengths of cornel. It seems certain that they were deposited together, and

Fig. 44 Wood: willow and alder.



if they had floated around, the lengths of these two species must have been bound together. The distribution may indicate a tradition spanning the period of use of the pool, from the earliest deposits in the southwest to the latest in the north. Hazel *(Corylus)* is rare, and the distribution is mainly along the trajectory of the stake row f4178, and to the southeast where it occurred as the longest find of wood (see 2.11.6, f4192). Beech was found to the south, in addition to the one remaining stake point in f4220, and one find adjacent to opening 4. The dozens of still standing beech stakes and posts of f4468, the large pit from the 9th/10th C, are not shown in this figure *(see fig. 58)*. Depression f4221 is earlier than the pool and has wood along its length. Other types of deposits cross this feature, rather than following it lengthwise, so the wood may not represent an original positioning. Drifting wood caught in the depression when the water level in the pool fell could be an explanation. The few finds of worked wood (other than chop marks) are shown in *Figure 46*.

Fig. 45 The remaining finds of wood.

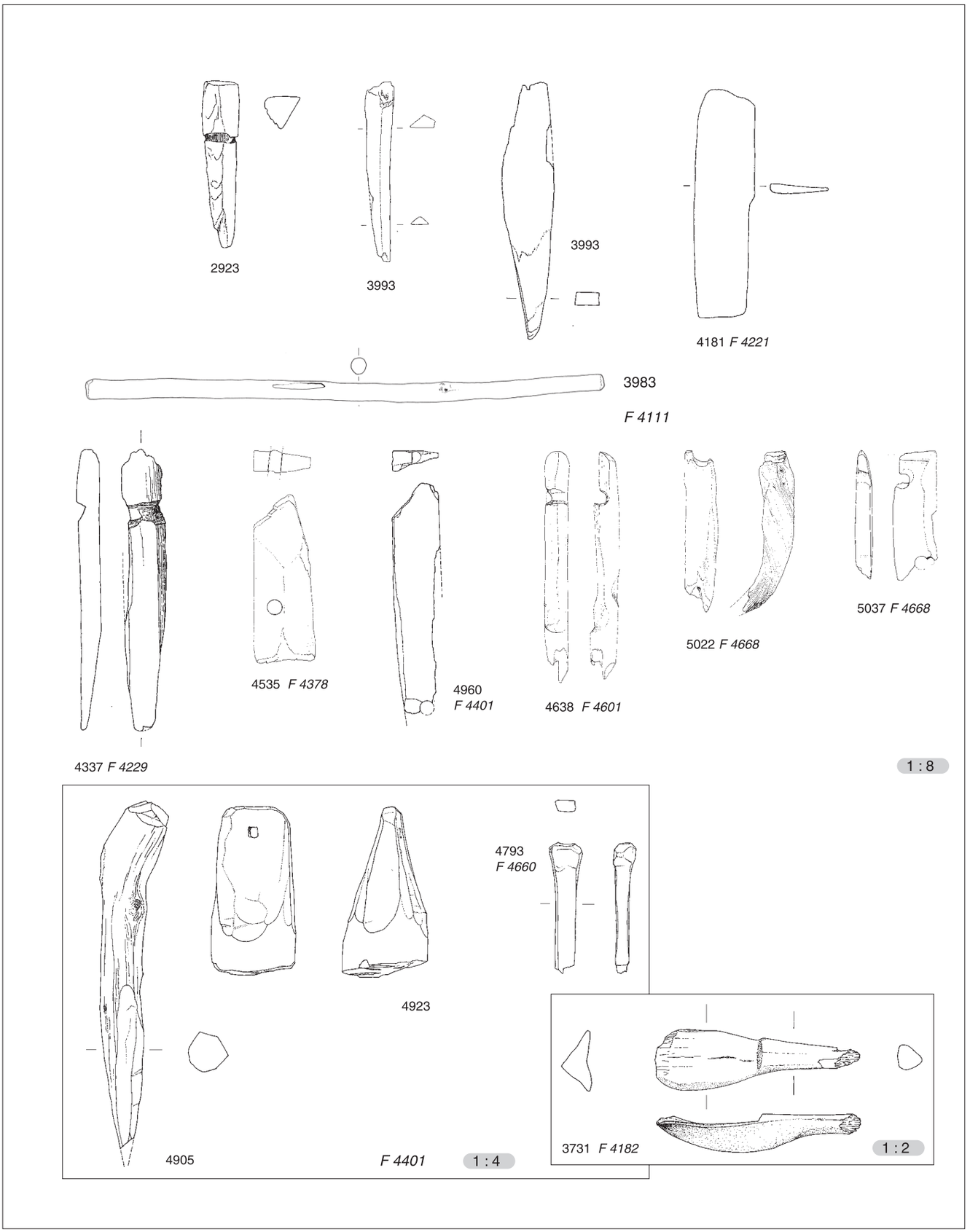
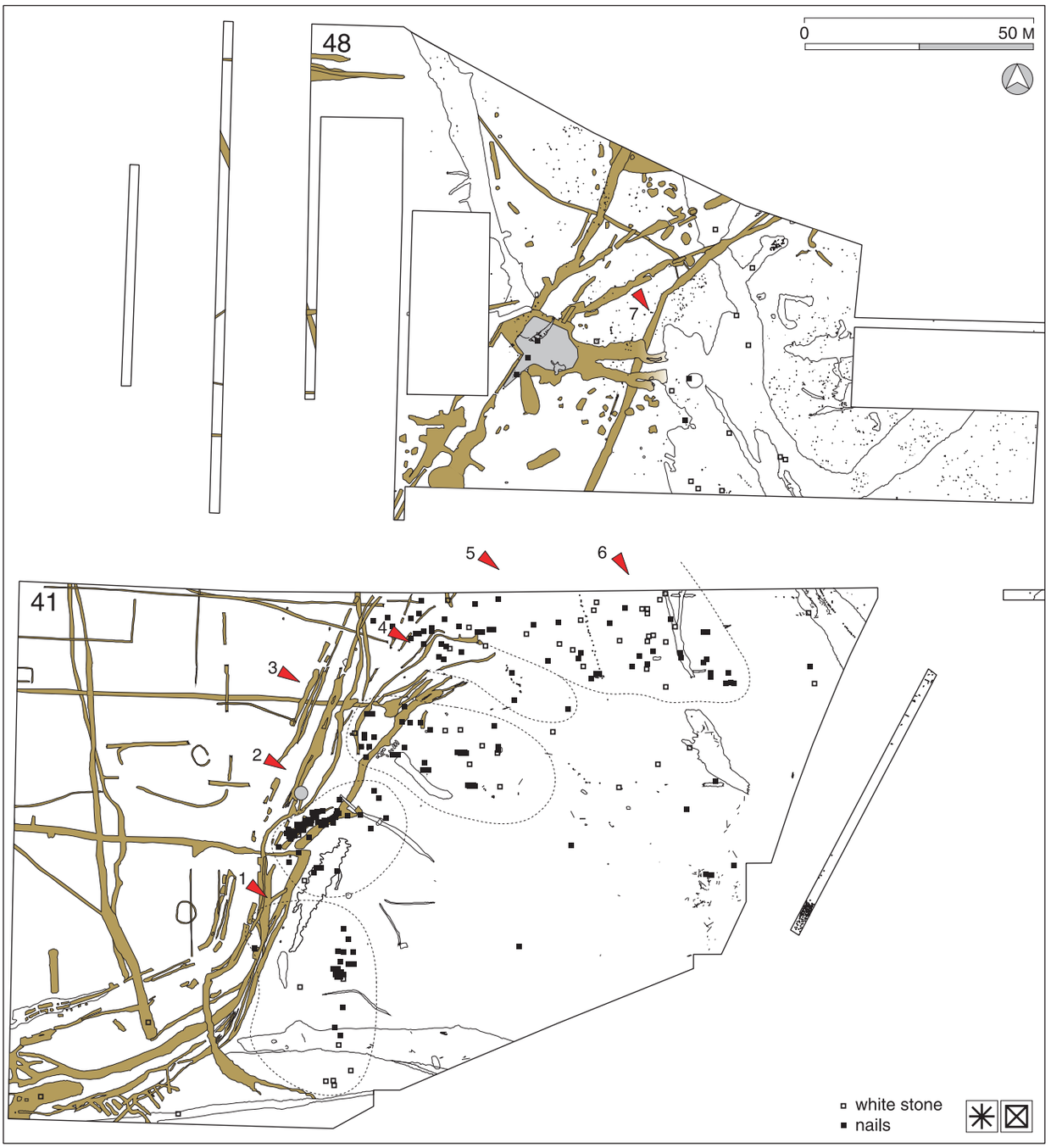


Fig. 46 The few finds of worked wood (other than chop marks) within the offering pool sediments and concentration of materials.

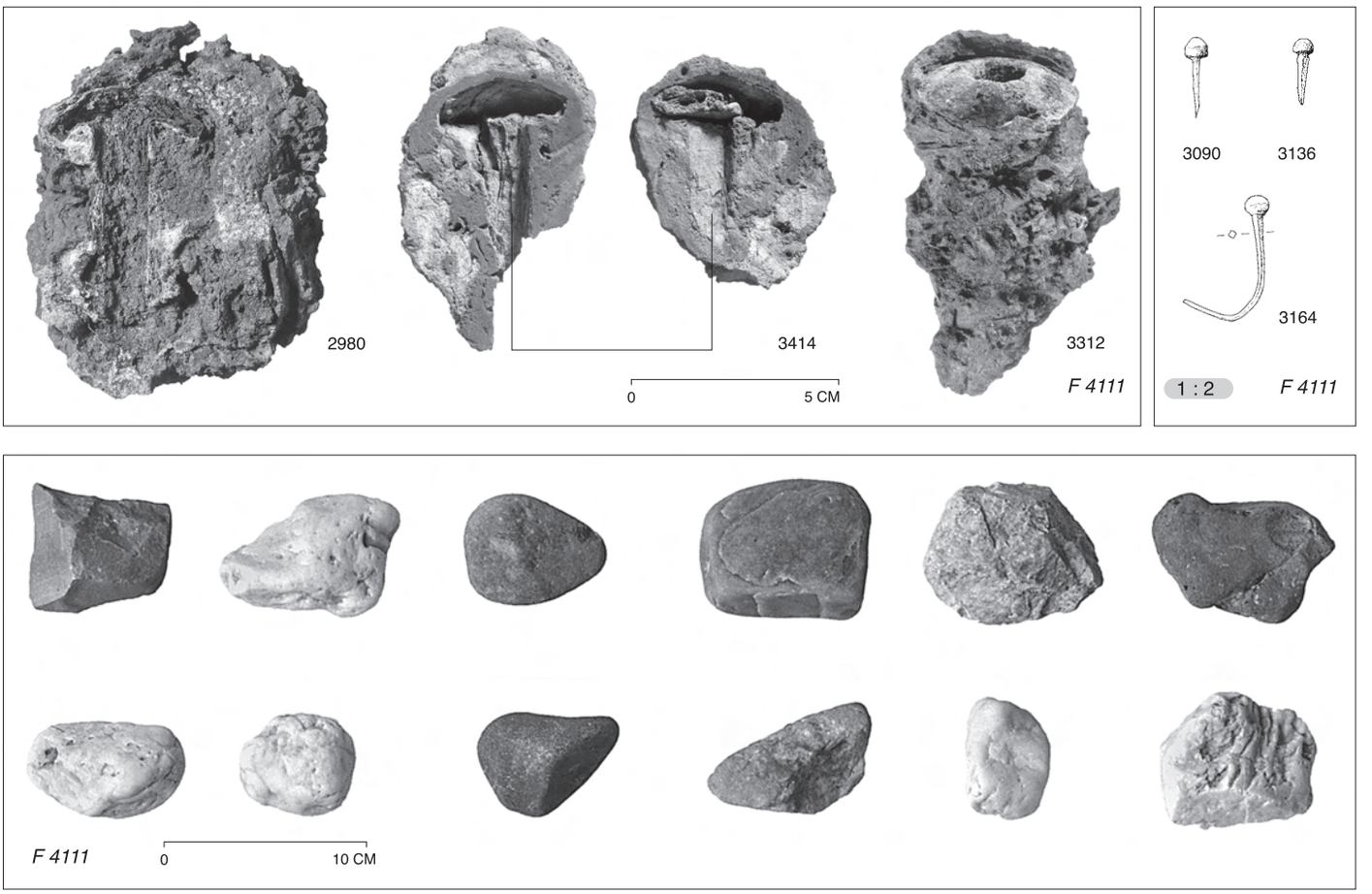


Nails, spikes and stone

The above spatial and temporal framework can be extended to the similarity and successive use of deposited materials. Spikes/nails (n = 159) and bronze studs (12), and later forging slag, are the most noticeable special deposits in trench 41, with an overlap of deposits of slag from clusters 6 and 7. Together with the 411 finds of stone, also characterising pool deposits, and other finds, these can be ascribed to a Donar-/Thor-type deity (3.4.5).

The first three clusters are the most distinct, certainly more so than the finds along the north of trench 41. Area 7 is least represented, although across the modern ditch disturbance stones do generally form more distinct clusters. Iron was deposited less frequently to the north. The finds in tr 41 were for the most part deposited closer to the higher-lying area than other materials, and the first three clusters serve to illustrate the connection with the suggested interrupted entrances to the pool.

Fig. 47 Distribution of white stone and 'nails' which includes finds of nails, studs and large spikes.



If the suggested general chronological sequence of southern to northern progression is correct, stones were deposited with growing frequency, and iron with declining frequency, until almost none at all was deposited as time progressed. There were only seven nails in tr 48.

The 'large nails' were recovered as extremely corroded iron balls, representing the heads of the nails with part of the shaft preserved in some cases. The most complete example was 12 cm long, with a broken shaft. It could not be determined if they had all been complete when originally deposited. A few of the more complete examples were X-rayed and through the corrosion the spikes could be determined as square in section (8 – 10 mm), all with round heads.[33] One example which was sawn through lengthwise is shown in *Figure 48*. These spikes have been declared non-Roman, and the round head is particularly unusual: 'Round-headed spikes of this size are unknown in the Roman period' (Mattijs van Nie, pers. com. 11/6/02). More work needs to be carried out on these spikes. Early Medieval ironworking is ill-understood in the region.[34]

Another category consisted of small bronze studs (n = 12) with rounded heads, one of them with remnants of gilding, and a longer example which may be a pin *(fig. 48)*. Considering the numerous nails that seem to be almost wholly concentrated within the certain earlier use of the pool, these small, unused studs are consistent with the theme.

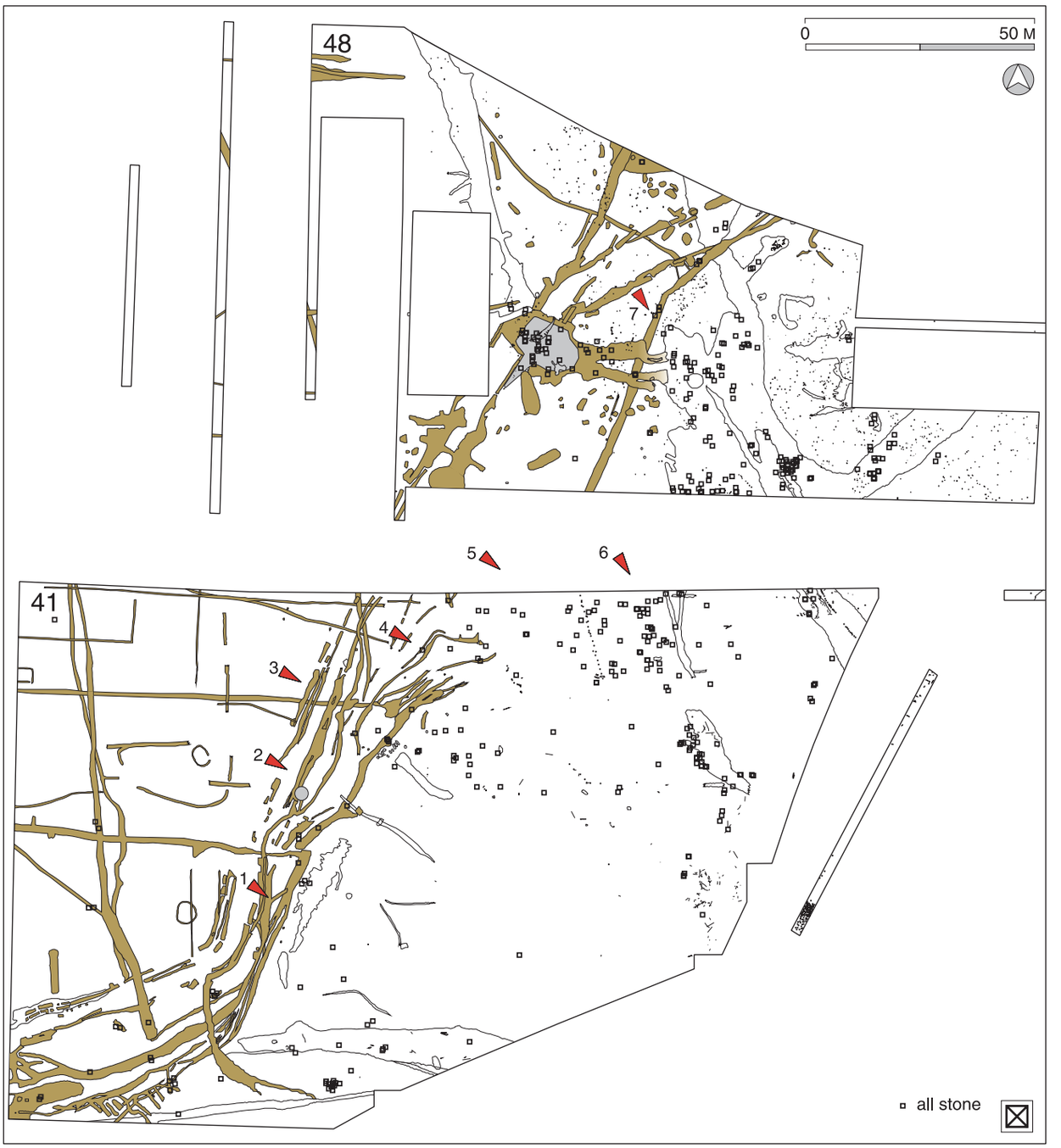
The distribution is primarily near to the suspected shore, though three clusters are very closely associated with the curves of the different phases of dug, snake-like gullies. Some were certainly somewhat displaced as features extending to the south over the area of earlier clusters were dug to renew openings.

White stone seems to correspond most closely with the distribution of iron spikes, although stones were deposited more frequently to the north, a change in deposition practice if time is represented from south to north.

Fig. 48 Examples of the finds of iron spikes, nails and stones. And see p. 115 for examples from f4182.

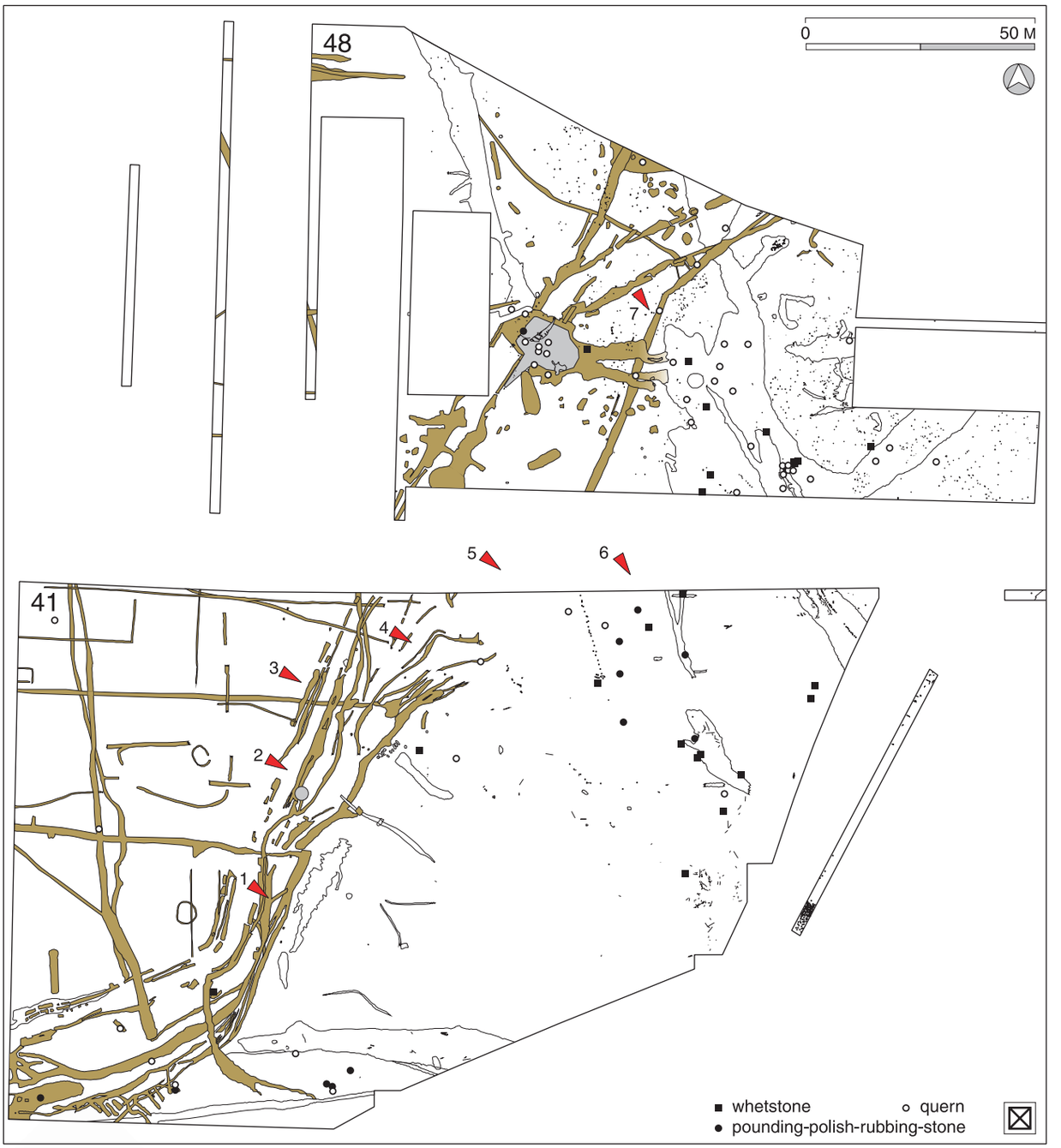
33 The iron was described and X-rayed by Anita Koster.

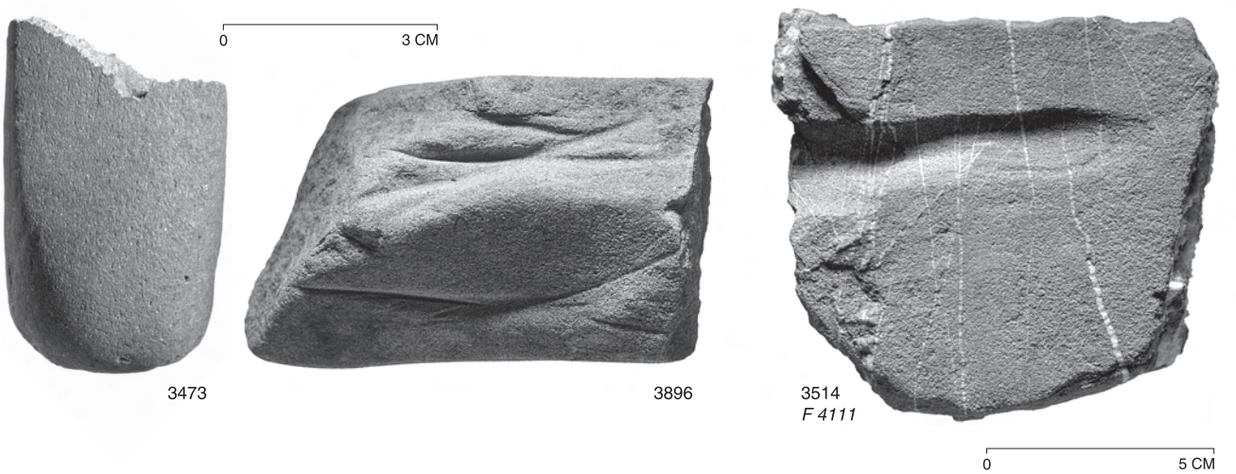
34 Prior to the iron specialist Van Nie's statement, and to receiving the ^{14}C datings, we considered the possibility that they were nails used in shipbuilding, deriving from the Roman harbour at Velsen. Examples were examined by Martin de Weerd, a specialist on Roman ships recovered in the Netherlands (cf. De Weerd, 1988), but he was unable to confirm any definite shipbuilding connection.

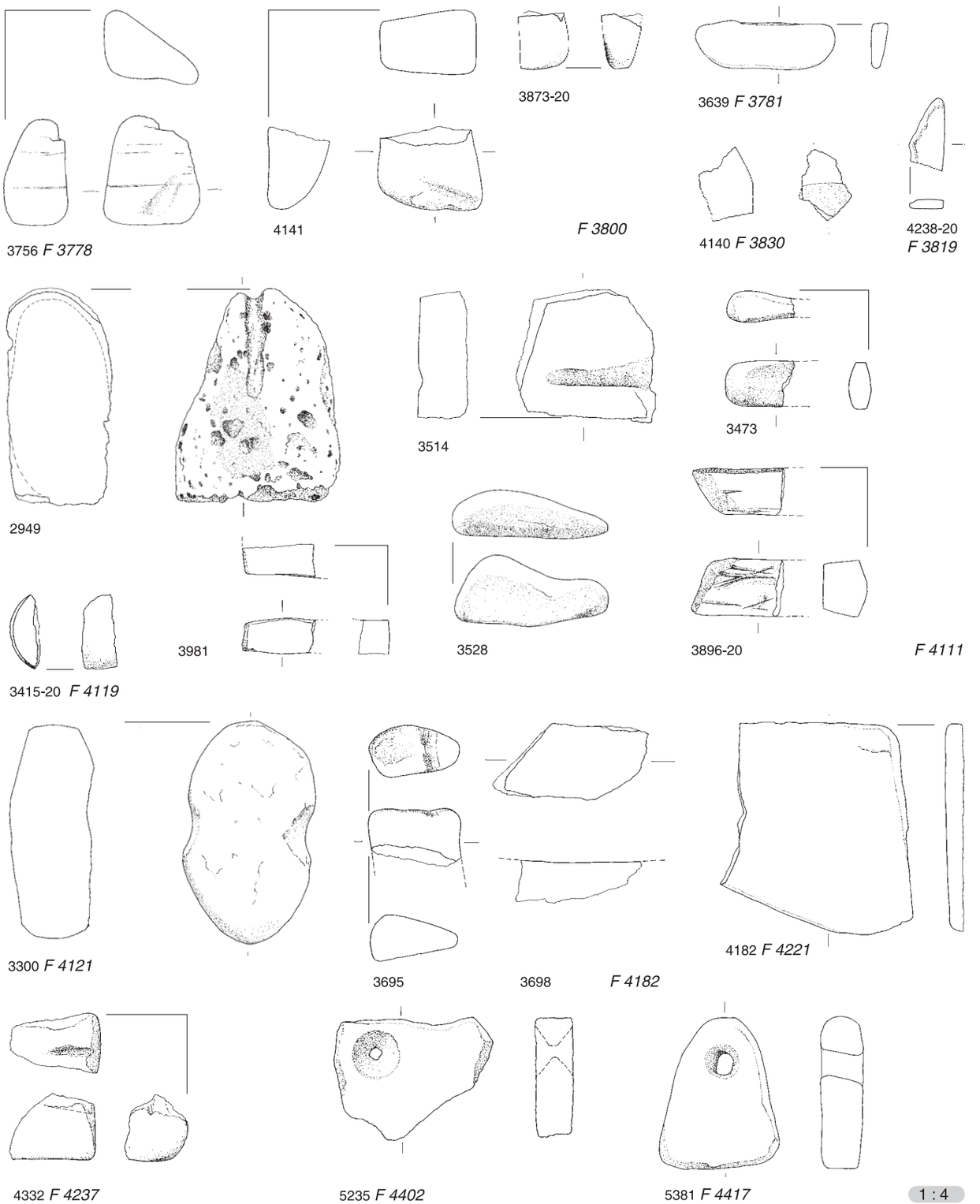


The plot of all the stones shows this more clearly *(fig. 49)*. In contrast to the distribution of nails, stone was recovered from further out into the pool and were a frequent deposit. An attempt was made to find a patterning in the colours represented, which range from reddish through to green, and white through to black, with various shades of grey. Clear colour combinations were also sought in combinations of stone, (Roman) pottery and building materials. Such work has previously been done in the region (Gerritsen 2000). Extending the tradition of pit deposits, some clear combinations were seen in stone and Roman pottery, particularly for materials in white and red. No such combination was clear in the case of the pool, however. The combination of white stone+pottery and red stone/tiles/pottery fragments does occur regularly, but not exclusively, and combinations of red and 'grey' are also frequent. The various colour combinations are not close enough to say with certainty that they were deposited together.

Fig. 49 Distribution of all of the stone finds.


48
41
0
50 M
1
2
3
4
5
6
7
whetstone
quern
pounding-polish-rubbing-stone

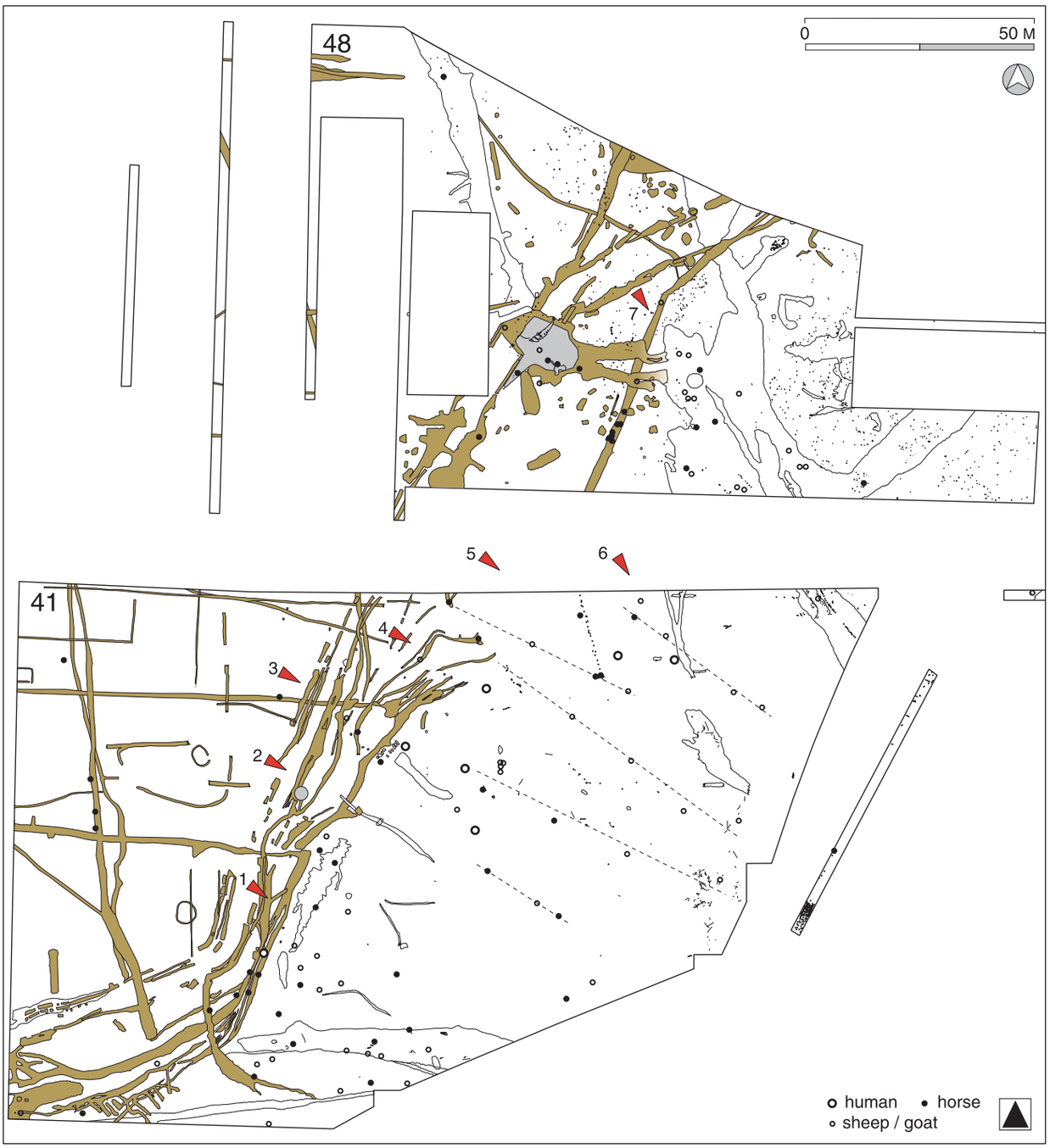

0
3 CM
3473
3896
3514
F 4111
0
5 CM



Quern stone fragments and stones with traces of use were infrequent within the south of the pool. Of the total of 283 stones deposited with certainty in open water, below the 135 cm NAP contour line, 89 were worked or showed traces of utilization *(fig. 50)*. A selection is shown *(fig. 51)*.

Fig. 50 Distribution of worked stone, and some examples.

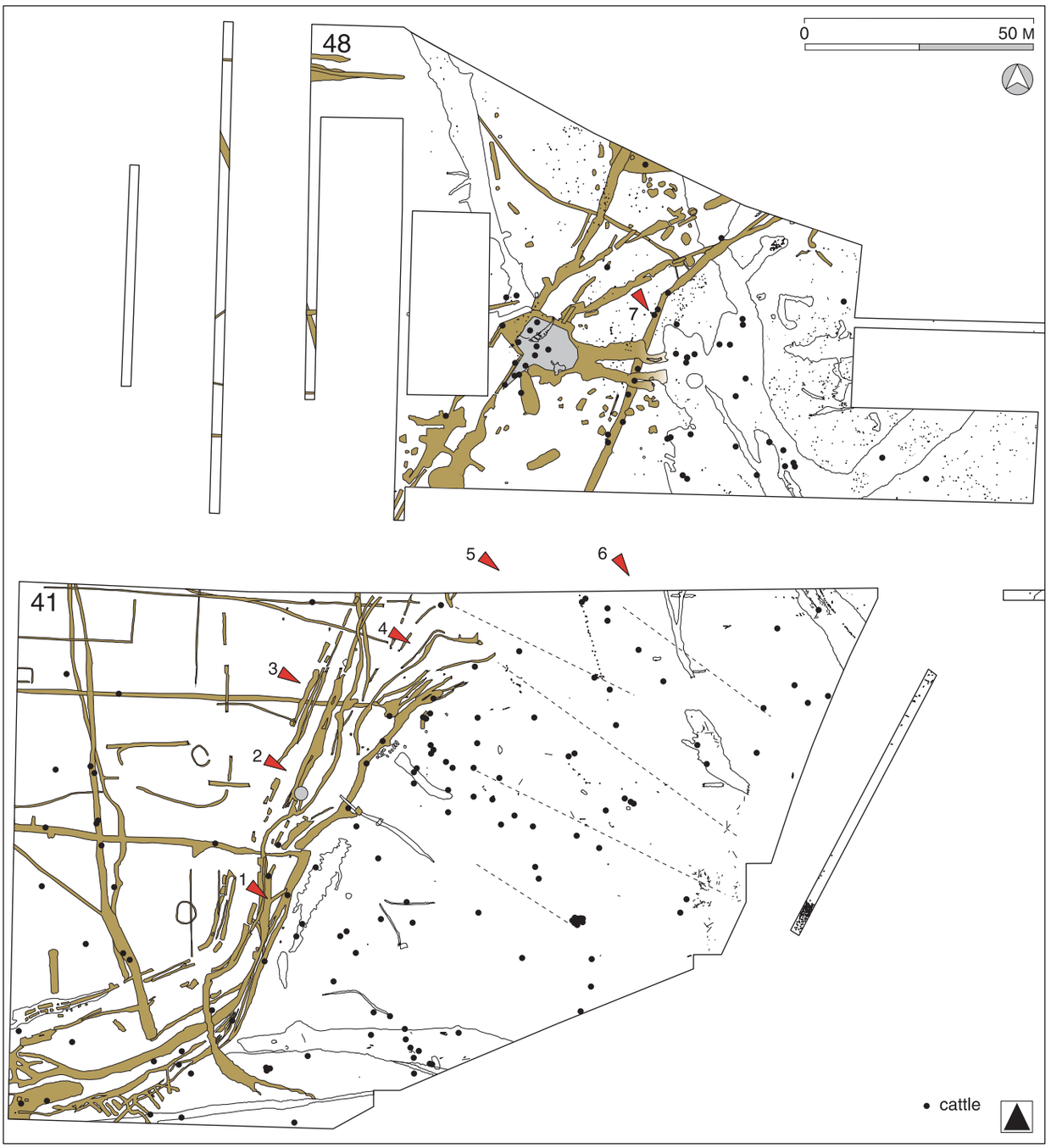
Fig. 51 Examples of worked stone.



Animal bone

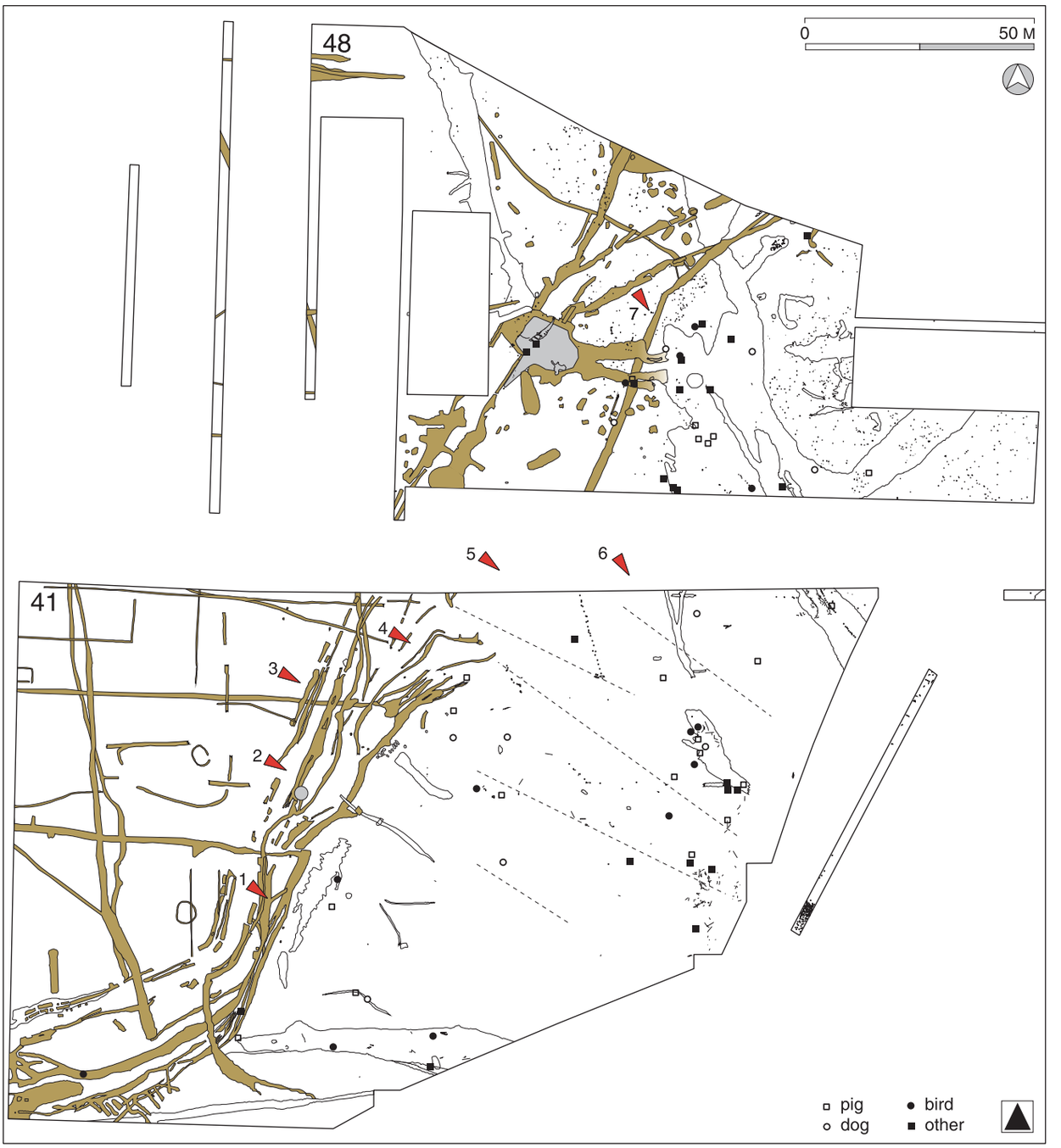
Bones were also frequent deposits in the pool. The distribution of horse and sheep/goat bone elements shows directionality more to the east than do the general placement of wood and the remains of stake rows *(fig. 52)*. Areas 3, 4 & 6 and these 'lines' are close to deposits of human bone. Area 7 is wider and the distribution remains unclear across from suggested opening 1.

Fig. 52 Bone materials from horse and sheep/goat, as well as the human remains.



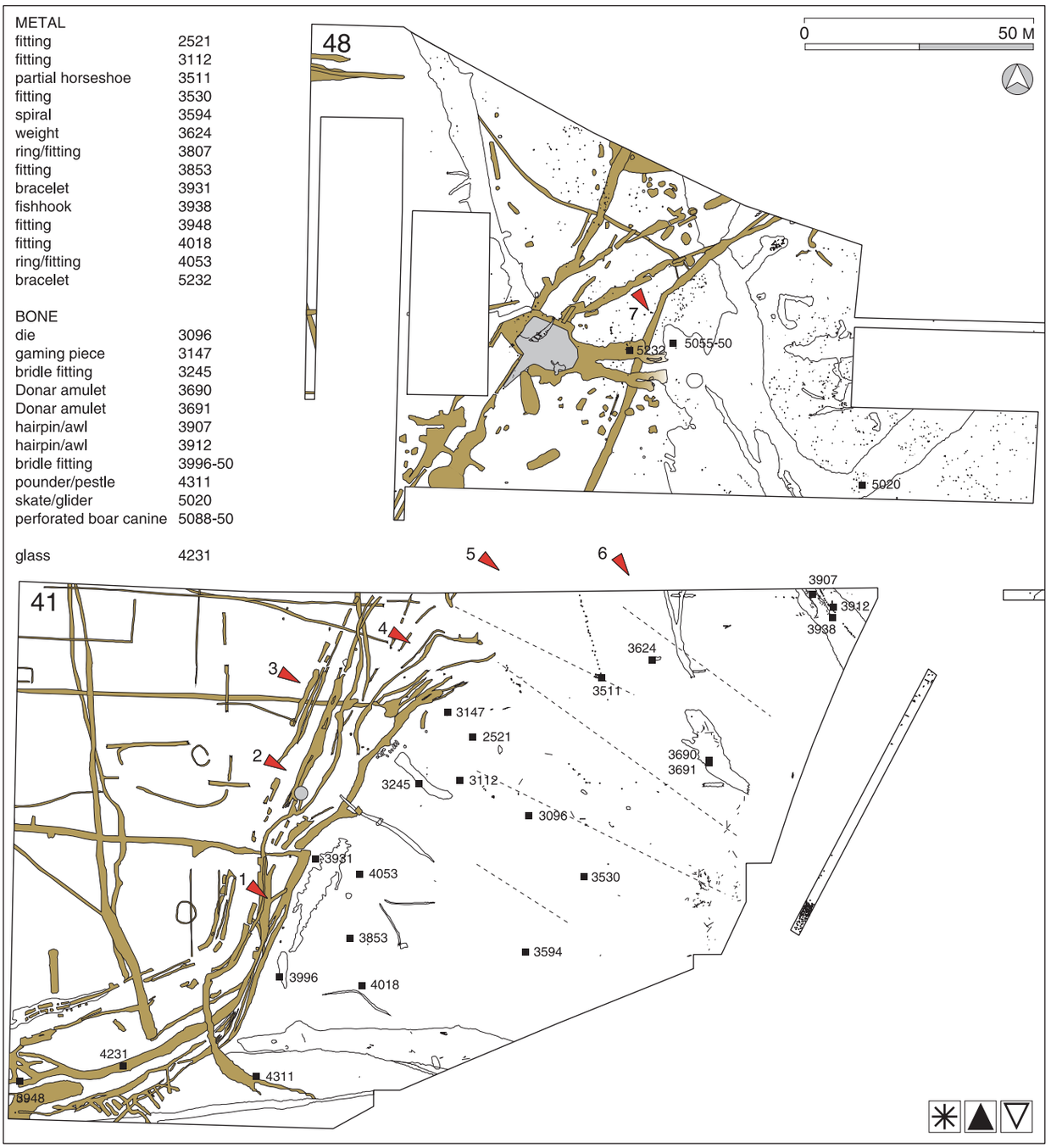
The 'lines' of horse and sheep/goat bone from *Figure 52* are shown in *Figure 53* with the distribution of cattle bone. The picture is one of greater spread, although a linear tendency to the southeast remains. The area of opening 3 remains the clearest. It appears that cattle bone might be a better indicator of the first opening and of directionality than the combination of horse and sheep/goat bone for the more northerly and suspected later distributions.

Fig. 53 Distribution of bone from cattle.



The remainder of the bone is shown in *Figure 54*, again with the reference lines suggested by the combination of horse and sheep/goat in *Figure 52*. The few deposits of dog elements are evenly spread throughout the different clusters, and these are 50% of all the dog bones recovered in the Broekpolder. Other bone is shown from fish, bird, an otter and a watervole (cf. section 3.2.2 & App. 4).

Fig. 54 Distribution of bone from dog, pig and non-domesticated species.



Complete objects and incomplete, infrequent categories

Figure 55 shows the distribution of bone and metal objects deposited in a complete or an incomplete state, excluding coins and Roman and Germanic fibulae. Complete objects of bone *(fig. 56)* were a die, a rectangular gaming piece, two awls or hairpins, two bridle fittings *(Oesdoppen)*, a skate or glider, and two 'Donar amulets' (and see box). A worn pounder or pestle from a gully feature along the ridge was incomplete.

Materials were evenly spread among the suggested clusters, excepting area 5, although, as can be seen in the *Figure 53*, two fibulae were present here. The bronzes include fittings of rings, the double spiral pendant (and see box) and a fish hook *(fig. 57)*. There was only one find of glass, a small clear shard. The partial horse shoe is from the pit dating to the 18th C (f4185).

Fig. 55 Distribution of bone and metal objects (excluding coins and fibulae) with find-number and designation.

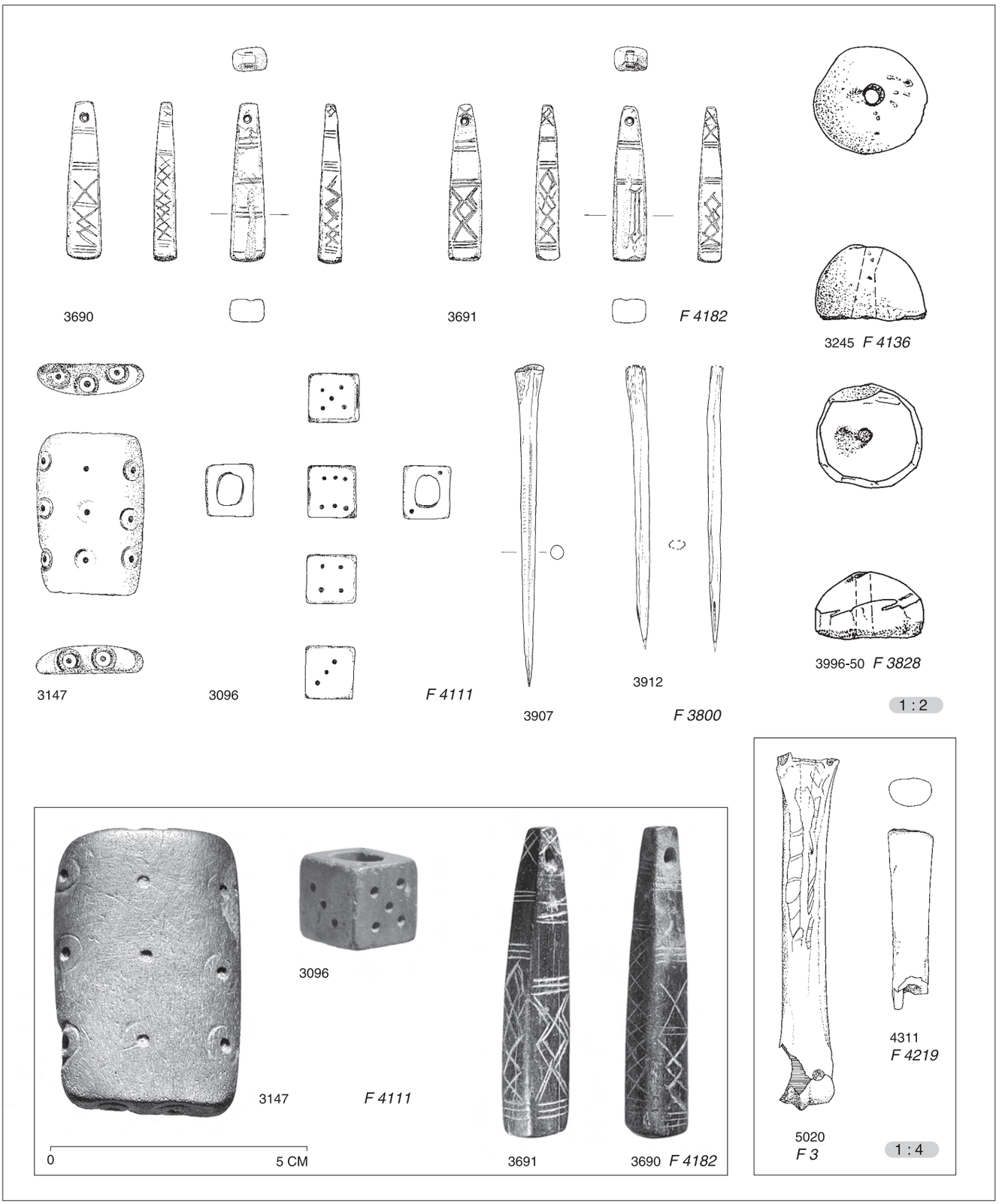


Fig. 56 Bone artefacts.

Donar amulets


from Werner 1964

Werner (1964) published an overview of objects which, because of the different forms and dates, were divided into 'Herkuleskeule' and 'Donar amulets'. The first group dates from the late Roman period, in the 3rd – 4th century. These objects show clear representations of the knots where branches were removed from the club. A 3rd C find from a cremation cemetery at Cologne-Nippes was engraved 'DEO HER[CVLI]', a reference to the god/hero Hercules. The 'Donar amulets' are considered to be a more schematic representation of Hercules' club, with the frequently occurring circle-and-dot motif interpreted as a schematic representation of the knots. At the time of writing, Werner dated these to the 4th – 7th C, listing 80 find-spots spread across Europe – from Britain, to northern France, Belgium, the Rhineland, and the central Danube region – to Syria and the Black Sea coast. Germanic areas of West and Central Europe were best represented. The Broekpolder examples *(fig. 56)* were probably deposited in the earlier 7th C, thus falling within the latest range. A few examples from Werner are shown here.

The objects are most often recovered from mortuary contexts such as graves and cremations and, where defined, exclusively from those of women and infants. This was the pattern distinguished in the 1960s, and it seems to be substantiated by more recent finds, as listed below. The urn without cremation, the house ditch at the Tjitsma/Wijnaldum terp, and our examples from the 'offering' site in the Broekpolder add to the types of depositional, archaeological contexts.

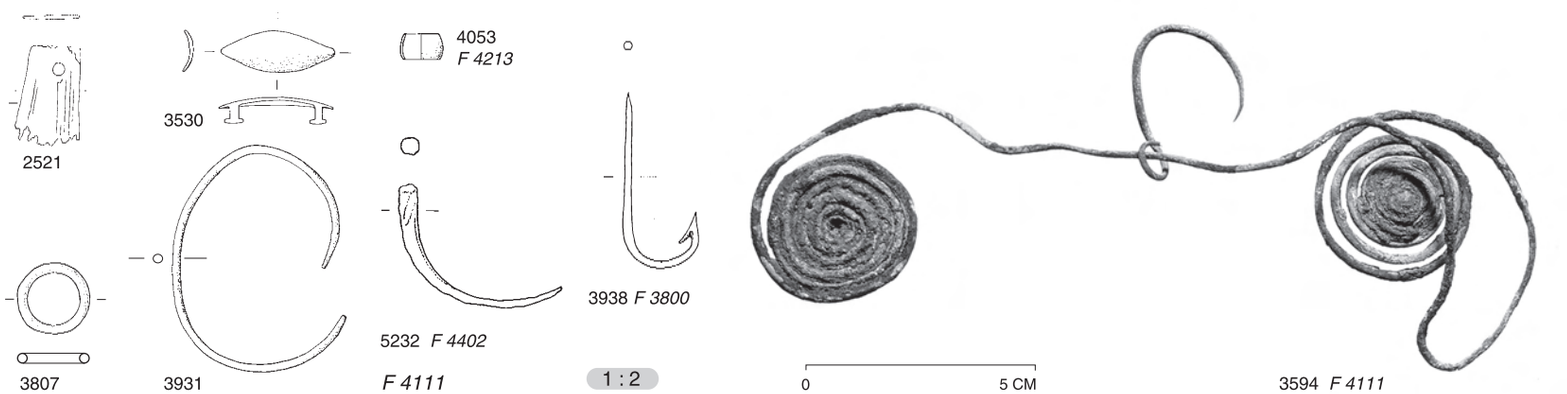
The objects are either conical or prismatic, the shape apparently correlating with the material from which they are made. Examples made of antler tips, bronze and gold are conical, although there is some debate as to whether the hollow metal examples should be included (cf. Meaney 1981, 165 – 166). Known objects of bone, such as our examples, are prismatic. A circle design is most common, sometimes interspersed with geometric motifs. There are also undecorated examples, implying the meaning should be sought in the form and material rather than in the motifs, or that the meaning of undecorated finds could be completely different. The Broekpolder examples are somewhat unusual in having a possible 'illustration'.

Werner started off the interpretation within meaning spheres of protection, growth and fertility. The combination of vulva-like cowry shells with the amulets was used to argue the case for fertility. Knol (1988) also argues this connection for the combination of materials at Dokkum. A brief literature search performed by Maaike Verhagen provided the following finds in addition to those catalogued by Werner. He was not aware of any finds from the Netherlands, and those listed below fill the gap, rather than constituting any overrepresentation in this undoubtedly incomplete update.

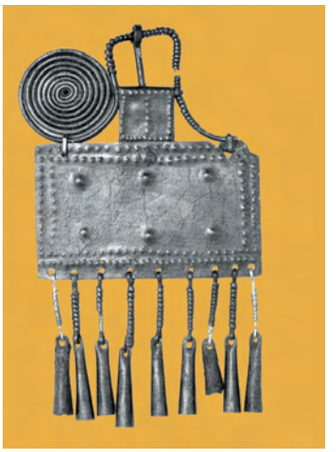
– *Belgium:* Arlon. Three conical amulets from women's graves in a Frankish cemetery (Roosens & Alenus-Lecerf 1965).
– *Germany:* Altendorf (northern Bavaria, Oberfranken), grave. Early 5th C (Haberstroh 1999).
– *Netherlands:* Aalsum, terp. Undecorated, undated (Miedema 1983).
– *Netherlands:* Valkenburg, Roman castellum. Prismatic amulet, undecorated, Roman-Early Medieval (Verhagen 1988).
– *Netherlands:* Hogebeintum, terp. In 2 urns, 3 prismatic amulets decorated with circle-dot motif, with other finds, 2 cremations of children, 5th/6th C (Knol 1988). >>

– *Netherlands:* Dokkum, Sionsberg, cemetery. Three undecorated, prismatic green amulets, possibly tusk, together with beads and cowrie shells, in an urn. 7th/8th C (Knol 1988).
– *Netherlands:* Tjitsma/Wijnaldum, terp. Two similar conical examples of red deer antler with circle design. One was from a woman's grave, the other from a house ditch, 6 – 7th C (Halici 1997).

The Broekpolder objects are in mint condition and both have carvings on all four sides consisting of zigzags, crosses and double and triple lines, demarcating three clear zones on each object. While these seem to be design motifs, an object also appears to be represented on one side of find 3691. The 'loop' to the horizontal lines in particular suggests something hanging from an implied belt, which would then imply that the object itself represents a human figure, with woven clothing represented by the lines and zigzag designs. As always, such interpretations are in the eye of the beholder, and one of us felt that the object pictured 'hanging' was phallus-like. Since the other of the pair does not have a similar 'illustration', one might think in terms of a male and female figure deposited together. Taking the idea of human figures further, another facet of both examples is the incorporation of the natural groove of the bone itself in the overall design. These are the shadowed, longitudinal, features on both objects, and they are present on the side of each object with the least adornment. On these bones in their natural state, the groove extends along the entire length. They are not deep, and these objects could certainly have been cut from the same bone element while avoiding the groove altogether. Since this is not the case, and the groove was incorporated on both examples while being cut away higher, from the 'waist' upwards, there does seem to be a conscious utilization of the natural form.
In line with the 'figurine' suggestion, legs would be implied, using the groove of this lower leg bone from which the objects are carved. Another argument for a 'fertility' interpre-tation is directly linked with the fact that the amulets are manufactured from the lower leg bone. Although the bone element is not often defined, the other prismatic examples could well be made from lower leg bones. The round examples seem to be of antler. Both antler and lower leg/foot bones are related to the site of procreative substance as discussed by Onians (1991) in relation to both materials, though the foot bones have drawn greater attention in the context of foot symbolics, a much-discussed topic of attribution as symbolic of male power and fertility (e.g. Aigremont 1909, Maier 1962, Sarfatij 1984). The many finds of complete metapodia, the bone from which these objects are made, are an important category of deposits in pits, certainly into the later Roman Iron Age (see also below for horse legs from a much later pit). They have been related to the subject of fertility, divination, and ultimately with a broader category of tree symbolics, such as the tree-of-life, and the origins of humans, within broad belief categories, as materials used for ritual deposits (Therkorn 2004). Coming back to 'trees', these objects did begin as objectifications of a wooden club, part of a tree.
In general terms, and if the selection of the material was the key factor in terms of symbolic representation, the many undecorated amulets are easier to understand. The decoration can be seen as reiterative rather than explanatory. If the 'club' and the 'illustration' suggested for a pair are reiterative, the meaning could easily be sought within the broader base of the phallic/fertility associations with the bone and antler from which the objects are made. Both types of representations are in fact similar, actually referring to 'trees'. None of us 'sees' these objects as clubs. Our examples were found mainly with wood, also from trees, of course. Stone, pottery and bone were also present, and should be seen as part of an intentional combination. Intent will be examined in the general discussion on offering site materials, place and meaning, including the 'Donar' tradition, in relation to the offering site in general through indirect referencing in other categories of deposits.



Spiral pendants





The double spiral pendant is made of bronze and is 2 mm in diameter. It has seven coils forming two opposing spirals, 3.5 cm in diameter. The dating of this object is problematic, as parallels from reliable contexts are lacking. Two similar pendants were found in Woltersum, Friesland, and are now in the National Museum of Antiquities, but their context is unknown (RMO. inv. no. RMO: W.E.V. 3; Pleyte 1877, plate XL: *see figure*). This group of finds consists of one complete pendant and another missing a spiral. Both are comparable to the pendant from the Broekpolder in terms of size, form, number of coils and thread diameter. They differ in the presence of chains and/or beads attached to the spirals. The third object is smaller, and consists of one spiral ending in a hook.

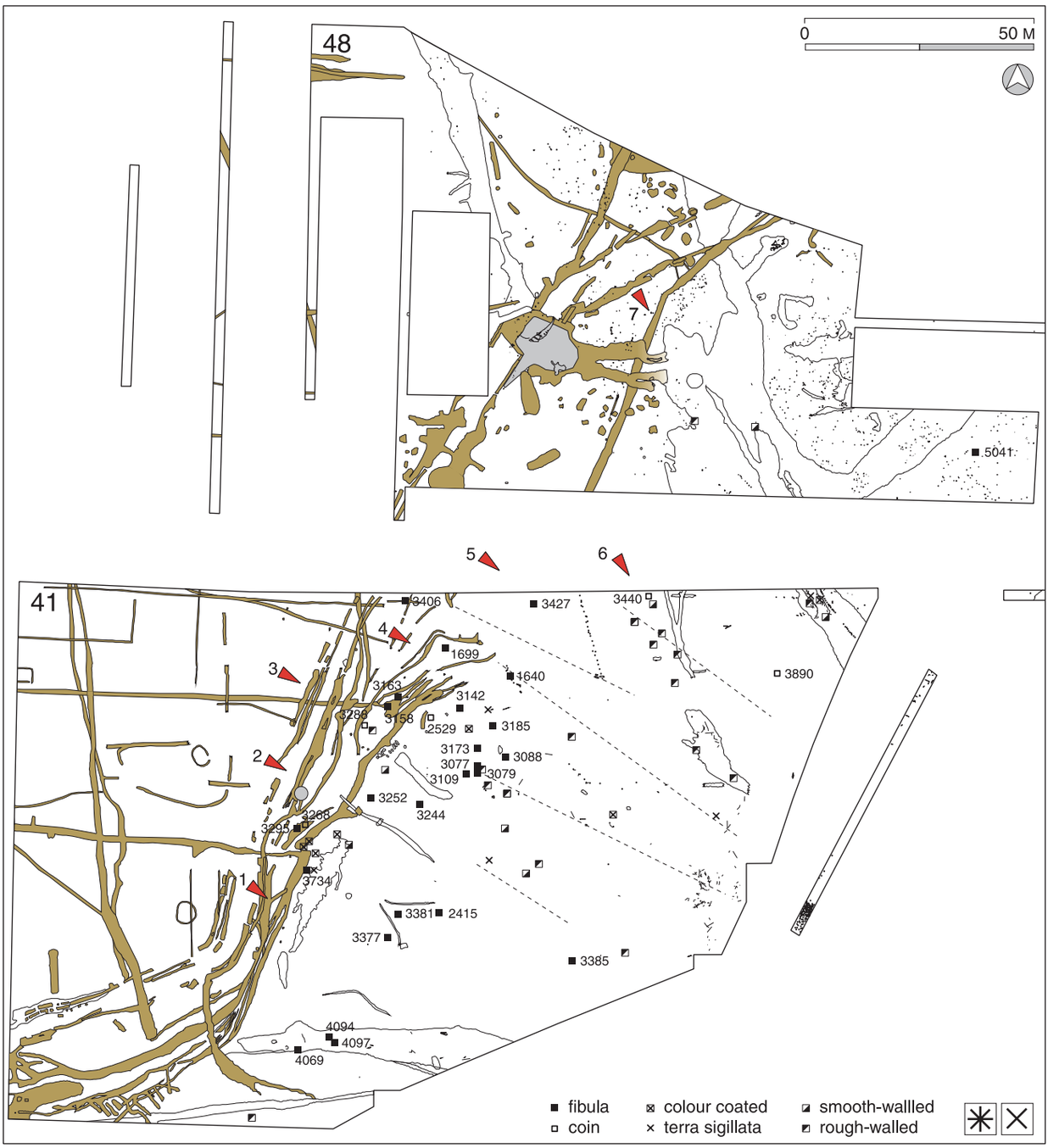
More generally, of the *Brillenspiralen* and *Hakenspiralen* type of personal adornment is well known in Europe. The distribution in time and space is striking: from the 5th millennium BC to the end of the 1st millennium AD and covering much of Europe, from Britain to Russia, and from Denmark to Spain. The oldest examples come from the Balkans and Northern Italy, and date from the Neolithic and the Early Bronze Age. The distribution climax is situated in Central Europe during the Bronze Age/ Early Iron Age (13th – 7th C BC). Most of these spirals are considered to have been part of the personal adornment of women and children, as suggested by the grave contexts recovered. They show great variation in size, form, position on the body and combination with other ornaments; they are also found in hoards and occasionally in settlement contexts (Matuschik 1966, Laux 1973, Betzler 1974, Wels-Weyrauch 1978, 1991, Vasic 1999).

These objects are rare in the Netherlands. The National Museum of Antiquities' collection includes a few spiral pendants from unknown contexts; one complete example was found in the river Scheldt and a number of partial pendants came from cremation graves, including from the Early Iron Age cemetery at Roermond-Musschenburg (Tol et al. 2000), as well as from 'hoards' (pers. com. David Fonteyn, RMO). Double spiral pendants become less frequent in later periods. They are found at the end of the Early Iron Age (6th C BC) in Northern Germany (Betzler 1974) and in the transition to the Middle Iron Age (6th – 3rd C BC) in Southern Europe and Britain (Ladier 1984; Romero Carnicero 2001, 143). A double spiral from a woman's grave in the vicinity of Soria, Spain, is attached to the top of a rectangular decorated bronze plate. Seven undecorated conical pendants were attached to the bottom of the plate of the type that is sometimes considered to be part of the 'Donar amulet' category of finds. The find complex at Woltersum also comprised a small rectangular bronze plate, together with a U-shaped object and beads, which may well have been a part of the pendant, contrary to the author's reconstruction (cf. Pleyte 1877, plate XXXIX).

Finally, the most recent double spiral objects come from a silver hoard and as stray finds near Gudme, Denmark, and been dated to the 4th – 6th C AD (Jensen/ Watt 1993, 197).

The spiral motif is worldwide, and although the form and the associations are theoretically bound to time and space, the meaning of the spiral is most often interpreted in terms of fertility symbolism (e.g. Matuschik 1966). The association with women and children, and tutulus forms, seems to justify this view. The double spiral has also been related to cycles of life and death, the world of the living and the world of the dead, the natural and supernatural domain, as reflected in the interpretation of the positioning of engraved stones at the threshold of tombs such as those at Newgrange, and associated with temples on Malta. Sørensen (1997) studied the double spiral pendants from the Middle Bronze Age in Germany in a more specific contextual focus, as a component of personal adornment. She has convincingly argued the role of the complete array in the cultural construction of regional identities, as well as the personal social identities of women in the course of their lives within the local community. The similarities in interpretation and depositional context between the spiral motif and the 'Donar amulets' (see previous box) are striking, both cases involving fertility symbolism, women and children.

Fig. 57 Examples of metal objects, other than coins and fibulae.



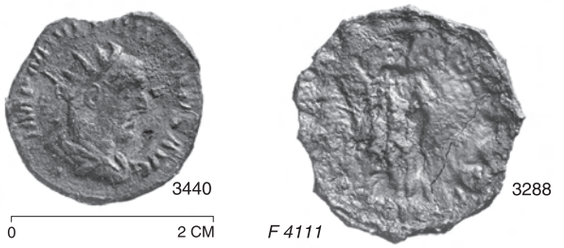


Fig. 58 Distribution of Roman and Germanic fibulae, Roman coins and Roman import pottery, all deposited much later than manufacture date.

Roman and Germanic materials, and Medieval pottery

The distribution of complete and incomplete fibulae, and coins (legible or not) have been included in *Figure 58* as well as the certain Roman import pottery. The more complete Roman and Germanic fibulae are illustrated, as well as some of the pottery, which was all very fragmentary *(fig. 59)*.

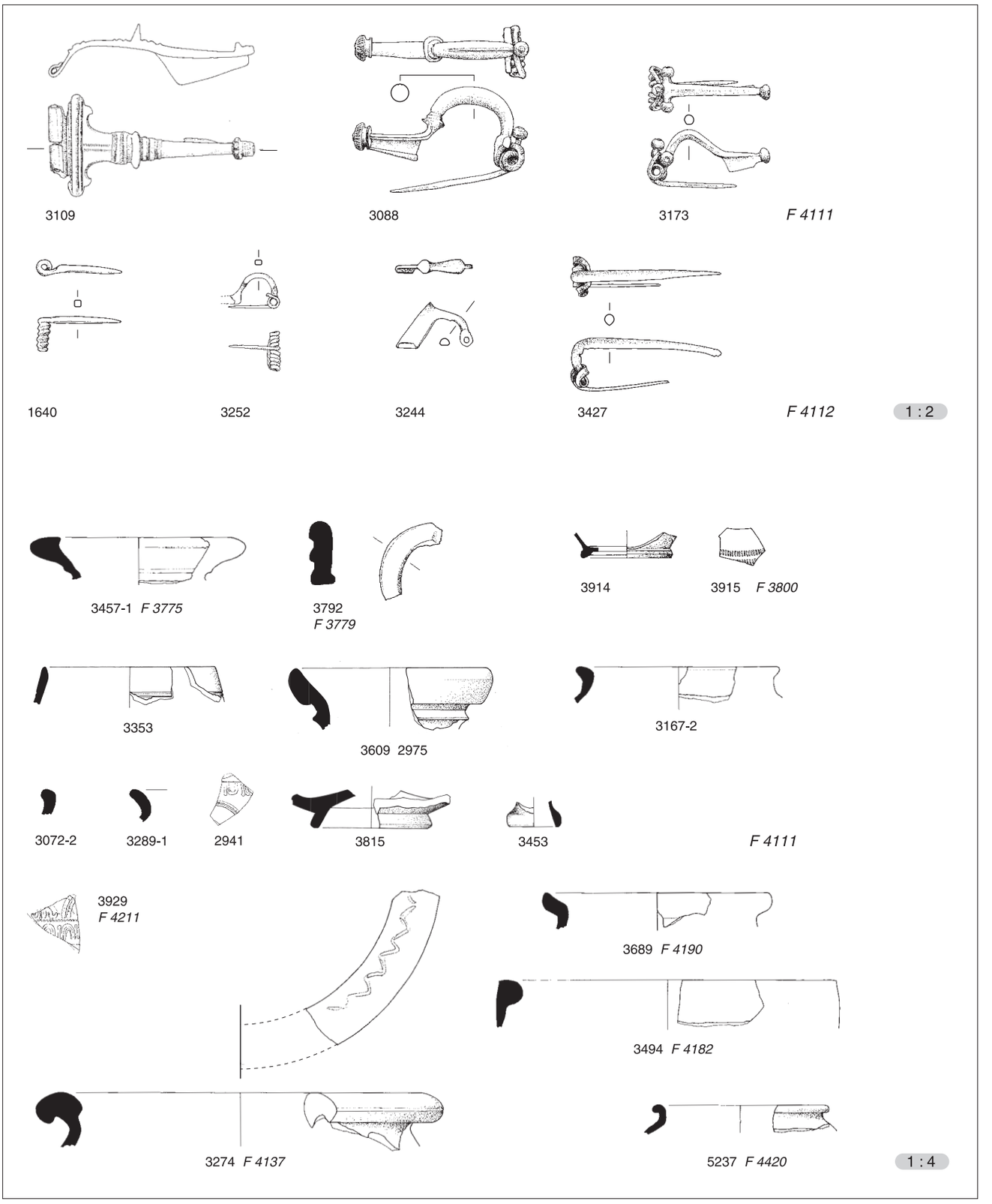


Fig. 59 Roman and Germanic fibulae and Roman import pottery.



Pottery that could not be identified with certainty[35] as Roman or Medieval, or was claimed by the specialists for both their respective periods, is shown in *Figure 60*, alongside pottery identified with specialist[36] certainty as 'Early Medieval'.

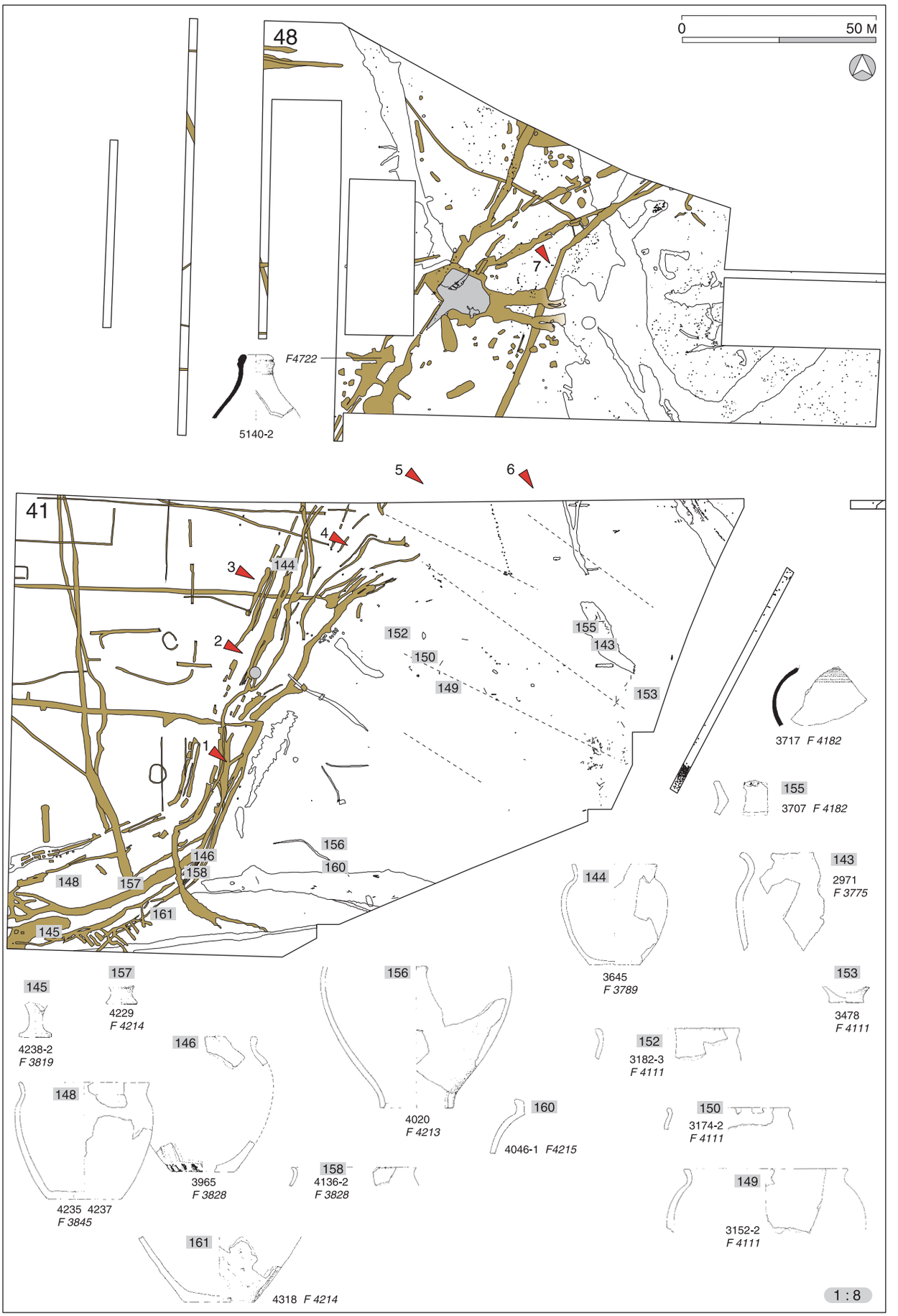
Figure 61 shows the distribution of native rim and base sherds with find, feature and pot number (see Chapter 3; and App. 8) and finds of the later Medieval pottery.

Fig. 60 Distribution of Early Medieval pottery, and those sherds either of Roman or Early Medieval date.

Fig. 61 Distribution of native rim and base sherds (with find, feature and pot number–see Chap. 3; and App. 8) and later Medieval pottery.

35 This was done with no knowledge of the circumstances of the finds. There is a problem with these materials and they should be looked at more closely, with the 5th century in mind.

36 Thanks are due to Jan de Koning and Jan Besteman.


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The cluster in f3800 (detail Plan 6) has deposits including Roman imports, among them early 1st C Samian ware deposited with Early Medieval pottery. The two ^{14}C dates in the 6th/7th century from a stake in the row and a horizontal length of wood placed with the finds, and the juxtaposition of the Roman imports with Early Medieval pottery make it certain that the entire concentration is from the 6th/7th C.

The nature of the undisturbed layering in the northern part of area 6, with both Roman import and Early Medieval sherds at the same level, also indicates an Early Medieval date. The date from the stake row f4178 is also 6th/7th C and, in association with opening 4, would suggest that the Roman import finds in this cluster were also deposited long after their manufacture date. The Roman materials were deposited in the Early Medieval period. The human bone element, also found at the same level, and within the same cluster in area 6, had a 1st/2nd C dating, which also contradicted the recovered patterns. As is becoming clearer (cf. Bradley 2000, 2002), the past in past communities, and practices of curating older objects, including parts of humans, are opening up new aspects of intent that require exploration.

Plan 6 also shows the distribution of other pottery and tile fragments. Altogether, 1079 pot and tile fragments were found in sediments f4111, the general layer which included all of the above categories of materials. The sherds were generally small. The eroded, reduced fired sherds from f4112, the layer representing the surface before the pool filled, were even smaller. As shown in *Figure 61* depicting all rims and bases of the handmade pottery, there was very little, mainly from group 1 and 2 (see Chapter 3, on native pottery groups). There were also sherds, considered to be from the Roman Iron Age, in f4182, definitely an Early Medieval feature. Two wheel-thrown sherds, the Badorf-like pot (fnd 3717) from the concentration of f1482, are also illustrated.
Whether the Roman Iron Age sherds derive from the earlier period of use of the ridge, or were gathered for deposit, is something for further research. Aside from those in the southwestern corner, there is a similarity in orientation with the other categories. There is also a possibility that, as Early Medieval pottery is not well understood, these sherds are of a later date. In any case, it is clear that clay objects, including complete pots, were not used for deposits. There were no other types of clay objects present, such as spindle whorls or game counters.

2.11.6 *Combinations of materials (detail, Plan 6)*

A concentration of wood is described in this section, followed by two features with a combination of finds clearly deposited together, to illustrate the selection of various types of materials.

Feature 4192 The concentration of wood, f4192 (detail, Plan 6), with a dating from one length of wood, falls completely within the 7th C, 620 – 689 AD(KIA 9999). There were only a few other materials amongst the wood, and it is uncertain whether they were deposited at the same time or were from more general categories of materials thrown in from the shoreline: two unidentifiable iron fragments, two bones (ox and sheep/goat), a pounding implement and a whetstone, both of sandstone, and a piece of quartz.

Shorter and longer lengths of wood were recovered ranging from 12 cm to over 2 m. The longest, 2.30 m, was hazel with a clearly sharpened end, lying near to a 1.80 m length of alder, also with a well-defined point. Among the other wood identified, there was one each of birch, ash, oak, and elderberry, as well as alder (4) and willow (10). Of these, three also had good points, so they may also have served originally as standing stakes. If the hazel post had stood upright stuck into the pool bottom, it would have extended about 1.70 m above water level when the water level was up to the – 140 cm NAP contour, and if the post was pushed 30 cm into pool sediments. The deposit may have been the remains of dismantled, displaced stakes, and associated with the concentration f4182, to the north, or with the concentration around f4178 *(fig. 42)*.

Feature f4182 A linear concentration of finds, 22 m long, was recovered from a slight depression (detail, Plan 6). The overall impression of the feature was that the deposits had been placed or dropped in very shallow water, rather than thrown. The range of materials, in the wood, bone and stone categories, seems to reflect selection for difference and variation. The remains of stake points at the northern extent (f4189, alder) and another to the south (fnd 3495, willow) could have been the remains of a stake row. The horizontal wood with the finds consisted of short lengths of branches, except for one object and two wood-chips of willow.[37] The one wooden object appeared to be a small half-fabricated spoon (fnd 3731, *fig. 46*). The areas are given on the detail drawing (Plan 6), showing the samples collected from each area.

37 The wood was sampled for species, but collected by area, so it is not possible to say now which species were which lengths of wood. This was obviously a time-saving device, but it should be avoided if at all possible. It is however preferable to 'sampling' only some of the lengths.

They include the rarely found species privet *(Ligustrum v)*, spindle tree *(Evonymus e.)*, and a branch which was either apple, crab apple or hawthorn *(Malus or Crataegus)*, as well as more commonly deposited oak, hazel, alder and willow.

The deposited stones consisted of green shale (6) (see below), the largest of which was l.6 kg, quartz (5), sandstone (4) and a flint. There were only six identifiable bones from domesticated animals, including dog (a vertebra found beside the wooden 'spoon'), pig (2), cattle (2), and sheep/goat (1). Wildlife was also represented: the jaw of a vole *(Arvicola terrestris)*, Eurasian wigeon (*Anas penelope*; leg bone), tufted duck (*Aythya fuligula*; sternum), a bream head *(Agramis brama)*, and carp bone *(cyprinidae)*. These could be naturally derived inclusions from pool sediments, but they were found with the other placed finds. 'Bones' of any size, especially in combination with other materials, must be considered in the first instance as intentional deposits. There were also apparently Roman Iron Age sherds and sherds dating to the Early Medieval period.

Two 'Donar amulets' *(fig. 56)*, as they are called in the literature, made from the lower leg bone of an ox, were found 20 cm apart. A date from a length of wood adjacent to the 'amulets' gave a range of 539 – 652 AD (KIA 9995). This dating is in line with these rare but regularly occurring objects known from Europe and beyond (see box).

Feature 3800 and f3807 This 6th/7th C feature in the north-east corner of tr 41 was a 9 m wide, 18 cm deep (to 1.50 below NAP) depression (f3800) worn into sediments of the general layer f4111. A row of stakeholes (f3807) had four broken off stake points remaining (2 willow, 1 alder, 1 honeysuckle or privet: *Lonicera* or *Ligustrum v*). The stakes were 5 – 13 cm in diameter and evenly spaced 30 cm apart. The row had a similar date range (533 – 641, KIA 9998) to the wood of the concentration in f3800 (KIA 9997). A continuation of the row of stakes could be represented by a short row on the other side of the modern ditch, in tr 48 (f4416), with four alder and two willow stake points. Finds were concentrated almost entirely within one 7.50 x 3 m area, adjacent and to the west of the stake row in the depression in tr 41. Wood was found concentrated, lying horizontally, with stone, bone, metal and sherds which again seem to suggest careful selection. The horizontal wood was alder (22), willow (12), oak (8), and one rare find of purging buckthorn *(Rhamnus catharticus)*.The wood in the concentration ranged in length from 22 cm to 1.30 m. Three pieces were the remains of stakes (2 alder, 1 oak) and part of a squared beam (alder), with the remainder being short branch lengths. The other finds were concentrated in the area with the wood, not in the depression generally and display quite some degree of variety within the few bones deposited. These included rarely recovered bones of swan (Cygnus sp.) and crane *(Grus grus)*, and also a (wild?) duck, and fish bones from pike *(Esox lucius)*, Cyprinidae (carp and minnow family), and bream *(Abramis brama)*; the last two were also found in the deposit described above, in depression f4182, and similarly dated. Bones from domesticated animals included pig (1), cattle (4) and sheep/goat (3).

The combination of pottery deposited also suggests selection, as it included Roman import sherds, comprising one each of colour-coated, smooth-walled and Samian ware (this is the only sherd with a certain early 1st C dating from these trenches), as well as two coarse ware sherds. The other eleven sherds were Early Medieval. There were also three tile fragments. The deposited stone – quartzite, granite, sandstone and gneiss – is clearly an array, pointing to selection for difference. Metal is represented by a large lump of slag (410 gm) and a complete fish hook *(fig. 51)*.

These materials were among the wood, one length of which was dated to 544 – 658 AD (KIA 9997). The concentration was quite distinct, and the finds belong to the same deposit; Roman sherds were certainly deposited with these other materials, in the Early Medieval period. The early 1st C Samian sherd was deposited more than 500 years after the manufacture date (and cf. 3.4.5).



Examples of green shale from f4182; see also *fig. 48 and 49* p. 98.

2.11.7 ***Extent of pool and sequence of pool use: areas 1 – 7***
Trial trench 42 contained a few finds matching the pattern of the more extensively excavated area. There were three stones of basalt, gneiss and a worked sandstone, and bones of domesticated animals (2 cattle, 1 sheep/goat, 1 horse), and a complete coracoid bone from a white-tailed eagle *(Haliaeetus albicilla)*.[38] A Medieval or later pit (f4235) was partially recovered in the trial trench and contained one find: a complete metacarpal from a sheep. No materials or features were recovered from tr 43, or further to the east, in tr 44. It would seem that only a small part of the offering site was not excavated, confined mainly to the area disturbed by the modern ditch, along the east of tr 41 and the area to the south of tr 41. The creek bedding, and any finds in it, remain beneath the monument, in the area from the southwest corner of tr 41 to the west.

Dating the use of the pool defines how the pool was used. The stratigraphy did not in any case show signs of turbulence or admixture of earlier layers with later sediments and finds. As discussed in the sections on the Late Iron/Roman Iron Age, there was no marine influence to any extent after the 1st C BC due to blockage of the former tidal inlet of the Oer-IJ. Gradually rising water levels in the immediate area of the Oer-IJ channel depression were caused by a rise in the water table and poor drainage for the freshwater creeks draining into the depression from the west. The pool formed as a result of these factors, and samples showed remains of plants associated with slow-moving freshwater.

Continuous use of the pool seems most likely, given the similarity in the suggested structuring of the edge of the ridge by gullies, with sequential openings, and the suggested signs of structuring in the open water area using stakes. The use and distribution of the iron spikes, in particular, best show that even areas without ^{14}C dates (to the southwest of row f4178, with 6th/7th C dating) are similar, up to the area of overlap between Roman and Early Medieval sherds. As such, all of the materials with a typological/manufacture date earlier than the 6th/7th C are considered to have been deposited in the Early Medieval period.

The compact bone of a patella (a kneecap) has a range from 47 BC to 121 AD (KIA 14281). It was found at the same level and in the same layer (f4111) as, and 12 m from, a coin dated to 244 – 249 AD, which is also the latest date provided by Roman imports. To the southwest, another late coin (238 – 243 AD) was found 15 m distant, though in the same area (3) as an early 1st C coin (Augustus, 27 BC – 14 AD). These early coins are notorious for turning up in late contexts, and long remained in circulation within the Roman Empire in any event.

Explanations involving 'special event' use of the pool for deposits (e.g. victory in battle, eclipses) are not considered below. Instead, the focus is on cyclical, annual additions as part of seasonal ritual, exploring an explanation based on ritual combined with the position and materials in the pits and associated deposits.

The consecutive openings, the proposed succession of use from the south to the north, and the similarity in the alignments of stakes and 'lines' of materials indicate a tradition of planning and similarity of use falling entirely within the 6th/7th C. Each cluster could have formed during use of the pool by one family successively through the generations. With seven clusters, a total of about 150 – 175 years could be represented.

All Roman imports were deposited much later than their manufacture date. There is only one sherd dating to the early 1st C, and it was recovered as part of a neat package with smooth-walled and colour-coated Roman sherds, and with Early Medieval sherds from a context dated to the 6th/7th C by two samples (KIA 9998 & KIA 9997). Only areas 2 – 6 have associated human bone, unless curation or redeposition of the infant bones is considered, whereby only area 7 is without an accompanying human bone deposit, unless it was deposited in one of the areas disturbed by the modern ditches. The greatest divergence, of around 500 years, between dating and time of deposit is associated with the human kneecap from area 6 and the early 1st C Samian sherd in cluster 7.

Area 6 contained Early Medieval and Roman sherds, and a coin with a mid-3rd C dating; the Medieval sherds date the area. Area 5 also contained a definite Early Medieval sherd. The 'domino'-like gaming piece is more likely to be Early Medieval than Roman Iron Age (cf. 3.3.6), and was found in area 3. The W-E depression in area 1, possibly a path of earlier date, contains materials typical of the dated 6th/7th C cluster. Beech is present, which was also used for the few stakes in area 1. The pairs of wood – birch and cornel – are present in the same depression, as they are in areas 4, 6, and 7. The same green shale recovered from f4182 (area 6) also occurs here.

The materials most characteristic of the pool are the iron spikes and the stones. The latter, if they are not parts of utilised artifacts, may in fact have been obtained specially for

38 Again, this is a bone which is considered more likely to have been a deposit than a natural inclusion in the pool; Hagberg (1967, 86) assumes a natural origin for the same eagle species at the offering site at Skedemosse. See also above, f4182.

deposit, but were certainly used more often as time progressed. Forging slag, rather than production slag, was determined to be present in cluster 7, but this may have been specially obtained for deposit, too, as could the iron spikes. They may even have been forged specially for the purpose.

If a cluster represents the accumulation of annual, seasonal rites for a period connected to a generation of users, the numbers would somehow reflect the number of years over which the cluster formed. The number of nails per area, as the most consistently deposited category of finds, showing the least overlap, can most easily be interpreted as reflecting something of the time span and the minimum number of years if at least one spike was deposited per year. The number of spikes in clusters 1 to 4 varies, at 19, 45, 32, 25 respectively. Disturbed by the modern field ditch, the incomplete clusters 5 and 6 together have 30 spikes, area 7 has few, but more slag.

Forming a backdrop to all of these materials, however, is the consistency of deposits of cattle elements binding the entire area. Cattle, as livestock, were still the primary source of subsistence and economic resource, and their bones were used most regularly throughout the use of the pool.

While the 'lines' of finds extending from the area of the openings into the pool might be tenuous to some degree, the combination with an opening and remains of stake rows in some of the areas provides an explanation of the progress and the process of use over time, whatever the dating or period in which deposits were made. The number and quality of materials in this pool is not large or spectacular. Cyclical use through the years, through generations of inhabitants could easily account for the numbers and materials recovered. The individual human bone finds would bind use of the offering site with consecutive, individual family households living near the pool site. A new farmhouse and generational succession might in any event be coupled with the 'founding' of a new, and making of another, differentiation in the offering pool by resituating and re-marking the opening to the pool with ditches and a series of stakes into the pool. Assuming human remains represent a way of honouring esteemed members of the past community (perhaps relatives), continuity over time constitutes a shared sequential use of place in the context of referencing the past. Considering the admonition concerning the pagan practice of honouring some of the dead as 'holy' quoted from *Indiculus superstitionem* in Chapter 1, the use of single bone elements as relics could certainly have early precedents.[39] The pits from the Middle Iron Age and Roman Iron Age with single elements of human bone are signs of the earlier tradition, and are consistent with other sites in the region. This suggestion for the offering site expands the idea of a transforming use of human bone.

The discussion in Chapter 3 explores the broader referents of a Thor/Donar figure in northern European texts, and the specific period of deposit in the year, on the basis of alignments.

2.11.8 *Features from the 9th/10th century: f4468 & f4469 (tr 48)*

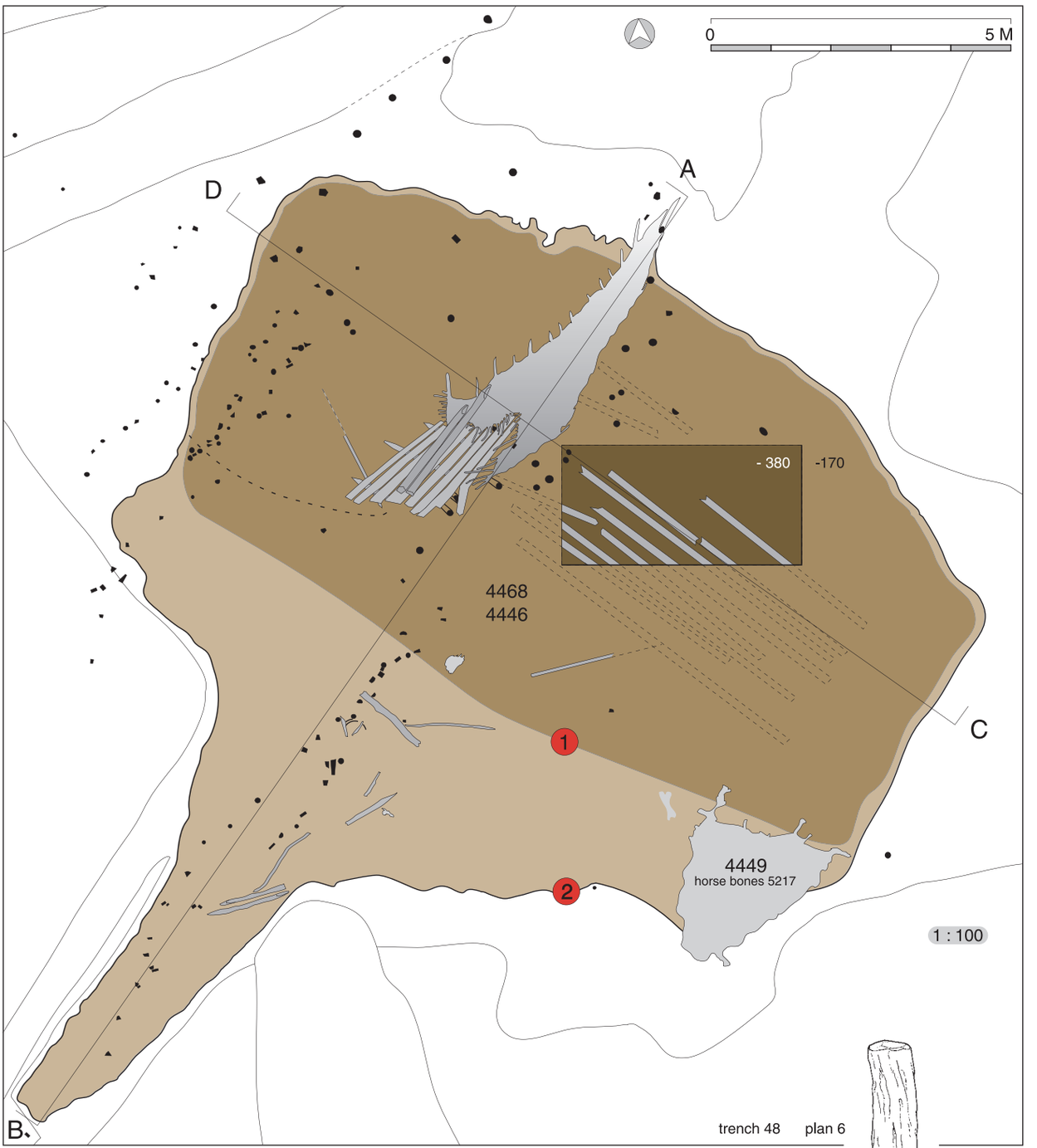
Only one large feature in tr 48 (f4468, etc.) has been dated with certainty to the 9th/10th C. Though it was not excavated under ideal circumstances, enough of this large feature and the lower levels was seen to allow a good reconstruction of the phases and layering to be made *(figs. 62, 63)*.[40] The natural organogenic, silts from the 9th/10th century dug feature 4468/4 (Appendix 3) differed significantly from the samples described for the offering pool only in terms of a decrease in halophytic species. Salt-marsh plants such as *Juncus gerardi* and *Aster tripolium* were absent from the macrofossil record. Two other species indicative of brackish water conditions, *Zannichellia palustris* ssp. *pedicellata* and *Ruppia maritima*, were also absent from these samples. The two samples came from the fill of the dug feature that had silted up in natural conditions, with no admixture of material eroded from the salt-marsh ridge or earlier habitat indicators.

Five dates were obtained from wood and bone associated with this small, watery focal point of activity covering about 266 square metres. It was used in the 9th/10th century, possibly even only in the decades around 900, depending on how the only slightly overlapping dates apply to possible phases of use, and on the reuse of wood from older structures.

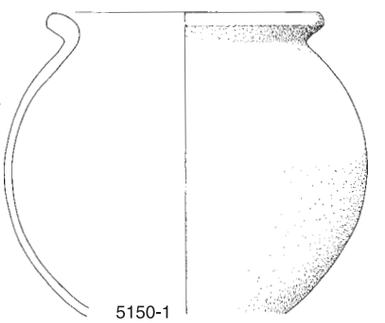
Originally, a large pit was dug measuring 13.50 x 8.5 m and 1.80 m deep, oriented NW-SE. At about two-thirds of the pit length to the west, the area was divided across the width by a wattle and plank 'wall'. The 1.50 m high wattle had alder verticals averaging 5 cm in diameter, spaced 29 – 36 cm apart. The adjacently positioned, eight split planks of beech were 15 to 22 cm broad, 4 cm thick and varied in length from 1.5 to 2.56 m. One of the planks had a mortise hole, without tenon, indicating reuse of a construction element. The planks were

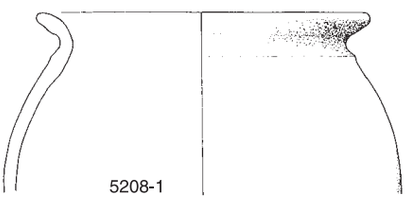
39 Bradley (2002) has highlighted this aspect of many British prehistoric monuments where materials were of a considerable age when deposited. For the late Roman Iron Age in Noord-Holland, at least, the idea of bone 'reliquiae' has been suggested to apply not only to humans, but to some other animals as well, such as the rare single bones from species such as the eagle owl (Buba buba), or single elements from exceptionally large, non-native cattle found in ritual contexts within the region (Therkorn 2004), and known from other parts of Germania (Teichert 1984). This facet of study deserves more attention, and the use of Roman imports as a means of dating anything must at any rate be avoided.

40 Ground water was the main problem, but also sections that were made at odd angles. The layering was understood and the reconstruction sections incorporate those actually drawn, presenting the layering at right angles to the multiphase pit.

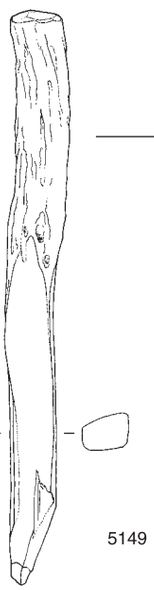

0
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D
C
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- 380
-170
4468
4446
1
2
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horse bones 5217
1 : 100
trench 48
plan 6


5175


5150-1


5208-1


5160


5149

recovered fastened with ash pegs to three split verticals of beech *(fig. 64)*. Although the wattle could have been constructed in the pit, the plank wall section could well have consisted of reused elements derived from a farm structure.

The area of the pit to the SE contained beams (12 x 12 cm) and split trunks (15 cm in diameter) of beech, which were recovered at the interface of the pit bottom and the lowest silts. The full extent of these beams was not seen, but they did extend up to the plank partition and some were therefore at least 4 m long. A complete sheep/goat tibia was also recovered from this lowest level. The partitioned pit filled up naturally during which time a few finds were deposited, at least in the end to the south. These consisted of stone (2 quartz, 2 sandstone) potsherds (5) and half an iron clinch nail (fnd 5603).

It cannot be determined if deposits were made in the northwestern end during this phase, as this end had been re-dug at some time. The re-dug area was backfilled with lumps of light-coloured sand and clay not extracted from the pit itself or in the immediate vicinity. Nothing was found in this material, which was against, and sometimes pushed through, the wattle partition. Layers 1 – 3 of f4468 consist of the plant dust fill of a partial re-digging and widening of the southeastern end of the pit, and an extension to the south. The posts/stakes set in a trench dug into the depression are probably contemporaneous. The pit, depression and post trench filled naturally with plant dust, indicating a watery environment and peat accumulation in the near vicinity. There was probably always standing water in the pit, and at least seasonally in the larger depression.

Deposits had been made during the silting process. Basketry was found in the pit area at the interface of layers 5 and 3. It was damaged during excavation and it is unknown if a complete or partial receptacle had been deposited. The following were found in the area of the depression (f4449):

– the left half of a longitudinally split (before deposit) sheep skull – nose to the east – from a ewe aged between 2.5 and 3 years old, and a vertebra from a large catfish *(Siluris glanis)* were found near to the point of a 95 cm long beech post lying horizontally.

– three curved lengths (17, 19 and 21 cm) of yew, split from a larger branch or trunk, a horizontal of alder, and a sheep/goat vertebra were found at the base of an alder post.

– three sherds making up a near complete *Kugeltopf* pot were found deposited with a tenon of alder and a quern stone fragment.

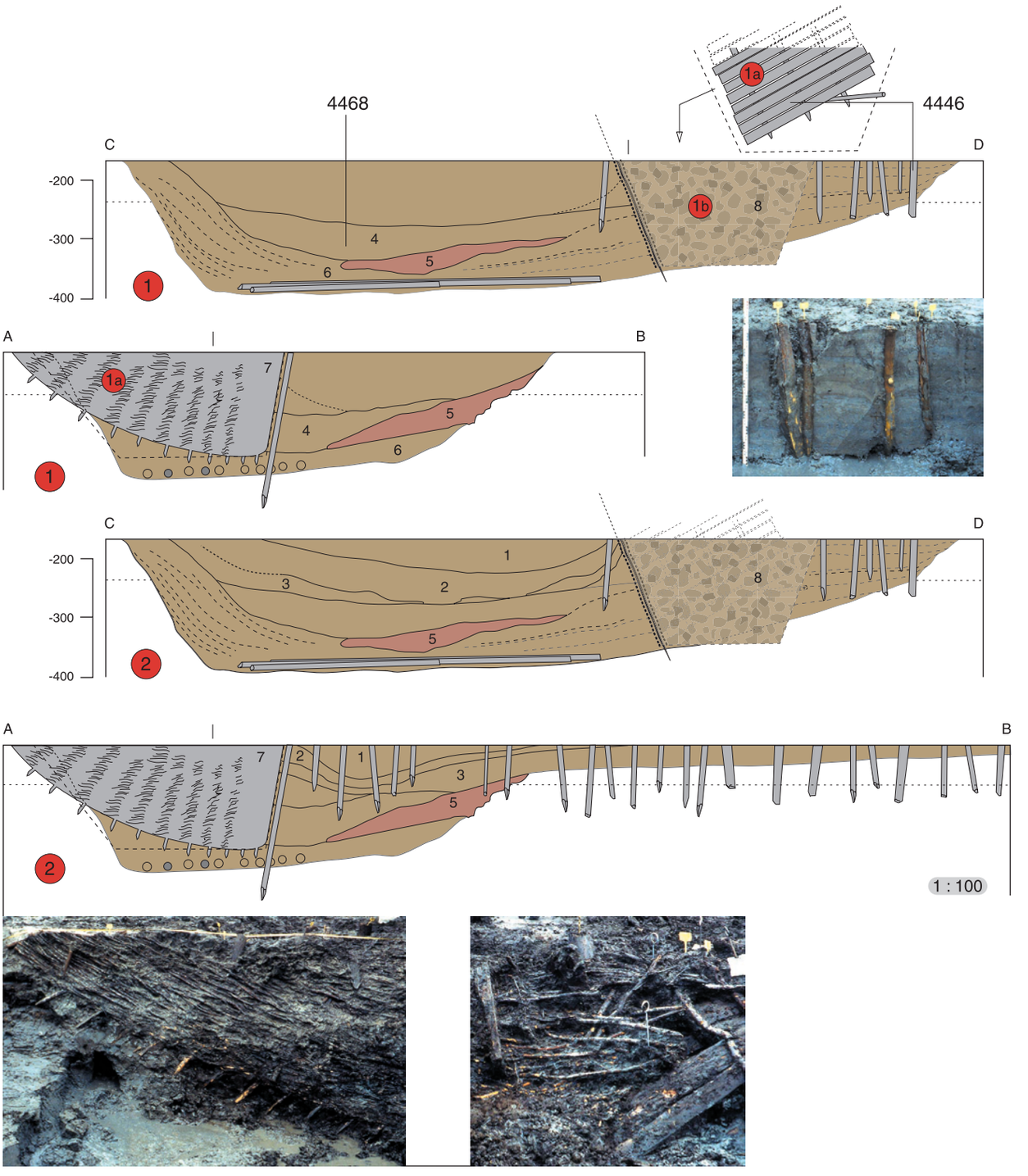
– a 3.5 x 4.5 m spread of horse bones from a 4.5 – 7-year-old stallion had been placed in the southeastern corner of the depression. The horse was not articulated when deposited. The pelvis, for example, was found in three parts, and only 25% of the right half was present, over a distance of three metres; the lower jaw was found next to the sacrum. All elements of the hind legs were present, except for one lower leg. The forelegs had not however been deposited at all, except for one humerus and one radius-ulna. Thus the entire right foreleg from the shoulder blade downwards, and the left lower foreleg were not deposited. Of the head, the lower jaw was present, but only a small section of the cranium. There were no de-fleshing, cut or chop marks on the bones, which one would expect if the horse had been dismembered and deposited. Without these traces, these bones may have come from a naturally decomposed body that had been redeposited within the area. Among the bones were a selection of short lengths of wood: one each of oak, birch and alder and two of ash; there were also two stones (quartz and amphibolite), a complete sheep/goat foreleg bone (radius), and five sherds. Juniper rootwood with both ends worked (fnd 5223) had been stuck into the ground on the eastern edge of the concentration.

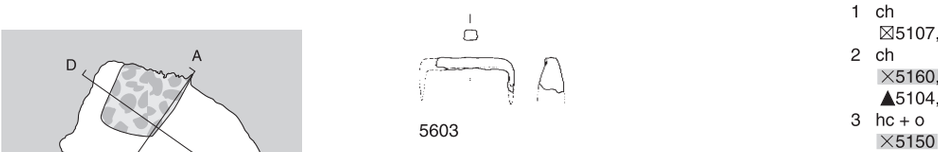
One of the horse bones was dated to 886 – 998 AD (KIA 13675), a date overlapping only very slightly with one of the f4446 dates (692 – 889 AD; KIA 13680). This could be read as a later date for the horse (at death) than the pit construction, or possibly even a very precise date in the last quarter of the 9th C for the entire feature.

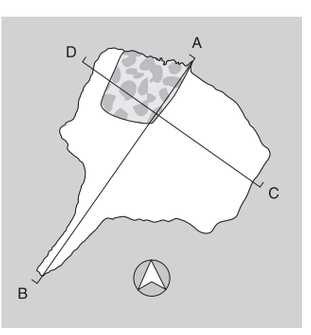
About 135 stakes and posts had been rammed into the northwestern half of the pit and adjacent areas, but mainly along the northwestern end and in a shallow ditch (f4448) that had been dug at right angles to the pit on the south. The trench to the SE was most probably dug at the same time as the original pit was deepened, as indicated by the similarity of fill in the trench and the higher layers (1 – 3, *fig. 63*) of the depression, though this cannot be concluded with certainty.

The posts and stakes were of beech and alder, with one stake of ash. They had been rammed into the ground to depths of 30 cm to 1.20 m, the majority being between 60 and 90 cm long. In the fill of the trench were seven stones, including quartz, flint and quern fragments; five bones – including complete lower right jaws from ox and sheep/goat, and an ox rib and neck vertebra – three sherds, and two lumps of iron slag (fnd 5176, 5172; each approx. 70 g). The deposits were evenly distributed along the length of the feature.

Fig. 62 The large dug pit of trench 48 with post and horizontal wood, and examples of the materials recovered.

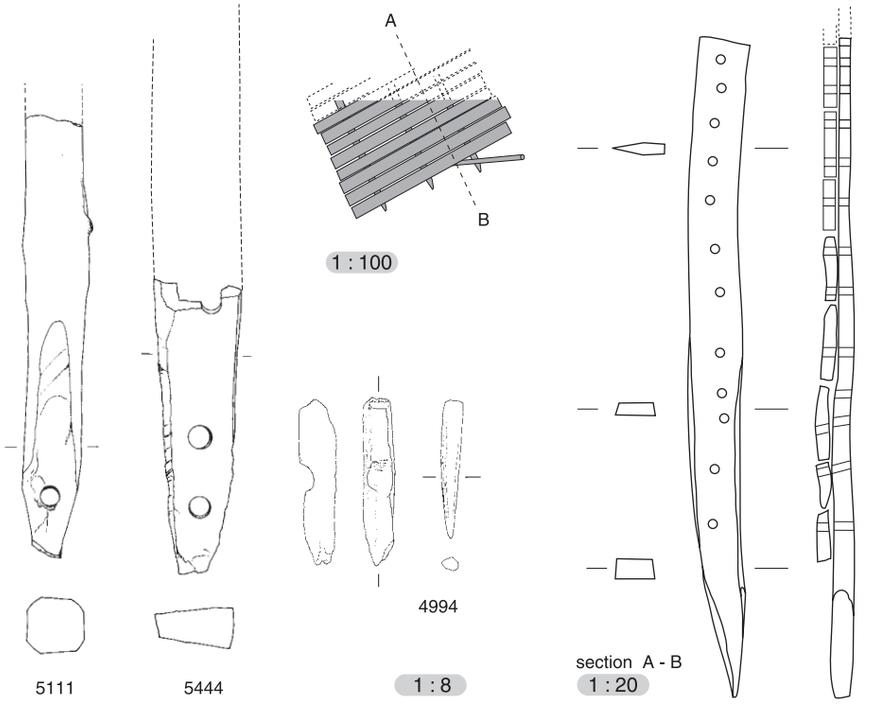






1 ch
☒5107,5108▲5109,5192
2 ch
×5160,5132,5155,5191,5193,5440
▲5104,5129,5148,5188☒5422,5477✳5157
3 hc + o
×5150 ◇5149 ☒▲5449 ▽5445
4 ch + s/ly
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0 ×5175,5208/1,5443



It was unclear if all of the stakes/posts had been rammed into the completely silted up pit or into the pit while it was gradually silting up. In the latter case, therefore, the number would have been added to during the use life of the entire feature. They have been shown with the pit 'phases', each phase with a clustering of posts (*fig. 62*, phases 1 & 2). However, this is by no means certain and it gives a static picture.

The posts and stakes found in the northwestern section of the original pit, and those further to the west, were of alder and beech, but there were also seven posts made of ash. A single willow stake was centred at the northwest end. Again, the recovered depth of the posts/stakes was extremely variable, ranging from 12 cm to 2.02 m deep, but the majority were between 50 and 70 cm. Deposits among the posts at this end consisted of five stones (quern stone, quartz, and tuff), a sacrum from an ox, and four sherds.

The diameters of the stakes/posts ranged from 4 cm to 16 cm. No patterning in diameter or depth has been found. There is some sign of clustering of wood species within the vague rows, and groups of three do occur. This is most evident in the clusters of three beech stakes in the northwest.

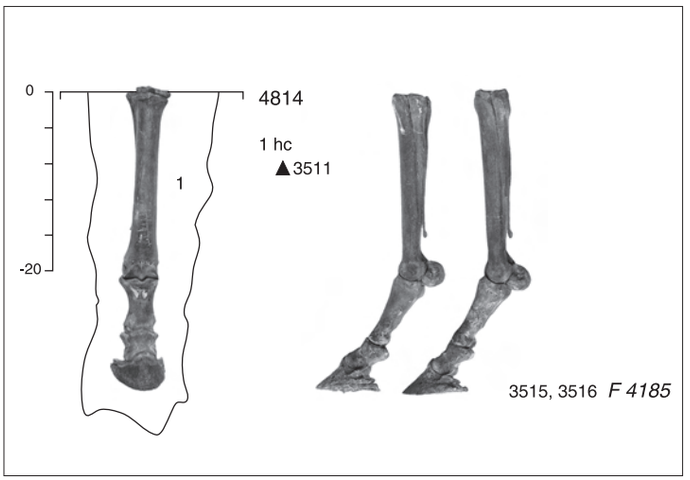
An interpretation can be most easily sought in the use of this low-lying landscape feature consistent with the previous use of the site when it was a pool. The types of deposits made here were similar to those from the 6th/7th century, especially the stone. The area may certainly have been remembered continuously into the 10th C, and possible through to a later phase incorporating the most recent features.

The depth of the pit and the complete absence of cattle trample in the vicinity rules out the possibility that it was a simple watering hole in a pasture. Functions such as fish traps or flax soaking pits would not account for the large number of posts and stakes. The types of fill in the feature and in the larger depression and the surroundings make it likely that the entire area was very often, if not permanently, under water. A structural use of the posts/stakes to enclose or roof over the pit(s) does not seem likely, as they were not placed in rows opposite each other. The dug feature was evidently open for some time, but the beams lying at the bottom cannot at this point be interpreted in the context of any 'function' unless they are simply (albeit rather grand) deposits, and consistent with lesser pit deposits of wood during earlier periods.

This large open pit feature has been interpreted as a small offering pool. At least one side of the pit contained water into which a few deposits were made in the categories found in the larger pool from an earlier period. This feature is a combination of the types of pit feature, but with the open water of earlier traditions. The many posts made of beech are certainly

Fig. 63 Sections of the large dug pit within trench 48, and examples of materials recovered.

Fig. 64 Details of wood from the large pit feature (cf. *figs. 62 & 63*).



intriguing. Beech is a rare find for the earlier periods of the Iron Age and Roman Iron Age in the region. Since Early Medieval features, and thus signs of practices, are also rarely encountered in the region, it is not known if the species was widely selected for other uses, such as for farmhouse structures. It is certainly not found in dwellings from the (later) prehistoric period. The wood was brought into the Broekpolder from a higher-lying, well drained location. The dune area to the west would have been the nearest source. How high the posts and stakes extended above ground and/or water level is impossible to say. Posts and stakes could have been added consecutively, and within the same alignment, singly or in groups, and part of the intention could have been to mark place and points of the year. A water-filled feature would be an extension of offerings made in larger pools, binding landscape and belief.

The dating of this features falls within the period of earlier and later texts, many by missionaries, but also recorded sagas, on pagan beliefs incorporating water and trees, or trees as columns, as indicated by the texts quoted in Chapter 1. We know from the classical writers that in Germanic and Celtic society the raising of pillars was associated with various gods, the seasons and water. 'Pillars' of wood (i.e. posts) are known from later sources on northern belief to have been associated with Thor/Donar (cf. Davidson 1988, 21 – 27), as discussed in 3.4.5, which considers the alignments in this feature and those at the offering site.

Continuity of use cannot be demonstrated for the two or three centuries between use of the pool as evidenced by the 6th/7th C features and the 9th/10th C dating of this large pit feature. The nature of the use of wood, the types of materials deposited (stone and iron), and the theme of water do however point to a continuity of intent, and alignments will be argued as referring to the same sky phenomena in Chapter 3. The fact that the feature was dug to the side of the offering pool may be an indication of remembrance bound to the location of this specific landscape use, or of a tradition continued as part of the widespread belief system by those newly inhabiting the area.

2.11.9 *Post-Medieval traces from the offering site*

Feature 4688 The dozens of stake points (f4688) from the eastern part of tr 48 were late, dating to the 17th/18th C. Of the fifteen samples identified, fourteen were alder and one was beech.

Feature 3774 A row of 25 stakeholes, three containing the remains of stake points (alder, ash, pine) was oriented NNW-SSE. The stakeholes were spaced unevenly, from 30 cm to 1.20 m apart. The feature has a rather broad date range, but is considered to be from the period around 1700, rather than the later part of the date range of the 19th/early 20th C (KIA 10000). The reason for suspecting the earlier part of the range lies in the type of fill – very humus-rich, iron-stained clay sealed by homogenous clay, with the upper reaches incorporated into the topsoil.

Three narrow dug pits, or slots, were found at the SSE end of the stake row. One slot (f4186) was only 12 cm deep, and 56 cm long. The only recoverable material it contained was a vertical 9 cm length of willow in the upper fill. The two other slots were deeper, at 35 cm, and 12 cm wide, as well as longer, 1.20 m and 1.25 m. Slot f4184 contained one lower hind leg from a horse, from the ankle bones to the hoof, set vertically into the eastern end of the slot. The other slot (f4185) contained two lower forelegs from a horse, also from the joint bones down to the hoof, and also deposited vertically in the eastern end *(fig. 65)*. At a deeper level there were two heavily corroded lumps of iron, one of which is identifiable as part of a horseshoe.[41] The situation of the iron finds relative to the hoof, and the size of the fragments, make it certain the hoof was not shod when deposited. In other words, the fragments of horseshoe most probably represent individual deposits.[42] The position of and deposits in this feature could represent a long-remembered tradition of landscape use and marking of the area, and this is not a typical feature encountered in the region, except at the larger offering site at Velserbroek-B6.

Fig. 65 Horse legs from the latest feature within trench 41.

41 One of the lumps of extremely corroded iron was X-rayed, and the form and two nail holes were visible.

42 Complete horseshoes marking places at the Velserbroek offering site were found in three contexts (Therkorn & Oversteggen 1994, Therkorn 2004): a Medieval pit, a small pit from the 18th/19th C, and a Medieval mound (about 13 m in diameter) covering five complete horseshoes surrounding the complete scapula of a horse.

2.11.10 *Closing remarks on excavating the area of the offering site*

Most unfortunate for interpretation is the discontinuity of space between trenches 41 and 48 caused by the modern ditch feature (see *fig. 37*). This essentially cut off the possibility of studying stratigraphy between the Early Medieval sediments (mainly f4111) and the 9th/10th C features. The ditch also disturbed a fuller understanding of the post Medieval features. Despite this drawback, having the opportunity to excavate the area at all has surely added a dimension to landscape understanding not achieved before in the archaeology of Noord-Holland. There was also importantly the chance of studying the long term through the presence of features dating to the historical period. At the risk of over-emphasising the point, these type of sites are probably everywhere, and they need to be addressed whenever the purpose is of understanding tradition as use of landscape in the past. These areas are simply in contrast, but of contiguous space, to habitation areas, with the more usual settlement features. Something more on the combination of modern mentality, expectations and excavated areas will be gone touched on in Chapters 3 & 4.

Possibly part of modern mentality, and also influencing how apparently these offering sites are excavated, is the emphasis on metal finds. We of course collected these when uncovered, but we did not go in search for them with the deep fervour and reverence noticed elsewhere. We strongly feel that giving attention to the unknown is of greater importance than in gathering more of the same; of course metal finds are important, but not to the degree of ignoring other types of finds. Within the choices made in allotting time, we probably achieved recovery of a broad sample of metal finds. Considerable time however was allotted to careful excavation of especially wood – both in drawing deposits *in situ* and in collection methods. It might be called a more landscape approach as elements of the physical landscape were usually collected as fully as possible, rather than sampling these landscape referencing materials. Bone was also carefully collected as it is not often preserved in the peaty circumstances of many of the offering sites known from Scandinavia (see Kok 2008) and bone does reflect economics. In an offering site context, symbolic and ritual is combined to livestock concerns.

The excavation methods used took into account the excellent preservation circumstances. The attempt applies to both the connection of how this offering site compares with the large body of offering sites outside of the Netherlands; and, with how the nature of deposits in the offering site connect to the period of pit deposits, also with their exellent preservation of especially wood, for the longer term.





Fig. 66 The topography of this low lying area in the Broekpolder, here where the offering site was predicted to be found and for the people of the past evidently important. Within modern archaeology these low-lying areas have been largely ignored. *Aerial photograph: Willy Metz, January 1998.*

Areas of attention within the larger research context and fields of study 3

At the beginning of the project, some basic precepts were in place which were theoretically interrelated with where trenches were positioned and how the features and materials were approached (*fig. 66*; Therkorn *et al*. 1999, Diepeveen-Jansen 2001). This chapter advances some analyses and interpretation which may go some way towards illustrating the following points:

– The interrelationships in and constitution of society as a collective take place by means of dwelling, working, veneating, and the fabrication and trading of specific goods, in specific places, by specific persons and groups, at specific moments in the ritual calendar and/or annual seasonal and economic cycle.
– The dialectics of the social, physical and cosmological universe, the organisation of society, and people's reaction towards the surrounding material world affected the location, the form (and style) and the meaning of the features in the Broekpolder. These features – the materialisation of the participants' vision of their world – represent only part of the inhabitants' means of self-definition.
– Archaeological context and material culture form one inseparable entity. The central idea in the interpretation of recovered traces is the relationship between individuals and society, in which neither is determinant, but both are constituted in interaction. Members of a society share perceptions, values, and ethical dispositions that guide social practice, but at the same time these structural principles are reproduced and/or transformed in their materialisation through validated categories of people, places and goods.
– The specific contexts in which materials are used are instrumental in the definition and realisation of the individual, progressing towards collective identities of various types and, through ageing, also through various stages, in interrelationship with others. Specific social practices are (re)constructed within particular groups, places and objects at specific moments in their life cycle (annual or otherwise).
– People and objects are intertwined in an interactive relationship and together they give meaning to places. Their relationship with the surrounding material and metaphysical world is produced and reproduced in ritualised situations or circumstances. Every action context has a specific assemblage of artefacts, specific codes of conduct, and specific social personae and groups as actors.

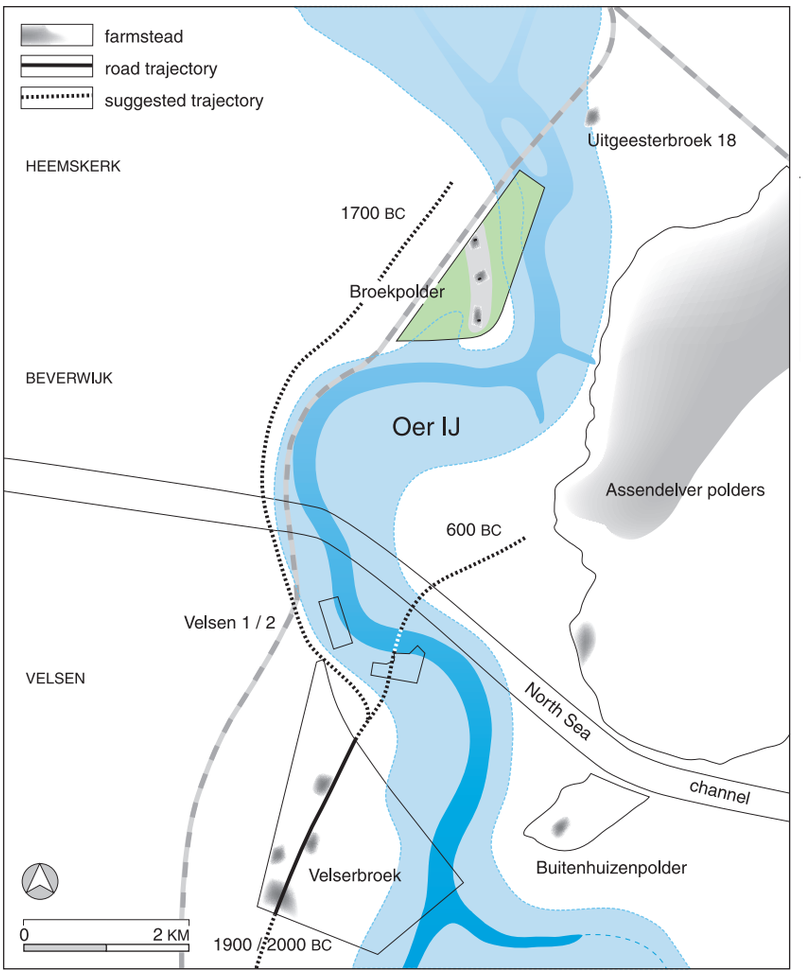


Fig. 67 The Broekpolder with the region and areas where excavations have taken place to either side of the Oer-IJ main channel. The probable trajectory of a roadway is shown and it was established prior to permanent settlement within the Velserbroek (from Therkorn 2008).

The above concerns groups, individuals, identities and contexts which must first be addressed, but it is not of course immediately apparent how archaeologically obtained data can be analysed within this framework, as well as those more traditionally applied to Dutch archaeological studies. In this chapter, we attempt to examine some relevant facets through the physicality of the landscape, in particular, rather than through finds. In examining the combinations of features and materials in the context of similarities and differences in the region, and in adding to the definition of the broad theoretical points outlined above, we emphasise four aspects:

1 Section 3.1 briefly considers where the people who first used the area seem to have come from and when they left recoverable traces in the Broekpolder. Some remarks are made as to the two different areas represented by the Oer-IJ Estuary, as two neighbouring territories, visible in differences in the habitation traces to either side of the Oer-IJ channel.

2 Section 3.2 then explores the subsistence traces in the Broekpolder in more depth, with an emphasis on the Late Iron Age/Roman Iron Age. A brief summary of the materials recovered during the excavations is given to delineate activities related to subsistence. The near absence of spindle whorls in the Broekpolder highlights a difference between the two sides of the Oer-IJ, and is subsequently considered in relation to the activities of women.

3 Section 3.3 looks at the largest find group – pottery. Research on indigenous handmade pottery shows similarities over a much larger area in later prehistory, the Roman Iron Age, than one would expect for a 'tribe'. Various approaches and methods of analysis are used to describe the pottery.

4 Facets of interpreted ritual – such as cosmology and the terrestrial and celestial landscape – are explored in the final section (3.4). Buried remains of humans and livestock, materials in pits, and circles engraved in the landscape are brought together as they are in the landscape, as a tradition in later prehistory. Activities such as the ritual of Medieval offering pools are also addressed.

The emphasis here is on interpretation through action and meaning based on patterns distinguished in one region. Little reference is therefore made to others areas, except in the very broad sense of references to historical texts, and how they might be useful in giving us an insight into ideological settings.

3.1 Whose landscape(s)?
Aspects of dating, colonisation and difference

This section very briefly summarises the dating and apparent use of the Broekpolder over the longer term and the direction from which the first colonisers may have come to the Broekpolder, followed by the differences seen to either side of the main Oer-IJ channel, as a broad physical landscape feature.

3.1.1 *Summary of the dating and spread of settlement to and within the Broekpolder*

While the earliest traces in the Broekpolder have been dated to around 1700 BC, this is about three centuries later than the first signs of use in the areas in the south of the Oer-IJ region. The Velserbroek – a polder area of approx. 300 ha 4.5 km to the south of the Broekpolder –revealed a barrow raised around 2000 BC (Therkorn & Van Londen 1990), and there is a group of four barrows to the north, the earliest of which may have

been raised around 1600 BC (Woltering 1979). Dating indicates that the area here was first marked with these barrows when the wider area was used as grazing land and for cultivation only. The barrows to the north and south were most probably linked by a trackway, 106 m of which has been recovered near to the earliest barrow in the south. Extending the trackway trajectory leads to the barrow group in the north, as well as past other excavated sites, all with early traces of use but used for permanent settlement only in a later phase, starting somewhere between 1500 and 1100 BC. Gradual settlement of an already familiar and marked landscape, where the dead were buried, seems to be the pattern to this side of the Oer-IJ channel (Therkorn 2008). *Figure 67* shows the suspected route and broad dating of the first use of the areas immediately adjacent to the Broekpolder.

No trackway was found for any of the periods in the Broekpolder excavations. The cattle paths and broader droveways recovered did not have the raised and maintained character of the traces found in the Velserbroek polder. A continuation of a connecting route binding settlements to the south and southwest of the Oer-IJ might be indicated by single finds and results of limited excavations in the urban area of Beverwijk and Heemskerk, to the west of our excavations in the Broekpolder.[1] From this presumed and somewhat higher-lying settled axis, the Broekpolder would most likely have been used as grazing land during all periods. It was suggested in the preceding chapter that the west-east creeks cutting through the main salt-marsh ridge may have defined 'family territories' within which these movements took place. The shifting character of farmsteads within a small territory has been noted in settlement analysis of other coastal areas (e.g. Meffert 1998, Woltering 2000), and also seems to be applicable to the Broekpolder, if we consider the natural traces of land divisions actually recovered.

It is uncertain whether initial use of the Velserbroek polder and the Broekpolder occurred during the same general period. The traces of the earlier Bronze Age recovered in the Broekpolder, as shown by enclosures and traces of cultivation, could not be dated with certainty. They are certainly later than the first Velserbroek barrow. A dwelling can be assumed to have existed in the Broekpolder somewhat to the west of trench 45 by the Middle or Late Bronze Age, and both the northern and central segment of the salt-marsh ridge had traces of Bronze Age use as arable land. Cultivation does not seem to have been intensive. The crop grown could not be established, due to the poor preservation of pollen and macroremains.

Habitation site indications for subsequent periods are best known from the areas to the west of the Broekpolder. There is no evidence of types of use leaving archaeological traces during the centuries leading up to the Iron Age in the Broekpolder, though the area would certainly have been suitable for grazing. During the Early Iron Age, the clearest form of use was for cultivation. Narrow strips in all three of the segments formed by the creeks cross-cutting the salt-marsh ridge were under cultivation. Again, use does not seem to have been intensive and the question of whether the segments were used contemporaneously or serially remains unresolved. If the idea of 'family territories' is correct, contemporaneous use would be more likely, certainly in light of the later farmhouses built in each segment. The range of materials in tr 45, including one pit with a human bone, make it likely that there was a dwelling in the near vicinity on the northern segment by the (Early) Iron Age. The house plot is likely to be preserved beneath the archaeological monument.

The landscape situation was similar in the Middle Iron Age, and one dwelling was found, as well as pits and large ditches establishing a border between higher- and lower-lying ground to the east of the ridge. The same situation may certainly have been present in the northern segment, as round pits dating to this period were also recovered here. But again, whether these areas were settled contemporaneously or sequentially is impossible to say. Use was not intensive and certainly the features in the central segment could have arisen within a single dwelling generation of about 25 years.

Erosion of the ridge probably occurred before 50 BC and might correlate with the blockage of the tidal inlet of the Oer-IJ channel in the vicinity of present-day Castricum. Use of the ridge was continuous from the (very) Late Iron Age onwards, at least into the 3rd C AD. Six to seven dwelling plans were found in trench 49, with features dated to a minimum range of 50 BC – AD 244. If the area had been continuously inhabited, another six or seven dwellings must exist in adjacent, unexcavated areas, including the preserved monument. One house plan was recovered in both the central and southern segment of the ridge, and both areas had indications for other dwellings in adjacent but unexcavated areas as seen by the trajectories of cattle paths, the find density and dating.

The 'Romans' were present, at the harbour forts of Velsen

1 Cf. Van Heeringen 1992, which includes a catalogue of sites; Wiegmans 1996, Meffert 1998: fig.44; and Kok 2008.

Some remarks on the Oer-IJ estuary during the migration period and Early Middle Ages

by Jan de Koning

Until recently, it was assumed that the coastal area underwent a near-complete depopulation during the later Roman Iron Age, given the lack of late-3rd, 4th and 5th C materials. Over the last few decades, however, a few sites have been discovered in the Oer-IJ estuary that narrow this gap between the Roman Iron Age and the Early Middle Ages. It seems that the Oer-IJ estuary was not completely depopulated during the late 3rd and 4th C. The settlements that remained inhabited did, however, change considerably.

In Castricum-Oosterbuurt, 5.5 km to the northwest of the Broekpolder, a 5 m wide ditch and a wooden palisade enclosed an already existing farmyard. The adjacent plot was used as a small cemetery consisting of five inhumation burials in a row and cremation burials (Hagers & Sier 1999). A similar and contemporaneous development, albeit less clear, took place at the settlement of Dorregeest situated on a tributary of the Oer-IJ, 5 km north of the Broekpolder. Remains of a wooden palisade were also found, probably enclosing a single farmhouse, but the burial practices were different. Here, people and animals were buried not in a cemetery, but along the creek. One of the inhumation burials was ^{14}C dated to the late 3rd or 4th C and two others to the 5th C. Due to the irregular orientation, the lack of burial pits and the 'strange' position of the bodies, some of these individuals could have been human sacrifices (De Koning 2003 and *in prep.)*.
The appearance of visible burial practices and changing settlement structure could be related to internal socio-religious developments. Another archaeologically traceable phenomenon that can be ascribed to these 'dark ages' is the disappearance of the indigenous 'Frisian' pottery, a tradition that originated in the Middle Iron Age. These developments were probably the result of migration and a near (with the emphasis on near) depopulation of the Oer-IJ estuary. People who had stayed behind evidently used the settlements of Castricum-Oosterbuurt and Dorregeest, or people culturally related to them had reoccupied the sites. Whoever they were, they had to adapt themselves to a totally new situation. Due to the lack of well-stratified sites, Castricum-Oosterbuurt being the only site so far recognised, late 3rd and 4th C pottery seems to be very rare. Typological studies indicate that it is still related to the indigenous 'Frisian' pottery. In the second half of the 4th or early 5th century this kind of pottery was substituted completely by Late Roman/Frankish imports. To date, however, Dorregeest is the only site in the Oer-IJ estuary where this kind of pottery has been found. Recent research has shown similar developments in the Frisian terp area: a similar density of settlements in the earlier Roman Iron Age, followed by a near-complete absence in the 4th century. However, in the 5th century many terps were reoccupied, especially in the Westergo region of Friesland, by immigrants with a different material culture and with building traditions that were very similar to the eastern terp area of the province of Groningen. At the same time alongside their locally produced pottery, they imported the same kind of Frankish pottery that has been found at Dorregeest. Ultimately, these imports replaced local pottery completely, probably by the late 6th century, in the terp

(Velsen 1/2: *fig. 67*) on the south bank of what remained of the Oer-IJ for a brief period lasting no longer than 35 years, from AD 15 to 50, possibly with a break in use (cf. Morel & De Weerd 1980, Morel 1986, Bosman 1997). The Roman harbour was probably situated near a junction with the trackway leading from the south, dating from the Bronze Age onwards, that was partially recovered in the Velserbroek polder. The Roman small-scale fort with harbour works may well have been strategically positioned at an earlier ford across the Oer-IJ, and possibly even a focal point which may have included an offering site. Complete native pots and numerous bones of indigenous cattle found during the fort Velsen excavations in the Oer-IJ channel might reflect trade with the Romans, or offerings. These materials have not been dated and possible Iron Age and (Early) Medieval traces have been largely ignored.[2] There are few fragments of Roman imports in the native context in the Broekpolder, as is usual for both sides of the Oer-IJ (cf. Meffert 1998, 94 – 96), and there is no evidence of any deeper form of acculturation. The assumption before the Broekpolder excavations was that the Roman ships reached the sea through the Oer-IJ channel alongside the Broekpolder. It is now unclear if, and certainly where, an outlet to the sea was, during the earlier 1st C. The topic needs more research.

The 5th C might be as elusive as ever in the Broekpolder and the region in general. However, some of the Broekpolder

2 In the harbour excavations, the emphasis was on analysis and publication of the Roman-ness of this site with a 'period' approach (Morel 1986, Bosman 1997), rather than the signs of earlier and later use.

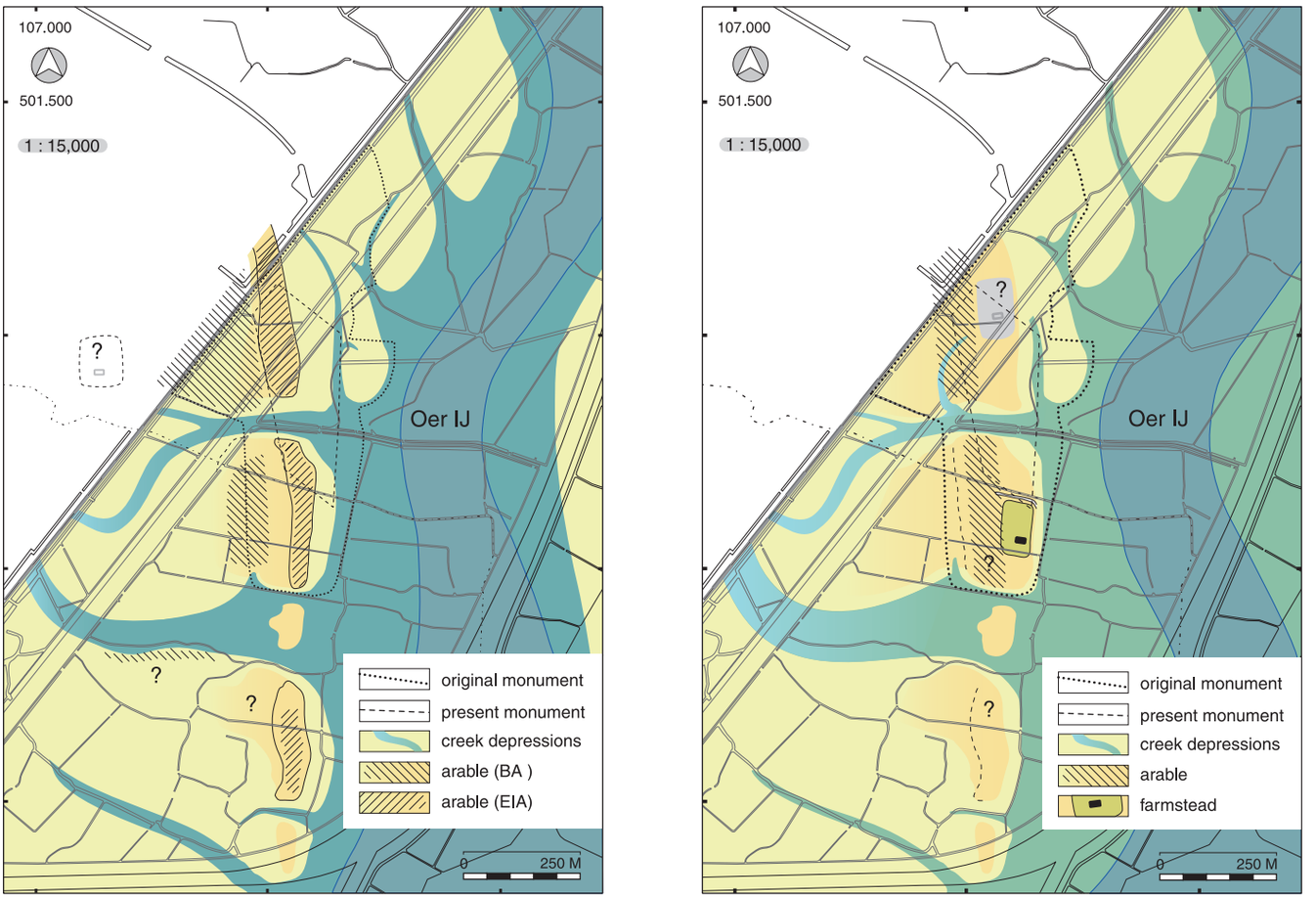
area too. By this time, Early Medieval settlements along the coast were generally characterised by imported Frankish pottery which was probably the result of the widespread trade network of the 'Frisians', the name that became synonymous with merchants.
How can we explain the transformation that took place during these 'dark ages', from scattered farmsteads, the Frisians of the Roman period, to the Early Medieval Frisian society of merchants with their network extending from the Frankish empire to England and Scandinavia? Gerrets (*in prep.*) emphasises that this transformation took place around the North Sea during the first wave of migrations from the coastal areas of the northern Netherlands and Germany. Frisians were known by the Romans for their agriculture, animal husbandry, and as skilled horsemen; they focused on the land, not the sea. The Chauci in the eastern terp area in the vicinity of Groningen, on the other hand, were known for their maritime tradition. They had a reputation as fishermen, but also as pirates. Classical texts document this by the 1st C AD. However, from the 3rd C onwards, people from the same area, now known as 'Saxons', appear as pirates, raiding the coasts. They formed the vanguard of a first wave of migrations that created the basis of a maritime network whereby the North Sea became a contact zone, and subsequently an intensive trade network, which included Noord-Holland.
By the 6th century, the Oer-IJ population was on the increase. Dorregeest was part of this maritime network situated along an open creek on the eastern edge of the former Oer-IJ estuary. To the east, large uninhabited moors extended as far as Lake Almere. Other 6th C settlements include Heemskerk-Kerkweg and Velsen-Haven. Large quantities of Frankish pottery have been found 4 km to the northwest of the Broekpolder, in Heemskerk. In the vicinity of Velsen, 6.5 km southwest of the Broekpolder, a 6th C hoard of gold coins was found, the only example in Noord-Holland. Historical documents also point to Velsen as one of the main centres in the early Medieval district of Kennemerland. These three settlements probably each functioned as a centre in their own territories. From these the surrounding area was cultivated and land distributed. The power of these centres would grow as the population increased in the 7th C. This development is contemporary with the Frisian expansion towards important Frankish centres such as Utrecht and Dorestad.

After the death of the Frisian king Redbad in 719, Charles Martel occupied the western coastal area up to the river Vlie during one of his annual military campaigns. Important residences of the former Frisian elite, such as *Adrichem* near Velsen, became incorporated as Frankish royal estates, and the first church of the missionary Willibrord was founded nearby. A period of political stability began. Even marginal areas, such as the fringes of the moors, were brought under cultivation. At Dorregeest, pagan burial practices continued at least into the 10th C, as shown by animal and human burials. In the 10th – 11th C a chapel was built on the spot, apparently in an effort to end this pagan tradition. A modest cemetery, where people were buried according to the rules of the new religion, surrounded this small chapel.

traces do have ^{14}C dates including the 5th C, and taking the one-sigma range, they could be from the earlier part of that century. An area of the central (cf. 2.9.1) and southern segments (cf. 2.9.3) might indicate use in the late 4th or early 5th C. The absence of traces is generally attributed to the effects of the blocked estuary and consequent rise of the water table.[3] Former lower-lying pasture would have become less attractive, but there was certainly no lack of land in the region in general. Viewed over the long term, there is no explanation for the absence of traces during certain periods.

It is certain people were in the Broekpolder in the 6th/7th C, as most conclusively evidenced by the offering site to the east of the northern ridge segment. Whether or not these people came from an entirely different area cannot be said at this juncture. There is probably much that would answer the question of continuity and transformation in tradition left unexcavated beneath the monument. Even more information on this aspect lies sealed under the Younger Dunes along much of the coast of Noord-Holland. Migration and the depopulation of the entire region during the 4th/5th C, as outlined by Jan de Koning (see box) is the subject of current research and, as he mentions, the number of Early Medieval findspots has increased over the last few years.
The Broekpolder has certainly helped to define the presence of people in the area during the Late Roman/Early Medieval period.

3 We do not assume that there was a 'collapse of a system' as postulated by Meffert (1998, 112).



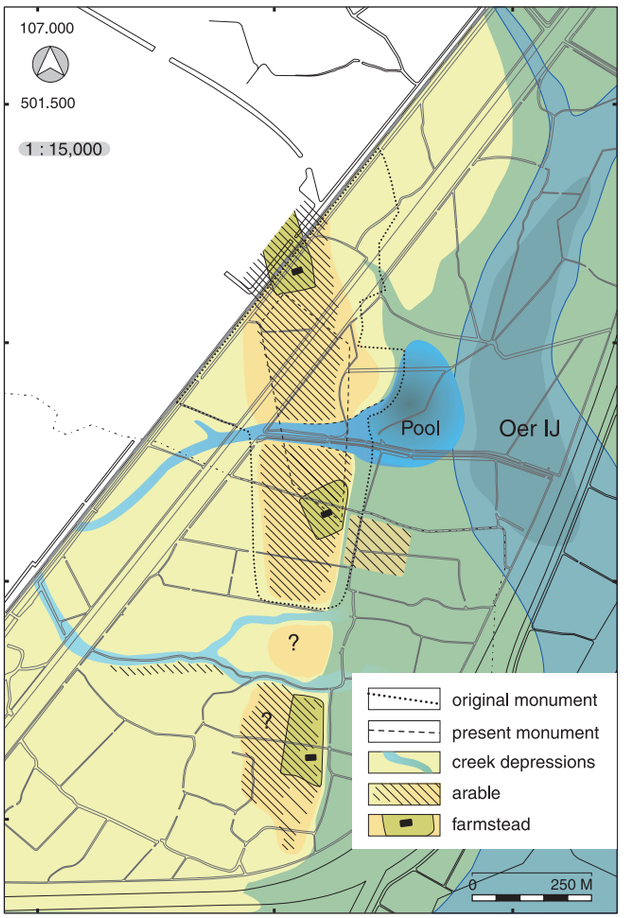
In addition to the offering site, features from the 6th/7th C to 10th C relate to the last phases of field ditches (cf. tr 49) and are contemporaneous with a thick ploughsoil, which was also found in core-borings taken over the entire area of the monument. In the central segment, a trackway also gave an Early Medieval dating. Pottery dates field ditches in the southern segment to the Early Medieval period.

Since sites from this period are rare, no regional distribution of materials such as recovered from the offering site – the 'domino', the spiral and the 'Donar amulets' – is known in the area, and we have nothing to compare with other sites in the vicinity. The spiral and the 'Donar amulets' do have a distribution in the northern Netherlands, however. They are both associated with women and exogamy, and women with their possessions marrying into to the area may be posited as an alternative to migrating groups shifting into the Oer-IJ region from the north. Women in any case seem to have stopped making large quantities of pottery of the type, which had been so identifiable for a thousand years.

Transforming social relations, or even changes to ways of cooking and storing food, would be another way of approaching this absence of handmade pottery, rather than a 'near' depopulation of the area.[4] Pottery has also played an important role in the surveying and identification of dozens of sites from the Late Iron Age/Roman Iron Age in the region, and it could simply be that this gave rise to the idea of an increase in population during this period. If pottery was no longer being made and used, or to a much lesser extent, there is no way to recognise sites by means of surveying using the current methods. Even the tradition of the 'depopulation' idea may have led to non-recognition of possibly Late Roman/Early Medieval handmade pottery such as is indicated by a dating association of materials in tr 15 to the late 4th/early 5th C. A commensurate lack of recognition of sites from the period

Fig. 68 The Broekpolder with general areas of land use and farmstead complexes given for the Bronze Age, early Iron Age (l), Middle Iron Age (m) and Late Iron Age – Roman Iron Age (r) with the Early Medieval offering pool shown for the 6th/7th C.

4 There are a number of questions to be addressed here: it seems to be no problem that Bronze Age to Middle Iron Age sites have relatively little pottery as compared to the Late Iron/Roman Iron Age. This would seem to be an implicit evolutionary attitude – as time goes on, there is more pottery, as a natural response to whatever factors arose.



could well be directly associated with a change in manufacturing method and traditions associated with the use of pottery, rather than a near-complete absence of settlements.

Establishing probable late 4th/early 5th and certain 6th/7th century features in the Broekpolder was simply a question of putting funding into ^{14}C dating, rather than making assumptions based on native pottery and on dating features by Roman imports. Settlements of the Late Iron/Roman Iron Age best represented by excavations in the region in any case display differences on the smaller scale of the region divided by the Oer-IJ channel depression. The Broekpolder is shown in *Figure 68* with the main areas of use through the prehistoric periods and the Early Medieval pool offering site.

3.1.2 *Two areas: either side of the Oer-IJ*

The 'region' of study – the Oer-IJ Estuary – can now be considered to encompass parts of two neighbouring territories, possibly even of tribal entities, and to be defined by male territoriality. These 'tribal' entities may have been named. Possibilities include the 'Cananefates' and the 'Frisii Minores', who are mentioned in the Roman period at least, using Tacitus' *Germania* as a guide to the number of tribes possibly squeezed into the coastal zone of the present Netherlands and northern Germany. This touches on the complex topic of 'ethnicity', as well as the debate as to which parts of Tacitus should be taken seriously (Bazelmans 1991). Few have difficulties with a designation of the more northerly part of Noord-Holland as part of the territory of the Frisii Minores. The idea that the Cananefates might be associated with Medieval Kennemerland, an area including part of the former Oer-IJ estuary is considered an impossibility, however (Dijkstra & De Koning 2002).[5] The definitive Roman border through the Netherlands was established in the mid-1st C AD along the Old Rhine, 36 km to the south of the Broekpolder. The tribes above remained part of 'Germania Libera'. Attempts to incorporate more northern areas of the Netherlands into the Roman Empire had been abandoned by the middle of the 1st C AD.

Combining texts and archaeology, and the archaeological perceptions of the 1980s, Bloemers (1983) suggested a division into tribal areas as shown in *Figure 69*. Although it is suggested the Oer-IJ was a boundary, it is unlikely to have anything to do with the northern extent of the Cananefates' territory and it is usually assumed that the area inhabited by the Cananefates was bordered on the north by the Old Rhine. The area to the other side and northwards up to the Oer-IJ would be an unnamed (tribal) entity, or perhaps a division within the Frisii. The interpretation of the Oer-IJ as a border between two entities rests on indications obtained from excavations to either side of the channel, and with the Broekpolder excavations we now have enough archaeologically acquired information to suggest particular traditions.

Four points will be discussed briefly in examining ongoing research on similarities and differences between neighbours separated by the Oer-IJ channel depression. In section 3.2.6, the topic of differences and possible specialisation among women is addressed, followed by a look at the general tradition (also among women) of pottery style and manufacturing technique spread across very broad areas (3.3). The points below concern the dimensioning, orienting and marking of spaces, and the differentiation a 'style' of digging features on either side of the Oer-IJ.

5 Some translators/editors of the *Germania* have the Cananefates occupying the whole of the present-day province of Noord-Holland (cf. Mattingly 1970, 100).

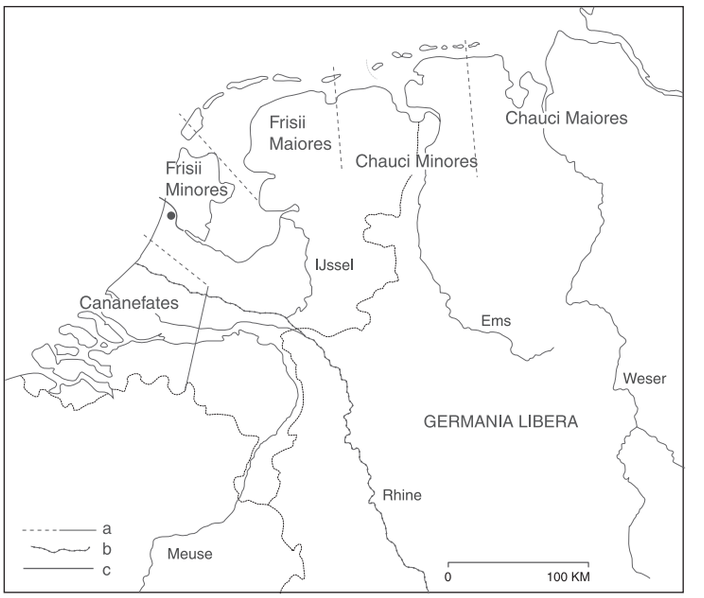
House dimensions

In work done previously (Therkorn 1987), it was shown that the dimensioning of housing differed between sites falling into possible tribal areas based on Bloemers' divisions *(fig. 69)*. It has been suggested that the dimensions of three-aisled farmhouses – the common type throughout much of NW Europe – and even farmhouse orientation were a means of delineating group traditions. The Assendelver group of farmhouses was analysed from the Oer-IJ region. It was found that patterns of setting out enclosed spaces could be established and it was thought this may have been due to family traditions of perceiving and reproducing 'proper proportions', perhaps even unconsciously. There is also good indication for the use of standardised widths, and thus an inkling of the use of a measuring system. Outside the region, to the northeast, the sites of Wijster and Feddersen Wierde, both hamlets, show some standardisation in central aisle widths and total widths respectively.[6] Closer to the Broekpolder, to the east of the (remnant) Oer-IJ channel, at the farmhouse sites of the Assendelver Polders 3 – 5 km distant, standardised widths of either approx. 5 m or 6 m seem to have been set out for the three-aisled dwellings. The central aisle width, however, showed excellent correlation with a longer total length in the Iron Age to 1st/2nd C AD group of dwellings. While measuring was evidently taking place from the Early Iron Age onwards, the 'looks right' factor probably also played a role in determining total length at Assendelft. None of the sites yet studied on the other side of the Oer-IJ channel, to the west, and further away to the south (in the province of Zuid-Holland) has shown signs that the builders chose a standard width.[7] This is also the case with the Broekpolder group of dwellings.

Uncertain end wall positions meant it was not possible to take more than three length measurements from the Late Iron Age/Roman Iron Age farmhouse plans in the Broekpolder. Total width and central aisle widths could be measured, however, and the central aisle grows wider as the width of the house expands. Since there is no standardisation in width, they differ from the Assendelver group of houses which, though they have a similar dating and are only 3 – 5 km distant, are on the other side of the Oer-IJ remnant channel depression.

House orientation

The orientation of the Broekpolder farmhouses differs from sites across the Oer-IJ. There is no doubt that house no. 3



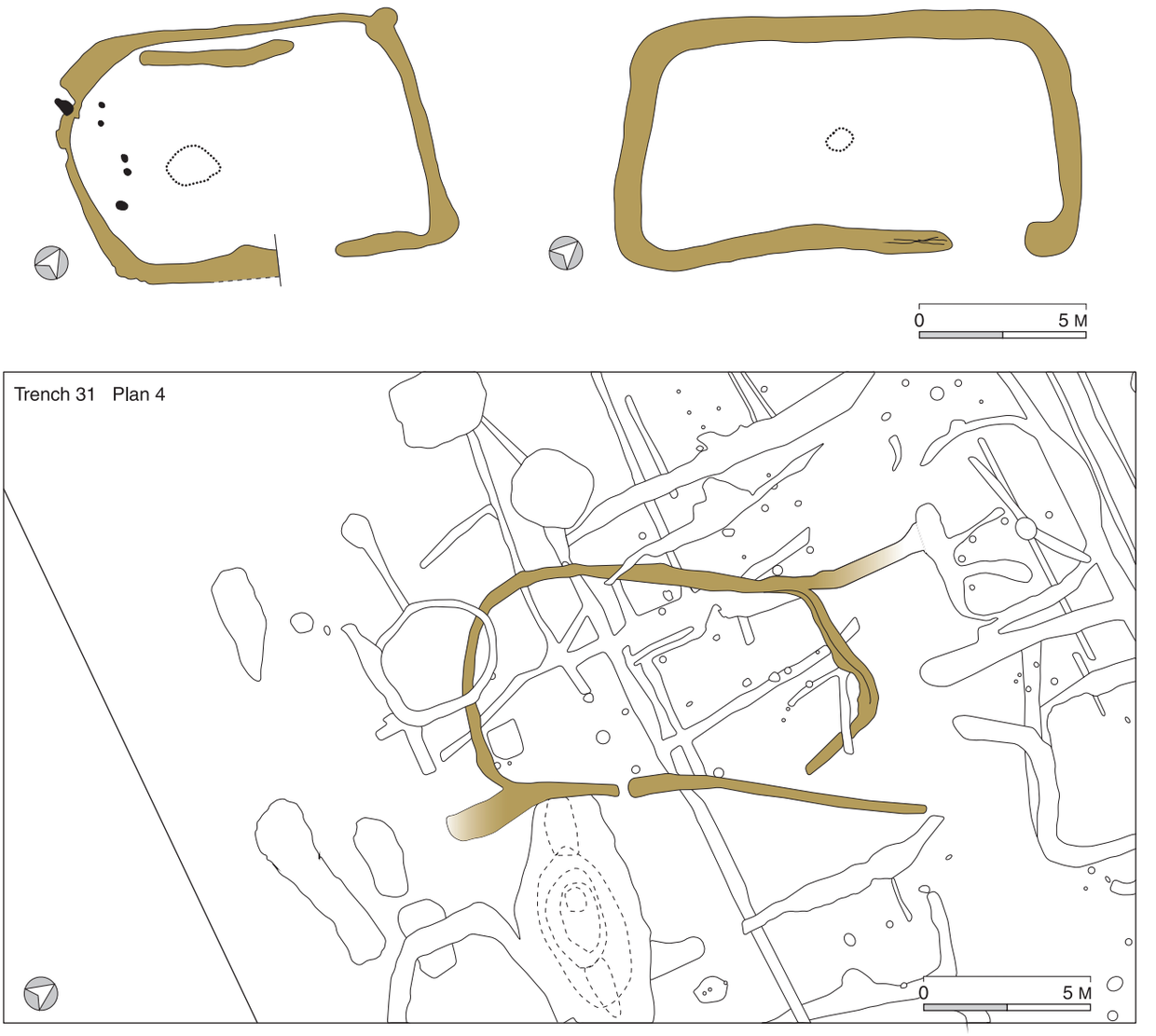
(*fig. 26*; Plan 5), aligned NE-SW, was the first in the area of trench 49. The subsequent building sequence for the other houses is also certain in this area. There is a shift from a NE-SW orientation in the Late Iron Age to a near E-W orientation in the later dwellings in tr 49. It would be tempting to follow this sequence in dating the NE-SW oriented house in trench 32, which could be very Late Iron Age, as earlier than the house in tr 15, which is aligned more or less E-W. As noted (2.9.3), the house in tr 15 is probably from the 1st C AD, taking the one-sigma date range and the pottery into consideration. During the Roman Iron Age, it seems that house orientation generally became almost E-W in the Broekpolder. The one dwelling recovered from the Middle Iron Age was also near to E-W, but unfortunately more house plans of the period are needed to suggest implications and shifting traditions in house orientation. To the other side of the Oer-IJ channel, houses were mostly oriented nearer to NE-SW during the Iron Age and Roman Iron Age, and in one, possibly two, cases NW-SE. No E-W orientations have been found so far.

There is thus a difference between adjacent areas lying either side of the Oer-IJ. Functional interpretations such as 'prevailing wind' or 'physical landscape' cannot adequately explain the variation in the built landscape.[8] Variation appears to be patterned in the Oer-IJ estuary, and the topic will be dealt with more fully in future work. The choice, and change, is part of a broader topic encompassing cosmological concerns and patterned settlement sites.

Fig. 69 Tribal map as suggested by Bloemers (1983) with suggested tribal boundaries (a, c) and the Roman empire border along the Rhine established in the mid-1st C in the Netherlands (b). The position of the Broekpolder (dot) is shown on the late prehistoric trajectory of the Oer-IJ. Rivers and channels such as the Oer-IJ were probably boundaries more than is indicated by these suggested borders.

6 At Wijster (Van Es 1967), 72% of the structures have central aisles of either approx. 3 m or 3.50 m; these dwellings were often extended during their life-span, whereby the width to length proportions obviously changed. Feddersen Wierde (Haarnagel 1979) houses have standardised side aisle widths of approx. 1.40 m, and five standard widths, with a great range of lengths. Buildings with widths of 5.60 m ranged, for example, from 11 m to 25 m long. Haarnagel was able to distinguish the 'Feddersen Wierde foot' (FW foot) of 35 cm as a measuring unit (ibid. 244 – 248). Starting with a width of 4.90 m (14 x 35 cm), the widths are increments of one FW foot, up to 6.30 m (18 x 35 cm).

7 Dwellings at Rijswijk (Bloemers 1978) showed excellent correlations for all three pairs of dimensions (Therkorn 1987a, 198).



Marking and absence of mounds: Late Iron Age/ Roman Iron Age farmhouses

Characteristics signifying a tradition of marking house sites, at least during the Later Iron Age/Roman Iron Age period, and different from dwelling sites on the other side of the channel, may be visible in the three segments of the Broekpolder.

The house plan in tr 15 was the best preserved, the plan disturbed only by a much later Medieval ditch. The farmhouse plan (*fig.* 25, no. 10; Plan 7) was interpreted in terms of marking and visibility after dismantling. The stratigraphy clearly indicated that at least one post had not been pulled up when the superstructure of the house had been dismantled. The horse burial was added near to the post at some time, and could also have been a way of marking the house site. The house plan in tr 32 was not recovered completely, but dug features had not disturbed what was found. The partial plan was covered by a thick ploughsoil, which arose with subsequent use, whereby the postholes were nearly ploughed out. This house had therefore been ploughed over, in contrast to that in tr 15. Six to seven plans were found in the northern segment, but although trench 49 covered 1.3 ha, the collections of postholes were found over an area of only about a third of a hectare. However, later features and farmhouse plans did not disturb the earliest plan.

Later plans did show over-cutting by other features, however. It therefore seems plausible that the earliest house

Fig. 70 Examples of the 'curvilinear' style of feature (digging): two plans of wall ditch structures from the Assendelver Polder (from Therkorn 1987a) and the area of the Broekpolder, in tr 31 (Plan 4) with similar style, but this ditch was not the foundation ditch of a house.

8 See for a summary of the later anthropological literature on the subject Gerritsen 2001. The subject of proscriptions (tending away from) and oriented towards (aligned with) was briefly explored in relation to the region in Therkorn 1983, 1987a,b and Abbink & Therkorn 1988. Since the 1980s, the number of sites excavated to the south of the Oer-IJ channel has increased considerably and the arguments have been augmented by even more data, whereby the differences have become more obvious.

established was not dug over as subsequent generations of users created new features within each segment of the ridge. It could not be established whether the earliest house plan remained visible in the form of a post left in position, as in the case of the house in tr 15.

To the other side of the Oer-IJ, low mounds were traditionally raised over dismantled dwellings dating from c. 700 BC to 350 AD to mark the site.[9] The mounds became features in themselves and have been interpreted as features incorporated in a cosmological sense of dead and buried dwellings in relation to the larger landscape scale with its tripartite division into land, tidal zone and sea (Therkorn 2004, 218). A similar treatment of house sites has never been established in the area on the Broekpolder side of the Oer-IJ.

Curvilinear style of feature digging: functions, gender, others

Only two areas within the 12 ha excavated in the Broekpolder demonstrate features dug in a 'curvilinear style', which apparently arose during the 1st C. Circular gullies are not included in this category, which focuses on enclosures or partial enclosures formed by deeper gullies and ditches. One area is in the southeastern corner of tr 31 (Plan 3), with feature digging and re-digging in this style. There was no associated dwelling. Trench 49 also contained a few curvilinear features associated with houses (cf. Plan 5).

Figure 70 shows two 'wall-ditch' houses from the Assendelver Polder in relation to a very similar feature in the southeastern corner of tr 31 in the Broekpolder. However, there was no evidence whatsoever for a structure built of sods set into a ditch as at Assendelft. Here in the Broekpolder there is a striking similarity in the ditch form and dimensions (and orientation), but not the function. Dug curvilinear gullies and ditches characterise the Assendelver polder sites, across the (remnant) channel. The 'style' could be linked to a traditional method of digging features. Some Assendelver sites had few straight lengths of ditches, while at others there were no straight stretches at all, not even the wall-ditches of the sod wall dwellings (cf. site plans in Therkorn & Abbink 1987, Van Gijn 1987, Meffert 1998). Thus, it appears that the style sometimes relates to complete sites, rather than a specific, possibly gender-specific, activity associated with settlement traces in certain areas.

In the context of crossing boundaries through intermarriage, this manner of digging features could relate to the areas used by women, marked by features dug by women in the curvilinear style. An aspect of lived space, in feature form, would thus have been reproduced from the other side of the Oer-IJ, in the other setting of the Broekpolder, but only to a very limited degree.

3.2 Broekpolder farmsteads

Areas and materials as representations of activities

The long farmhouse with the three-aisled construction style encompasses important aspects of animal husbandry. Livestock was housed under the same roof as the family, at least during the winter months.

3.2.1 *Family territories*

Late/Roman Iron Age farmsteads were recovered in each of the three segments along the Broekpolder ridge. If the LIA/RIA farmstead in tr 15, in the south, the partially recovered farmhouse in tr 33 – in the central section – and the earliest farmhouse in trench 49 to the north were contemporaneous, they were almost exactly 500 m apart. A similar distancing between probable contemporary, but earlier, farmhouses is also present in the Velserbroek polder, which is on the same side of the Oer-IJ as the Broekpolder sites. Using the small, natural waterways and Oer-IJ channel as boundaries, there is some concrete indication of micro-territories, those in the central and southern segment being the clearest. In all periods these micro-territories would have provided the combined resources required for one family to subsist within each of the ridge segments. Focusing on the central segment, where it was possible to excavate the breadth of the ridge, we can highlight as an example some aspects of subsistence which might apply to all periods of settlement.

Woltering (2000, 262 – 362) has provided a recent, and extensive, quantitative and qualitative analysis of many factors of farm life based on sites on Texel, 62 km to the north of the Broekpolder. The study is invaluable for its analysis, and for its summary and discussion of previous authors' estimates. Because of the time depth on Texel, Woltering is able to suggest changes in the overall composition of arable farming and animal husbandry. A cycle is seen from the Bronze Age to a decrease in cattle herd size by the later Middle Iron Age, and an increase again in the Late Iron Age and Roman Iron Age period. The changing length of farmhouses is used as the best criterion for establishing this cycle, whereby the byre area of

9 The mainly 1st C sites in the Assendelver Polders were discussed in relation to this tradition and at least a marking function (Therkorn & Abbink 1987); sites from later periods have similar mounds up to the mid-4th C (e.g. Therkorn *et al.* 1986, Therkorn *et al.* 2006).

the farmhouse becomes smaller, and then larger again.[10] Although no Bronze Age farmhouses were recovered in the Broekpolder, we could add the Middle Iron Age fenced-in dwelling to this trend if it was only 14 m long, though it may have been as long as 20 m. Possible reasons for shorter dwellings include a greater emphasis on sheep and, on Texel, spindle whorls are important for the wool connection (Woltering 2000, 318). This cannot be argued for the Middle Iron Age in the Broekpolder, and spindle whorls are in fact very rare finds for any period here (see below, 3.2.6).

The presence of separate stalls is not indicated in the Broekpolder house plans, except to some extent in the tr 15 plan. The absence of clear recoverable architectural features reflecting individual stalls is usual for the entire Noord-Holland area, but there are numerous indications in the stratigraphy and in traces (dung, cattle prints) that the larger end of the farmhouse was used for stabling cattle indoors, at least during the winter months.

It has been argued that farmhouses were constructed, and sized, with certain expectations in mind (Therkorn 1987), and this certainly applies to all calculations concerning use of the byre area for an increasing herd size, and also in relation to growing family size. Obviously, a small farmhouse has limitations in terms of the size of herd it can house. But a large farmhouse with a larger byre area may have initially been constructed with the idea of a maximum stabling capacity to be reached as the family grew. We have assumed that a single farmhouse housed from two to six people during its use-life. There are never signs of extensions to the length of the farmhouse in the Oer-IJ region, so the inhabitants probably also began with expectations of family growth and expansion of the herd, and possibly a somewhat larger amount of land to be brought under cultivation. The reverse might also be expected. Thus, in actual terms of a house as a family setting, all of the farmhouses may have been built with maximum expectations of a certain number of children, a number of years a farmhouse was to be inhabited, and the area needed to house livestock. That actually recovered and some estimates of use-areas needed per household follow.

3.2.2 *Livestock and other animals*

A total of 6967 bones were recovered with 31 species represented. Aside from the usual fragments of only partially or unidentifiable elements (40%), identifiable bones were from domesticated (55%), wild animals (4%), and humans (1%). A few generalities on the bones recovered are summarised in *Figure 71*, with more detailed information shown in Appendix 4. Bones were deposited mainly in the feature category 'pits' with 38% of the material (n = 2694). The general layers had almost no bone material, with the exception of the layer off the slope in tr 15 (f454). By far the greatest problem in establishing relative species occurrence on the basis of zoological materials is the lack of surfaces, as is predominantly the case in the Broekpolder excavations. When present, surfaces contain the majority of bones (and sherds). Trampling makes the zoological material so small, however, that the majority of it is unidentifiable. This also makes intra-settlement comparison of species unrealistic between contexts of layers in relation to pits and other dug features.

The general picture of species and distribution among the various types of dug feature categories seems to be somewhat different than that encountered thus far within the region. Moot questions are whether or not these are actual differences as meaningful to the subsistence package or simply – but importantly – traditions of deposit in particular types of features. These questions will not be solved here as there is no way of comparing feature deposits with surface debris. However, there are some indications given by the numbers.

The majority of the bones come from cattle, as usual for the Netherlands, and assumed is that cattle formed the majority of the livestock holdings for all periods. However, the difficulty in determining certain stratigraphic difference has led to lumping for the important periods of Late Iron Age to the Early Medieval Period. There was little bone material recovered for the earliest periods of Bronze Age and Iron Age, whereby there is also very little one can conclude. It is a very dubious enterprise to consider deposited bones as an exact reflection of the herd composition. Bone percentages of domesticated animals can shift between feature types, but also within the same type of feature but within different areas of a settlement complex[11] The epiphysial fusion data show that, as expected, cattle and sheep/goat were kept for both primary and secondary products, pig for meat and horses for secondary products, presumably draught, travel and status. Of the few bones showing pathology, the cause is primarily ageing and wear and thus also in line with the secondary product designation arrived at through fusion data (App. 4).

The percentage of cattle and sheep/goat bone is similar in the Middle Iron Age and combined periods of Late Iron to

10 That cattle do not theoretically have to be stabled inside during the winter is mentioned (Woltering 2000, 333 – 4, 360 – 1) and cultural traditions and/or 'bad winter' scenarios whereby cattle might be stabled inside for the full four months, December through to March, or for varying parts of the period, depending on weather conditions do warrant further discussion.

11 Many more intra-site feature comparisons should be made; see Therkorn 2004, tab. 1 – 4, 295 – 300; Therkorn & Besselsen 2009.

Total bone: all features, all periods

cattle	2239	57.4	53.7	32.1
sheep/goat	881	22.6	21.1	12.6
horse	389	10.0	9.3	5.6
pig	281	7.2	6.7	4.0
dog	42	1.1	1.0	0.6
human	66	1.7	1.6	0.9
	3898	**100 %**	**93.5**	**55.9**
birds	104		2.5	1.5
fish	157		3.8	2.3
amphibians	1		0.0	0.0
watervole/mouse	3		0.1	0.0
dolphin	1		0.0	0.0
otter	1		0.0	0.0
whale	1		0.0	0.0
roe deer	4		0.1	0.1
red deer	1		0.0	0.0
	4171		**6.5**	**3.9**
			100 %	
large mammal	1000			14.4
medium mammal	405			5.8
small mammal	5			0.1
indet	1386			19.9
	6967			**40.1**
				100%

Total birds: all features, all periods

Anas platyrhynchos.	3	2.9
Anas spec.	10	9.6
Anser fabalis	1	1.0
Anser dom./anser	44	42.3
Aythya	2	1.9
Corvus	1	1.0
Cygnus spec.	2	1.9
Grus grus	1	1.0
Haliaeetus	1	1.0
Phalacorax	4	3.8
aves indet	35	33.7
	104	**100%**

Total fish: all features, all periods

Abramis brama	34	21.7
Perca fluviatilis	4	2.5
Acipenser sturio	2	1.3
Esox lucius	2	1.3
Melanogrammus	2	1.3
Mugil	2	1.3
Plathychthys	1	0.6
Siluris	5	3.2
cyprinidae	81	51.6
pisces indet	24	15.3
	157	**100%**

Early Medieval Period (cattle at 72% and 70%, respectively). Taking just cattle in relation to sheep/goat, the *proportion* seems to be in line with the general picture for the coastal area above the Rhine (cf. Woltering 2000, 226 – 7; IJzereef *et al.* 1992). Cattle bones, however, certainly are of a smaller percentage of the domesticates as compared to these and other sites, where representation under the 60% of the total domesticates is relatively rare, certainly for the later Iron Age-Roman Iron Age (cf. summary of various sites: Hiddink 1999, 166 – 7). Interesting is that the percentage for cattle from MIA and LIA-EM features is similar: 53% and 57% whereby there does not seem to have been a major shift in the economics of cattle. The difference lies in the amount of pig bones from MIA features as compared to LIA-EM features, with an accompanying variation in sheep/goat bone percentage, rather than in that of cattle bones.

As the MIA is mainly represented by pit features, it is unknown whether or not the percentage of pig bone – 26% – realistically represents a relatively large percentage of the livestock during this period in the Broekpolder. For the much larger region, the only sites summarized by Hiddink *(ibid.)* with a similarly high percentage of pig are inland and were possibly more forest rich during the period. These are also the few sites with an accompanying lower percentage of cattle of less than 60% of total livestock bones. The aspect of forest, and thus foraging possibilities for pigs, does not apply to the Broekpolder.

The aspect of very conscious selection, for instance, of pig bones for pit deposit within the Broekpolder is evident in the following: while 23% of all the bone material of the MIA period was not recovered from pits, only 3% of the MIA pig bone was found in a context other than a pit. Seven near complete pigs

Fig. 71 Summary of the bone materials recovered from the Broekpolder. For specifics, see Appendix 4.

and piglets, which are counted each as 'one', were also included with other materials in MIA pits. Both of these facets of both single element over-representation and large deposit in pits very probably point to a symbolic importance of pig during this period. Although we cannot draw any conclusions on a differing economic strategy, there is a selection for deposit clearly represented. Certainly in the deposit of more or less complete animals, sacrifices must be considered.

Almost all of the features of the MIA were pits – other types of features were rarely encountered, and preservation conditions of pits could be a factor in the overrepresentation of the total amount of pig bone recovered during the MIA. But, in comparison, LIA-EMA pits have 3.4% pig bones which is similar to the total LIA-EMA pig bone recovered (4%), and obviously different to the 97% pig bone in MIA pit features, although preservation condition were also excellent for the later period pits. There were no large, articulating, pig deposits in the later pits and that is in itself quite a noticeable difference here within the Broekpolder. For the pits of the LIA-EMA, sheep/goat bones are overrepresented, with 40% in pits as compared to being only 23% of the total bone material.

Looking at the bones represented in pits, as elements, there is a difference in the distribution between pits and other features: axial elements of all the species – domesticates, bird and fish – are more frequent in pits. The right side is better represented in pits and ditches during the LIA – EM than in the other types of features.

Pits have only something more than 25% of the total number of bones, representing both eating waste and slaughter waste. Pits have been interpreted as having been dug at certain times of the year, at economic highpoints of the year accompanied by ritual (Therkorn 2004, Therkorn & Besselsen 2009). Feasting and ritual in turn generates 'ritual rubbish', including bone material. For the MIA, it would follow that along with sacrificing pigs and depositing most of the carcass, more pigs were also butchered and eaten, generating single bone element waste of these animals. Within an interpretation along these lines, it follows that during the LIA-RIA, more sheep/goat were consumed during these highpoints of the year. The bone waste may also represent sacrificial animals, but whereby the consumption, rather than burial with other deposits, had become the tradition.

Deposit of horse bones also show a difference through the periods; rare in the MIA pits (c. 3%) but more frequent in the pits dating to the LIA-EM (c. 7%). There is also a difference in the composition of the bone of the offering site deposits. As was long ago remarked for northern areas in general (e.g. Jankuhn 1967), and something also applying to the offering site only 4 km distant in the Velserbroek (Therkorn 2004, 107 – 116): horses are represented to a greater degree in watery offering sites than they are in the settlement traces. While we do not have many 'settlement' traces of the Early Medieval period, the Early Medieval period mainly represented by the offering site in the Broekpolder shows 18% horse bone, while for the more general time span LIA-EMED, horse bone is 11% of the total identifiable bone. Pig (7%) and dog (4%) are both better represented in the bone material of the offering site as opposed to the 4% and 1%, respectively, for the LIA-EMED, while cattle, but more particularly sheep/goat are less represented.

Of the total number of bones from dogs, in all periods, 50% were recovered from the offering site deposits. The possible reason behind this can be related in the combination of the rise of the Dog Star, Sirius, part of constellation Greater Dog. This aspect of bone material is gone into in section 3.4.5, as involved may be marking within economics and cosmology during the harvest period, when the Dog star, Sirius, rises in the southeast. The bone deposits of cattle and sheep/goat are also regarded as being combined to deposits in the pool during the slaughter period, in November, a time accompanied by the set of the brilliant star Sirius, in the southwest.

'Wild' is represented by bones from saltwater and freshwater mammals and fish, amphibians, rodents, deer, and birds. Included are goose and duck bone which are indistinguishable as to wild or domesticated *(fig. 71)* While many of the bones from fish, birds, amphibians and rodents could have nothing to do with deposits by humans, there are of course the numerous references in medieval texts of the same animals as having been perceived as various types of harbingers and/or as animals with attributed functions including symbolic meaning. It should not be discounted that these bones may represent consciously collected and deposited elements. Particularly the clusters of deposits within the offering site show selection of different types of materials, including bones from small species (cf. section 2.11.6). It is also in the offering pool that the majority of wild species were found, but as is usual for the periods Bronze Age to Medieval times, wild animals, fish and birds are very infrequent in the bone material. Most interesting is the selection that seems to be present as deposits in the offering site.

Estimates for herd size and cultivated area

Herd composition through the year	Stabled inside winter months		Born per year		Slaughtered per year	
Number of double stalls	6	10	6	10	6	10
livestock in byre area						
cattle	9	14	3 – 4	4 – 7	2 – 3	3 – 5
horses	1	2	–	(1)	–	(1)
sheep	2	4	1 – 2	2 – 3	1	1 – 2
pigs	1	2	2	4	1	2

based on Prummel (1992, 134, 143), but with horses added

Number of double stalls	6	6	10	10
Family size	4	6	4	6
Arable needed	0.6 – 0.9 ha	1.7 – 2.0 ha	0.3 – 0.8 ha	1.3 – 1.7 ha

Based on Brinkkemper (1991, 147), but altered for a yield of 1:10

Chop and cut traces demonstrate of course the butchering and cutting actions involved with meat consumption; the gnaw traces demonstrate – on all categories of bone and contexts – that many of the bones were available to at least dogs, for a time, before deposit. There is some difference between the percentages showing cut and chop marks between the different feature types, but this requires a more in depth study before conclusions can be made. The absolute numbers are generally too small for certain interpretations of difference. Human bones are included in the tables in App. 4 and they are discussed in section 3.4.1.

Prummel (1992) suggested hypothetical herd compositions for the stabling capacity of farmhouses at Voorne-Putten (province of Zuid-Holland), based on age indications and the percentages of animal species found there. These estimates are given *(fig. 72)*, taking into account regeneration of the herd, slaughter for meat consumption and keeping animals for milk production. Milk-producing animals were estimated at 3 – 4 cows and one ewe for a six double-stall byre; and, for a byre with 10 double stalls, 4 – 5 cattle and 2 – 4 ewes. It is assumed here that all of the animals were kept sheltered in the farmhouse during winter months. Based on double stalls of at least 1.30 m wide, a farmhouse with five double stalls on each side, thus ten stalls in total, hypothetically needed a byre area of only 7.5 m long to accommodate the beasts kept through the winter.[12]

3.2.3 Cultivated area in relation to herd size

Brinkkemper (1991, 147 – 152) used Prummel's estimated herd size and composition, and related them to family size and the amount of land needed for grain production to supplement the nutrition provided by meat and milk from animals *(fig. 72)*. Originally based on a grain yield of 1:7, his land area estimates have been revised downwards here, as a yield of 1:10 has been used. This is probably the minimum yield one could expect from Holocene soils such as those of the Broekpolder.[13] The stabling capacity calculations by Prummel and the calculation of the area of land needed for cultivation to provide the overall diet, as demonstrated by Brinkkemper's figures, could also be seen as a progression over time. Again, in line with Woltering (2000, 256) and earlier work done in the region, we assume that one farmhouse had only one dwelling generation of about 20 – 25 years. For the LIA/RIA farmhouses, the livestock stabled could have increased over time, the farmhouse being built with this possibility in mind. A commensurate increase may also have taken place in the cultivated area, from less than a hectare to about 1.3 ha to feed a family of six (with a yield of 1:10). A somewhat greater yield would bring the estimates down to the area actually found for the Early Iron Age and the measurable 1st C AD fields in the Broekpolder.

The strip field from the Early Iron Age in the central segment of the Broekpolder ridge (tr 31 – 32, 39, 40) was defined by ploughsoil and underlying ard-marks,[14] bordered

Fig. 72 Estimates for herd size in relation to yearly cycles, family size and number of stalls (from Prummel 1992). These estimates then lead to estimates of the surface area needed for cultivation (from Brinkkemper 1991).

12 This includes a maximum principal post diameter of 20 cm. Single stalls are considered to have been less than 1.20 m wide: cf. Brinkkemper (1991, 121) for a discussion of stall widths and his calculations.

13 Commenting on estimates for Bronze Age habitation, Woltering considers 'The yield ratio in West-Friesland could have been much better than 1:10' (2000, 343); West-Friesland can be considered similar to the Broekpolder.

by narrow gullies. The cultivated area can be measured with some precision. The field was extended at the northern end at some time. During the earlier phase, the field was approx. 1.03 ha. During the later phase, it covered approx. 1.24 ha. The increased size of the area cultivated could have coincided with an increase in family size. The figures are almost consistent with Brinkkemper's estimate, first for a family of four, with livestock occupying six double stalls and the increase in field area would correlate with the estimated increase in family size to six people, with ten double stalls.

The area used for cultivation in the Middle Iron Age is unknown. The dwelling could have been 20 m long and, if so, long enough for sheltering people and livestock, with more than enough room for a byre area with ten double stalls. The fenced enclosure at the west end of the house could also have been used for keeping livestock, such as sheep *(fig. 8)*.

Shifting use has made the area of cultivated land in the central ridge segment difficult to establish for the Late Iron Age through to the Roman Iron Age. Ploughing across the breadth of the ridge shifted over time, and also over the one recovered but incomplete farmhouse plan. Some measurements can however be gained from the banked field extension to the east, off the slope of the ridge, which has been dated to the 1st C AD *(fig. 15)*. Of the three rectangular fields, the central field was found to have an area of 0.32 ha. The total area of the three fields together was probably not much more than 1.15 ha, an area sufficient for a family of six, if they had the livestock composition estimated for ten double stalls. The higher-lying area to the west was undoubtedly cultivated at this time too. We must conclude –assuming only one family lived in the central segment – that the grain yield far exceeded the needs of a single family. The surplus may have had something to do with the Roman presence at Fort Velsen.

The farmhouse plans recovered from tr 15 and tr 49 were all long enough to have housed the estimated family size of six, with space for ten double stalls, at least. Cattle were most important for native subsistence, as they delivered the greatest weight of meat. What the cattle ate, as recovered from discreet lenses in pits in the form of dung, supplies further information about livestock management at the time (see below).

3.2.4 *Plants*

Macroremain analysis of samples taken from various archaeological contexts yielded information on facets of habitat exploitation as part of the economy.

Cultivated crops

The materials obtained from samples indicate at least some of the crops grown. In the Middle Iron Age, emmer wheat *(Triticum dicoccon)*, barley *(Hordeum vulgare)*, gold-of-pleasure *(Camelina sativa)*, and flax *(Linum usitatissimum)* were present, and have been discussed (2.7.4). Pits were the main depositional context of the samples analysed; why material was included is discussed in the section on pit interpretation. In addition to the above crops, the Late Iron Age/Roman Iron Age samples added Celtic beans to the crops that are known to have been grown. From the Early Medieval Period, the 6th/7th C samples from the offering site yielded crop remains of flax and gold-of-pleasure. The samples from about AD 1000 also indicated flax, as did those of the post-Medieval period. Flax is certainly a theme in all periods, and specialisation in the late prehistoric periods will be discussed below in the context of identity and women (3.2.5).

Despite the relatively large number of botanical samples examined, the number of crop plant remains from the Roman Iron Age was small. Two cereal crops were indicated by the presence of chaff fragments: barley (*Hordeum vulgare*, rachis internodes and awn fragments) and emmer wheat (*Triticum dicoccon*, glume bases and spikelet forks). Charred grains of barley were also represented in the record. The presence of threshing remains of barley and emmer wheat implies that these crops were cultivated and processed locally. One flower base of *Avena sativa* was found, which indicates that oats might have been cultivated as well. Two other crop plants, *Linum usitatissimum* and *Camelina sativa* are represented by seeds and threshing remains. Celtic beans *(Vicia faba* var. *minor)* were not established for the earlier periods in the Broekpolder. They might have been cultivated as a garden crop. Four charred Celtic beans were recovered from three features near farmhouse plans and the accompanying small plots on the northern segment of the ridge in tr 49 (Plan 5).

The interpretation of *Brassica rapa* (*Brassica campestris*, turnip) remains in the macrofossil record is somewhat inconclusive. This plant is commonly found at coastal settlement sites in the Netherlands and northwestern Germany from the Bronze Age onwards (Van Zeist 1974, Körber-Grohne 1967).

At Feddersen Wierde, for example, large amounts of seeds and some pods of this species were recovered. Körber-Grohne is of the opinion that *Brassica campestris* occurred as a weed

14 Areas showing only ard-marks found to the east of the cultivated areas were suggested to be places where sods had been stripped. It should be emphasised again that ard-marks in themselves are not enough to show actual cultivation, and sod cutting/gathering is an activity that should be considered where there is no accompanying ploughsoil.

in arable fields, while Van Zeist argued for cultivation of the species either for its oleaginous seeds (rapeseed) or for the root crop. In the Broekpolder, seeds were recovered from two dung/intestinal samples only (in pits f5719/2 & f5151/7). They were found together with weeds from arable fields associated with Polygono-Chenopodietalia (tab. 6, App. 3). It can be assumed that turnips actually were grown as part of the summer crop and were at least fed to cattle.

Arable weeds and ruderals, edible weeds and wild plants

A large number of species characteristic of Polygono-Chenopodietalia (weeds associated with summer cereals) were recovered, including *Anagallis arvensis, Lamium purpureum, Chenopodium album, Persicaria maculosa* and others. The weed species *Agrostemma githago, Raphanus raphanistrum, Fallopia convolvulus* and *Rumex acetosella* are characteristically associated with winter cereals on sandy soils (Secalietea). Three of these species occur together in one sample of dung/intestinal matter from f5719/2. These plants usually germinate in autumn, remain through the winter, and then bloom and set seeds the following year.

In the past, these weeds of winter cereals were thought to have first occurred in the Roman Iron Age, but subsequent research has demonstrated their presence on Pleistocene sandy soils in the Iron Age; one reason posited for the absence of winter crop indicators along the mainly clayey coastal regions is flooding in winter, and/or the fact that winter weeds do not grow among winter crops on clay due to the richness of the soil (cf. Brinkkemper 1991, 132).[15] Pals, however, had already examined the subject, emphasising (citing Bannink *et al.* 1974) the poor development of Secalietea species on cold soils:

> … when eventually the temperature is suitable for them to develop well, they are no longer able to do so, as they can no longer compete successfully with the already high-growing crop for light… The scarcity of Secalietea species in the coastal area in pre- and protohistoric times… can probably be explained by this phenomenon and not, as is often done, by assuming that only summer crops were cultivated… (Pals 1987, 74).

Thus, if these species of weed were present, as they were in the Roman Iron Age in the Broekpolder, one can conclude that winter crops were grown. We cannot however conclude that winter crops were not grown in the Middle Iron Age on the basis of the absence of these species.

Electing not to 'weed' means electing to have these plants among your crops. The terminology also implies that people in the past strove for 'clean' crops. From a broader landscape perspective, the meat and cereal discussion in the Netherlands is rather narrow when it comes to subsistence potential. Woltering (2000, 341) puts use of wild plant resources at 5% of total calorie intake. Elsewhere in Europe, the stomach contents of humans, such as those found in bog bodies, provide the clearest evidence that people gathered and ate wild plants (cf. Van der Sanden 1996). More broadly, Medieval texts in the vernacular such as those in Middle Dutch demonstrate known uses of dozens of wild resources in various aspects of daily practice (cf. Garthoff-Zwaan 1987, 334).

In the region, deposits of complete pots occasionally contain chickweed *(Stellaria media)*, sometimes in combination with other edible seeds.[16] Regular occurrence of orache *(Atriplex)*, the docks *(Rumex)* and fat hen *(Chenopodium album)* also suggests human consumption (Pals 1987, 86; Therkorn *et al.* 1984, 368 – 369). These are traces of seeds, which of course does not address the use of wild plants as greens, stems and tubers. Farther afield, there are of course many anthropological examples, and it may be worthwhile citing a few uses here, as they still tend to be overlooked in archaeological analysis of subsistence, as well as in the perception of the natural environment as 'landscape'.

Duke (1992, citing Facciola 1990) notes that the seeds of chickweed were used in breads and soups by various indigenous peoples of North America. The young, fresh stems and leaves were used as a green vegetable in eastern North America, and are a good source of vitamin C. *Chenopodium album* (fat hen) seems to be particularly important as a resource for human consumption. A considerable number of ethnographic records relate to the use of *Chenopodium album* and related species by native North Americans. Kuhnlein and Turner (1991) state that *Chenopodium album* complex, which includes *C. berlandieri*, *C. bushianum* and *C. macrocalycium*, is well known for its edible greens and seeds amongst Canadian indigenous peoples. For example, the Ojibwa boiled the young leaves with fat, and ground the seeds into flour to make gruel or bread. *Chenopodium* shoots and leaves were usually harvested from spring to early summer, while seeds were collected in late summer, through autumn and early winter. Tribes on the United States plains also used the greens and seeds of *Chenopodium album* complex (Asch & Asch 1985). Interestingly, the seeds of *Chenopodium berlandieri* have been

15 Citing Groenman-van Waateringe 1979, Bannink *et al.* 1974, Van Haaster 1985.

16 Two Roman Iron Age pots from the Assendelver polders, at site B, as carbonised seeds; at site H, carbonised with barley (Pals 1987, 86 – 7); at Schagen Muggenburg-1 (Van Haaster 1985, Therkorn 2004) in one small pot, with orach *(Atriplex)*, non-carbonised.

found at archaeological sites in the midwestern United States, indicating that the plant was known as an ancient food. There are also strong arguments to suggest that it was actually cultivated as a major plant food in the midwestern United States.

The fact that *Chenopodium* species often grow in great abundance, producing huge quantities of seeds, and that they are easy to gather and process is repeatedly emphasised in ethnographic records. For example, a single *Chenopodium album* plant can produce 50 to 70 thousand seeds (Parish *et al.* 1996). They have a high energy yield (414 kcal per 100 g fresh weight) and they are also rich in protein and carbohydrate (16.6 g of protein and 49.6 g of carbohydrate per 100 g fresh weight). *Chenopodium* greens are rich in nutritional elements: protein, minerals, vitamins A and C (Kuhnlein & Turner 1991). Landscape management is very much a part of subsistence strategies involving the gathering of 'wild' resources, as recent studies have shown. Far from haphazard, gathering activities can be amazingly complex (cf. Anderson 2006).

Returning to the Broekpolder, whether or not seeds and/or greens of *Chenopodium album* served as food can be briefly explored through the archaeological context and associations of the plant. The charred seeds were from the Middle Iron Age (f2773/3 and f3584/2) and from the Roman Iron Age (f501). These samples also contained a relatively large amount of cereal chaff and seeds of other plants associated with cultivation – also commonly designated as 'weeds'. According to Hillman (1986), both the 'weeds' and the cereal chaff are typical elements in the composition of the waste fraction from crop processing, which he suggests could have been saved and used to supplement the diet during times of scarcity, for example.

'Greens' are another matter and cannot be established by the methods of analysis currently used. If used, greens of fat-hen and other related species could have been one of the first vegetables to be collected in spring, while seeds could have been an important addition to the diet through the late summer and autumn, and perhaps into winter.

When seeds occur in carbonised form within certain feature contexts, consideration must (as with the 'dung' samples, below) be given to the reasons why they occur together, once patterns have been established.[17] Feature 501 had a combination of edible carbonised remains found with recognised crops of Celtic beans and cereal debris. Other carbonised remains came from a range of habitats, possibly representing the gathering of 'wild' species. This could also be one of the reasons why these species occur together in a layer of the pit. The seeds of common plantain *(Plantago major)*, fat-hen *(Chenopodium album)*, orach *(Atriplex patula/prostrata)*, sea clubrush *(Scirpus maritimus)*, and common vetch *(Vicia sativa)* would have been edible.[18] Black medic *(Medicago lupulina)* is also edible and it occurs as carbonised seeds in three other samples (two pits: f5577/4 & 5152/2 and a ditch: f4984), all with grains of barley. Hazelnuts *(Corylus avellana)* were evidently gathered, as was elderberry *(Sambucus nigra)*, which was at least eaten by cattle, as shown by two dung samples.

Harvesting

The method of harvesting was indicated by one sample (fnd 1888) only, from a Middle Iron Age pit (f2796/11). Both waterlogged and charred culm internodes and nodes were found among the straw. There were also solid culm bases with root scars probably belonging to cereal straw. The combination of culm bases and other chaff remains in the same sample indicates cereals were harvested by uprooting, at least during this period of the Middle Iron Age. Although there are apparently no experimental estimates of the efficiency of uprooting relative to hand-picking and/or using a sickle, Woltering considers (2000, 326) that for 'sandy or light, loamy soils uprooting was a rapid method of harvesting, and certainly no slower than hand-picking.' Uprooting would also certainly be a suitable method for gathering all of the 'weeds' evidently included along with the crops. Both would be taken back to the farmstead for various uses.

Processing flax

Samples containing flax stems are of special interest. They were recovered from layers in three pits, one from the Middle Iron Age (f3695/6) and two from the Late Iron/Roman Iron Age (f5160/5 & f5159/4). Again, 'weeds' are present to some extent: in the sample from f5160 they include *Chenopodium album, Polygonum aviculare, Sonchus arvensis, Stellaria media,* which are species characteristic of summer cereals (Polygono-Chenopodietalia).

Flax material made up nearly 100% of the sample matrix. The samples from f3695/6 and f5160/5 contained a large amount of waterlogged stems, capsules and seeds, while that from f5159/4 contained stem fragments, and the sample from f5160 contained a large number of seeds from other habitats

17 In these preservation circumstances, carbonisation as the result of burning dung is not an option, as this is visibly different due to the presence of white ash.

18 Long gathered and also grown as a (cash) crop, common vetch has been more recently determined to have toxic effects on humans, and trade has been officially banned (Tate *et al.* 1999).

as well. Capsules were preserved mainly as fragments or crushed specimens, some of which still contained seeds. Fragments of stems were compressed and only the woody inner parts were preserved, while the epidermis and fibres were absent. All four stages of flax processing to obtain flax fibres are represented, each producing characteristic processing remains (see box).

Material from the beating/rippling stage is probably represented in the numerous flax capsules and seeds in two features, f5160 and f3695. Refuse material from this stage consists mainly of crushed capsules and seeds, but also weeds, which were presumably growing with the flax. It also includes woody parts of flax stems, resembling the waste material from the process of braking. The stems were somewhat flattened and measured 5 – 8 cm. Two stages of processing represented in one sample shows either a mixture of processing remains before deposit in the pit, or capsules that were not removed prior to retting and braking. If the latter was the case, material such as flax capsules and seeds, and weeds and seeds, were carried on through the process of retting until they were removed together with the woody stems during braking.

Flax material recovered from pit f5159/4 consisted almost exclusively of woody fragments of flax stems measuring up to 5 cm in length. This could represent the remains of braking in order to separate the stems from the bast fibres. A complete wooden object (fnd 5804) was also deposited in a layer under that containing the flax remains in pit f5160. The stump of alder, 27 cm in diameter, had a lowered and roughened surface (10 cm wide) created by a gouge (*fig. 73* and App. 2a, pit f5160). The block could have been used during the braking process, the flax stalks being laid across it and pounded over the uneven surface. Blocks of wood with uneven surfaces were used in this manner during the braking stage of flax processing in the historical period (cf. Dewilde 1983, 291). Finally, there were also signs of an end product in the charred flax cordage or string fragments in which a number of parallel fibres are twined around each other *(fig. 73)*. These are from the Middle Iron Age, recovered from pit f2796/11.

Table 4 in Appendix 3 presents the weed species found with the flax processing waste in pit f5160 (sample 5927). They have been compared to the weed assemblage in samples containing flax remains from the Roman Iron Age settlement in Feddersen Wierde (Körber-Grohne 1967) as well as the weed

Stages in flax processing

Linum usitatissimum is commonly called flax when the plant is grown for fibre, and linseed when it is grown for its oil. The same plant was most likely cultivated for both purposes in prehistory. Flax fibre is produced by a process that consists of four main stages (Dewilde 1983, Pals & Van Dierendonck 1988). Each of the four stages of flax processing generates characteristic material. The four stages can be briefly described as follows:

Beating or rippling: Flax stems are stripped of leaves and capsules by beating. Waste material consists of crushed capsules and seeds, and weeds and weed seeds.

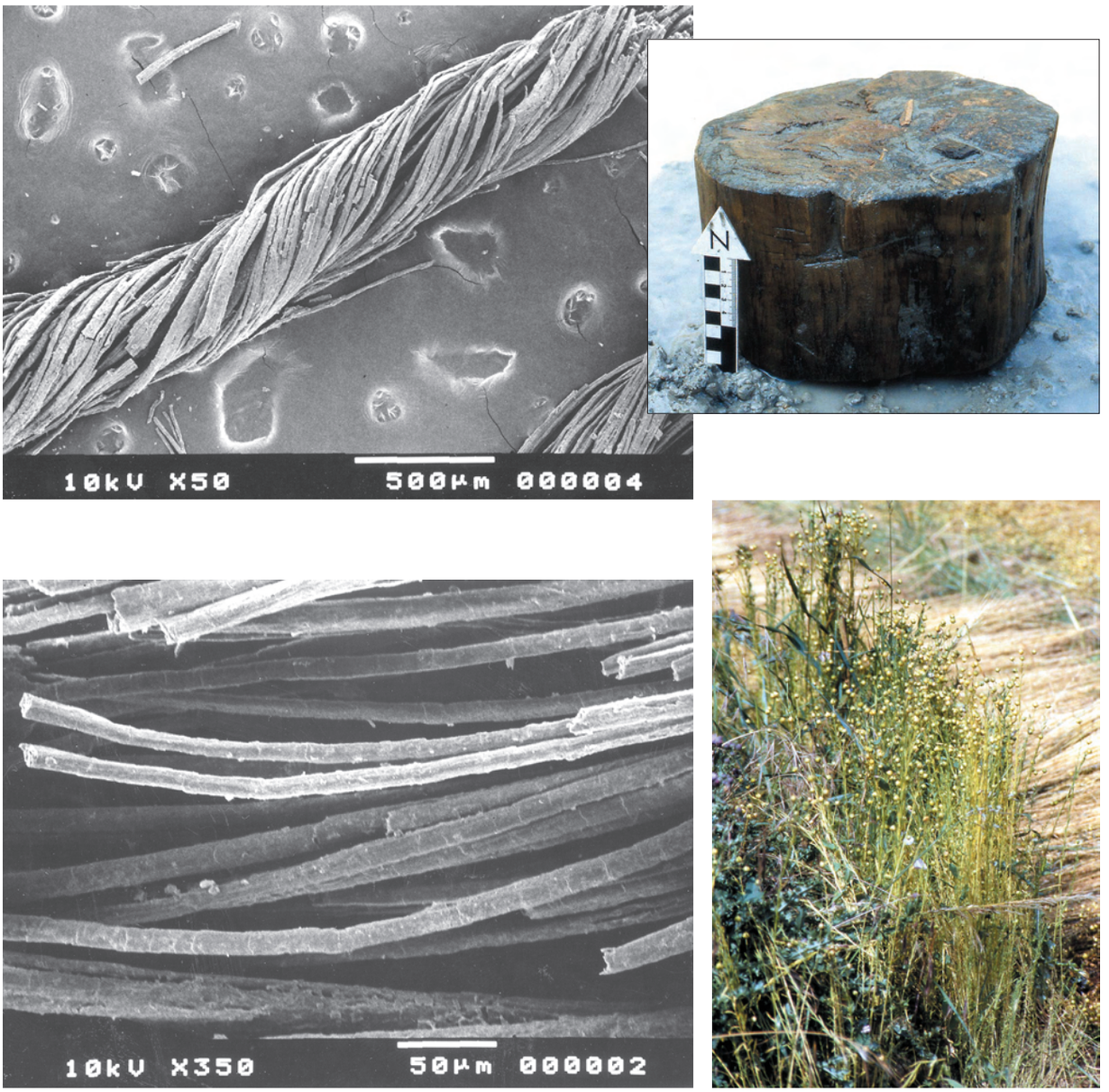
Retting: The stems are then submerged in slow-moving water or retting pits for one to two weeks. This process breaks down the pectin that binds the bast fibres. The plants are then dried in the sun. Waste material consists of rotting flax remnants, water plants and settlement noise.

Braking: Once dry, the woody parts are removed from the bast fibres by pounding, and the bast fibres are separated from the broken stems by bending them. Waste material consists of woody stem fragments.

Swingling: Fibres are removed from the remains of stems by beating and combing, producing fibres ready for spinning.

In the Netherlands, evidence of the cultivation of flax is known from the Middle and Late Neolithic and from the Late Bronze Age onwards (Buurman & Pals 1974, Bakels 1991). In most cases, however, these are remains of flax seeds or fragments of capsules recovered from various archaeological contexts. Work by Pals and Van Dierendonck (1988) on Medieval flax processing and weed flora associated with flax fields has drawn attention to remains from processing, and is exceptional in this respect.

In the Broekpolder, the second stage of flax processing is likely to be represented in the series of shallow, rectangular pits of post-Medieval date which may well have been used for retting (cf. Post Medieval Features, 2.10.3). The twined flax fibres recovered from a Middle Iron Age pit are the remains of an end product and a worked tree trunk section of alder from pit f5160 could have been used during braking *(fig. 73)*.



flora observed in experimental fields located in an unprotected salt marsh near Westpolder in the coastal area of the northern Netherlands (Van Zeist *et al.* 1976). Our sample is discussed again in the next section, when the other material it contained is interpreted.

Hay and ingested remains: samples as a complex of habitats and seasons

The above sections considered different facets of the macro-remains of the samples to distinguish crops, associated 'weeds', and processes. But by regarding the samples from 'dung' as a totality of remains, we can explore the fodder that livestock were fed. One other sample may well represent non-ingested fodder.

The samples of dung were retrieved from pits, but not as general lenses or layers infilling the diameters. They were usually discreet blobs and of a size consistent with a cowpat, but could even be part of the intestinal contents of a slaughtered bovine. Encountered during pit excavation and clearly visible due to its dull green colour, care was taken in the

Fig. 73 Left: scanning electron micrograph of charred flax cordage or string fragments in which a number of fibres are twined around each other, recovered from f2796/11, sample 1888. Below are individual flax fibres *(photographs: Kubiak-Martens)*. Above right: block of wood possibly used for braking from f5160.

field to collect only this material, omitting parts of other, more general layers from above and below. Thus, some part of one day's intake could be represented, considering the size of the discreet samples. It is uncertain, however, whether this material was dung or intestinal contents, or if both were represented by material of similar appearance from different features. Only one sample (f5719-2, sample 6106) was examined for parasites.[19] Podospora was present, suggesting that the material was dung, as this fungus germinates only after having passed through the digestive system. However, if intestinal content had been exposed to the air for a couple of days, reducing the acidity of the material, the ingested ascospores could have developed.

Table 11, App. 3, summarises the species recovered from all dung/intestinal content samples in relation to vegetation types. In addition to the remains of crop plants, processing remains, turnips, and elder mentioned above, the dung/intestinal content reveals even more of the varied diet, and a variety of habitats. These were in the immediate vicinity in the Middle Iron Age, but further away in later periods.

The Middle Iron Age dung/intestinal sample (f2796/11, sample 1888) mentioned above as indicating uprooting as the harvesting method contained, alongside straw, a plant spectrum consistent with salt-marsh vegetation, herbaceous remains from trodden places, threshing remains from flax and gold-of-pleasure, seeds from arable weeds and ruderals. Numerous waterlogged chaff remains from emmer wheat and barley, together with a few caryopses of barley, found in the sample indicate that unthreshed cereals had been given to the animals in addition to threshing waste.

This kind of fodder would most likely have been given to animals during the winter when they were stabled in the byre of the farmhouse. If this was indeed the case, we must consider use of the high salt marsh not only for grazing but also as an area for gathering plants as a component of winter fodder. Many of the plant species noted in the dung/intestinal content sample are characteristic of high salt-marsh vegetation, including *Glaux maritima, Juncus gerardi, Trifolium fragiferum, Puccinellia distans, Spergularia marina* and *Triglochin maritima*. This group of halophytic plants is accompanied by a number of species such as *Agrostis* cf. *stolonifera, Leontodon autumnalis, Potentilla anserina* and others that were growing in the high salt marsh due to grazing activities. Fodder is certainly indicated by the threshing remains and, consequently, the other landscapes, including all of the species associated with a high salt marsh, were also represented in the form of plants gathered as hay.

The same type of samples – dung or intestinal contents – from the Roman Iron Age produced plant indicators similar in habitat variety. However, while a salt marsh setting was within sight of the Middle Iron Age inhabitants of the Broekpolder, this was not the case in the later period. Some effort was evidently made to harvest plants for fodder from a salt marsh which could have been nearer to the coast or towards the extent of the open Oer-IJ, much further to the southwest of the Broekpolder. Plant species indicative of high salt-marsh vegetation include *Juncus gerardi, Glaux maritima, Puccinellia distans* and *Atriplex littoralis*. Closer to the settlement would be the fairly large number of species characteristic of Lolio-Potentillion anserinae (formerly Agropyro-Rumicion crispi), including *Potentilla anserine, Agrostis* cf. *stolonifera, Ranunculus sardous, Ranunculus repens, Carex otrubae, Alopecurus geniculatus, Plantago major, Poa annua, Trifolium repens* and others. Plant communities associated with Lolio-Potentillion anserinae occur in relatively unstable habitats such as extensively grazed and inundated pastures. Grazing and frequent inundations favour the development of this vegetation. This plant community is also found along depressions and ditches containing stagnant water, along former creeks and at the edge of watering holes for cattle, all situations that are shown by the archaeological features to have been present along the Broekpolder ridge during the LIA/RIA.

Lolio-Potentilion anserinae may develop out of Juncetum gerardi after desalination, a situation pertaining to the immediate vicinity of the farmhouses during the LIA/RIA period.[20] There are also seeds from grasslands in a freshwater environment (Molinio-Arrhenatheretea), indicated by plant species such as *Ranunculus acris, Rumex acetosa, Prunella vulgaris, Taraxacum officinale, Mentha aquatica/arvensis, Bromus hordeaceus, Poa pratensis/trivialis, Ranunculus repens, Trifolium repens* and *Daucus carota*. It is interesting to note that many of the plant species indicative of this plant community are considered hay plants (cf. Greig 1984). They would have entered the RIA assemblage as a harvested array of plants, later ingested by cattle. Freshwater grasslands for grazing and gathering winter fodder would have been to the east and west of the dwelling sites during the LIA/RIA period.

The sample of ingested material from pit f5151 contained leaves from *Erica tetralix* derived from a lowland heath situation.

19 Analysed by Henk van Haaster, of BIAX, see Table 12, App 3.

20 Van Zeist (1974) previously described vegetation characteristics for the Lolio-Potentillion for various sites in the northern Netherlands and Buurman (1999) for the early Medieval site at Schagen in the province of Noord-Holland.

Historical intestinal contents

Hay in the 16th C *(Table 11, App. 3)*

Intestinal contents were visible as green organic matter between the bones of the lower ribcage of the bovine burial, f4343. The material was visually very similar to that collected from the various prehistoric pits, the samples discussed.
The burial was dated by the sample material to the period AD 1480 – 1630 (KIA 12282). The intestinal material also yielded seeds from a variety of habitats, including the salt marsh *(tab. 11, App. 3)*. The macrofossil record could be interpreted as most likely the remains of hay plants. Species such as *Ranunculus acris/repens*, *Cerastium fontanum*, *Trifolium pratense*, *T. repens* and *Cynosurus cristatus* are found in hay meadows (Greig 1984). Other indicators of hay in this record come from the large amount of seeds. *Leontodon autumnalis*, for example, was represented by more than 1000 seeds, which indicates a mature stage of plant growth. This would be the case in an area intensively grazed or used as a hay meadow (Knörzer 1975).
In addition, flax seeds (*Linum usitatissimum*) were evidently also used as fodder, as they were in the prehistoric period. A remarkable number of flax seeds, and also a few capsule fragments, suggest that they represent waste material from flax processing, most probably for the fibres. A large number of species are indicative of hay production (or grazing) in the coastal area. Abundant occurrence of *Leontodon autumnalis* seeds and *Trifolium repens* flowers, accompanied by remains of species such as *Potentilla anserina*, *Poa pratensis/trivialis* and *Trifolium pratense* indicates the presence of a plant community that has a recent analogy in the subassociation 'Leontodon-tetosum autumnalis' of the Juncetum gerardi. Halophytes are reduced in this subassociation, except for *Juncus gerardi*. This plant community is induced by grazing but might also occur without grazing pressure, for example in places which are only occasionally flooded or places in the salt marshes with fresh seepage water (cf. Van Zeist 1974, Buurman 1999). In this sample, the frequent occurrence of *Leontodon autumnalis*, *Potentilla anserina* and other species indicative of grazing, combined with plants characteristic of hay meadows, suggests that the area was intensively grazed and/or used as a hay meadow. Körber-Grohne (1992) described a similar plant community for recent salt-marsh vegetation in the inland side of Helgoland Bight in northwest Germany. The author distinguishes a characteristic plant community of the Juncetum gerardi with abundant occurrence of *Leontodon autumnalis* and *Trifolium repens*, together with other disturbance/grazing indicators such as *Potentilla anserina*, *Agrostis stolonifera*, *Odontites rubra*, and *Plantago major* in the areas outside the dykes (i.e. embankments).

The species grows on poor soils, not a situation found in the 1st C AD Broekpolder, but one further to the west of the settlements, in the Older Dunes, nearer to the sea.

A range of habitats was also indicated by pollen and other microfossil analysis carried out on one of the samples, f5719/2 (Van Haaster, BIAX *Consult*, tables 7, 11 & 12 App. 3). The relatively high percentage of Hystrichosphaerids (Hystrichosphaeridae) is indicative of marine influence. The presence of *Pediastrum* (freshwater algae) indicates bodies of freshwater, and the pollen from pine was blown in from the higher-lying dune area.

We return to the sample important for defining flax processing, from pit f5160/5 (sample 5927), and the weeds associated with flax fields. Additional material of the sample bears a striking resemblance to the diversity in plant species characteristic of the dung/intestinal content samples. This raised the question of whether this sample represents flax processing waste exclusively, along with weeds associated with flax fields, or material of more diverse origin which might, for example, represent stored animal fodder. A possible answer is indicated by the occurrence of late-flowering weeds (e.g. *Atriplex patula/prostrate, Chenopodium album)* together with flax remains. Historically, flax was harvested in early July (Dewilde 1983, 31). Plants such as *Atriplex patula/prostrata* or *Chenopodium album* flower only in July and the seeds are not usually ripe before the end of August. Consequently, we can assume that the seeds of these species must have entered the assemblage not during the flax harvest but sometime later. Furthermore, the same sample includes plant species characteristic of pastures/meadows. Plants such as *Leontodon autumnalis, Ranunculus sardous, Potentilla anserine, Juncus gerardi and Poa pratensis/trivialis* can be found in a high salt marsh area, where they are indicative of grazing. Like the dung/intestinal matter, and in combination with species such as *Ranunculus repens, Daucus carota* and *Juncus articulatus,* it could also be argued that these remains represent plants gathered for hay, and they could have entered the Broekpolder record by that route. It is

therefore likely that the sample represents not only flax processing remains, but also an admixture of plants suggesting storage and (winter) fodder. In contrast to the above individual samples of green dung/intestinal material, this sample seems to represent uneaten 'hay', also deposited in a pit context.

3.2.5 *Women without spindle whorls: flax for wool from across the Oer-IJ?*

One way to account for the very few spindle whorls – 10 in total – recovered from the Broekpolder excavations is through gender and interaction spheres between women living on either side of the Oer-IJ. As Woltering (2000, 318, 329) has suggested, the number of spindle whorls at settlement sites over time can indicate the importance of spinning wool and woollen textile production, and can be used for weighting the importance of raising sheep for wool. Here we compare just two contemporaneous areas.

The very few spindle whorls from the Broekpolder settlements (as well as those from the Velserbroek sites to the south) are in contrast to LIA/RIA settlements lying directly on the other side of the Oer-IJ channel, where spindle whorls are regularly recovered. For example, the nearest excavated settlement, on the other side of the Oer-IJ, is the Uitgeesterbroek Polder-18 site, 1.5 km distant for Broekpolder inhabitants living in the area of trench 49. The Uitgeesterbroek site *(cf. fig. 67)*, with a permanent settlement phase dating from about 25 BC to AD 50 only, had an array of single farmstead features, including arable fields, and two to three sequentially built farmsteads, shifting over an area of 2 – 3 ha. Forty-three spindle whorls were recovered from features there.[21] The spindle whorls included both secondarily used sherds shaped to discs with holes (33) and specially made objects fashioned from raw clay (10) (Van de Velde 1992).

The total of only 10 spindle whorls found within the 12 ha excavated in the Broekpolder contrasts starkly with these figures. Only one was found in the central segment, in a MIA gully. None at all were therefore found in the numerous LIA/RIA features (Plan 4). Three were recovered from tr 15, containing one farmhouse plan and features of a later date, indicating a much longer habitation span. Six spindle whorls came from features in tr 49, which had seven house plans. Tr 49, in particular, highlights the difference, given the number of dwellings and accompanying features, and the habitation span of at least twice as long as that of the Uitgeesterbroek Polder site. The ratio is therefore three spindle whorls in the Broekpolder to 43 for the duration of settlement at Uitgeesterbroek Polder-18. Or, in terms of number of recovered farmhouse plans: less than one per farmhouse in tr 49 in the Broekpolder, as opposed to 14 per farmhouse (based on three farmhouses) for the Uitgeesterbroek Polder site.

Although Broekpolder inhabitants could have used other solutions for weighting spindles, these small clay objects are nevertheless part of the women's activity sphere.[22] Within the range of clay products, pottery production being the one most commonly studied for style, spindle whorls also have a 'style' recognisable over wide areas. The aspect of women 'marrying' into other, male-defined, territories, as seen by the large-scale coastal distribution of pottery styles, also applies to the design of other clay objects such as spindle whorls and loom weights. So is it likely that another weighting method for spinning would be used from one area to the other? Those few spindle whorls that were found in the Broekpolder are of the traditional form and can be used along with pottery style to demonstrate shared precepts of how to make these clay objects over wider areas. The quantity may well however indicate a much lesser relative importance of wool spinning on the southern side of the Oer-IJ as compared to the settlements on the other side.

It is also tempting to see, on the basis of the Broekpolder macroremains, an emphasis on flax to the south of the Oer-IJ. Flax was spun, as shown by the fibres recovered from the Middle Iron Age. Both areas to either side of the Oer-IJ yielded finds of twined string and rope made of flax, and this may have been the only product made from flax fibres in the later period. Loom-weights, demonstrating weaving are present on both sides of the Oer-IJ, as they are in the Broekpolder.[23] At this point, there seems to be no difference in loom weight occurrence, but they are relatively rare finds in any case.

It may be that products made by women from either side of the channel were exchanged, spun wool for worked flax. The difference between material indications for these two 'crops' is one which might also bind women between areas across the Oer-IJ into exchange networks based on cooperation, specialisation, and descent lines, across male-defined (tribal) boundaries. The near absence of spindle whorls is the only sign of activity differentiation yet noted between settlements excavated to either side of the Oer-IJ, within otherwise broadly similar economies.

21 As in the Broekpolder excavations, habitation layers were absent from the Uitgeesterbroek site, so there is no biased recovery chance due to an additional context of surface finds. Much of the area there was arable fields (where no spindle whorls were found) and thus a downward bias is applicable to the Uitgeesterbroek site compared to the type of area excavated in Broekpolder tr 49.

22 The feature context where spindle whorls were found in the Broekpolder was the same as elsewhere. A difference in dress might also account for the difference, whereby people to the south of the Oer-IJ did not wear woven wool, while those to the north did, although these sites do have loom weights, in similar numbers to the Broekpolder.

23 Weaving was a highly-rated activity, specified as performed by women, in the Early Medieval Period at least, as evidenced by the earliest customary law text from c. AD 800, *Lex Frisionum* (Eckhardt & Eckhardt 1982), applying to a much larger region. Stipulated higher fines for injuring the hands of those proficient in three activities: women who were weavers, and male goldsmiths and lyre players.

3.2.6 *Area exploited for subsistence and surplus*

Various combinations are possible when it comes to the size of the measurable fields recovered, and the possibility that they might reflect the land area needed by one family. The greatest margin of error is in estimating yield ratios per hectare, and of course the size of the families is unknown.
The fact that the surface area of the fields is similar both for the Early Iron Age and for 1st C AD banked fields might suggest maximum family needs. A yield ratio somewhat higher than 1:10 would bring the area down, putting it more in line with estimates for a family of six with ten double stalls (see 3.3.2). Alternatively, estimates of the cultivated area needed might be too high if insufficient gathering of 'wild' vegetation has been taken into account.

In the context of Texel, Woltering (2000, 330 – 335), considering numerous authors' discussions, suggests that an intake of 40% straw, as fodder, for a herd of 20 cattle during four months would amount to approx. 5500 kg, which could be obtained from 1.2 ha (based on a grain yield of 1:10). Although the indications from the Broekpolder that animals ate straw and that harvesting was by uprooting come only from a sample dating to the Middle Iron Age, a period for which we cannot estimate the actual field area, it is interesting that the field area for the Early Iron Age and the 1st C AD banked area is more or less consistent with this 1.2 ha estimate and could even produce more than enough.[24] In other words, the area needed to grow grain for a family, and the area found for the measurable fields could produce enough straw for 40% of winter fodder needs. Uprooting as a harvesting method would simultaneously gather the grain crop and the 'weeds', which would be further divided up and serve as part of the winter fodder for livestock, at least. Threshing grain and processing flax produced additional fodder. Hay gathered from a freshwater meadow is well represented, and salt-marsh vegetation was evidently gathered for fodder as well. Although undoubtedly abundant in the area, there is only slight evidence that reeds were gathered for fodder.[25]

Using some of Woltering's calculations (2000, 331, 334), the information given in *Figure 72* and the ecological zones available to the Broekpolder inhabitants, the following could have applied to a family of six and their livestock holdings:
– a herd of 15 – 20 could graze on 12.5 ha combining grassland/salt marsh/fallow for eight months.
– the area needed for grain production to supplement the meat and milk diet would be 1.3 – 1.7 ha (at yields of 1:10; and another 3.4 ha for fallow, maximum).
– enough winter fodder could be gathered for animals to be stabled for four months through the winter from 5.7 – 6.5 ha of grassland. If straw from the fields was used (40%), the area of 'grassland' would be 3.4 – 3.9 ha, which would also include exploitation of a salt marsh area nearer to the sea during later periods.

Based on these broad estimates, an area of about 25 ha would be needed for basic subsistence, with some surplus.[26] Surplus over and above consumption by animals was available, as shown by the Middle Iron Age pits containing pigs and piglets, and horses and cattle in later periods. Sacrifice of these animals would seem most likely, and burying complete animals is at any rate a long tradition.

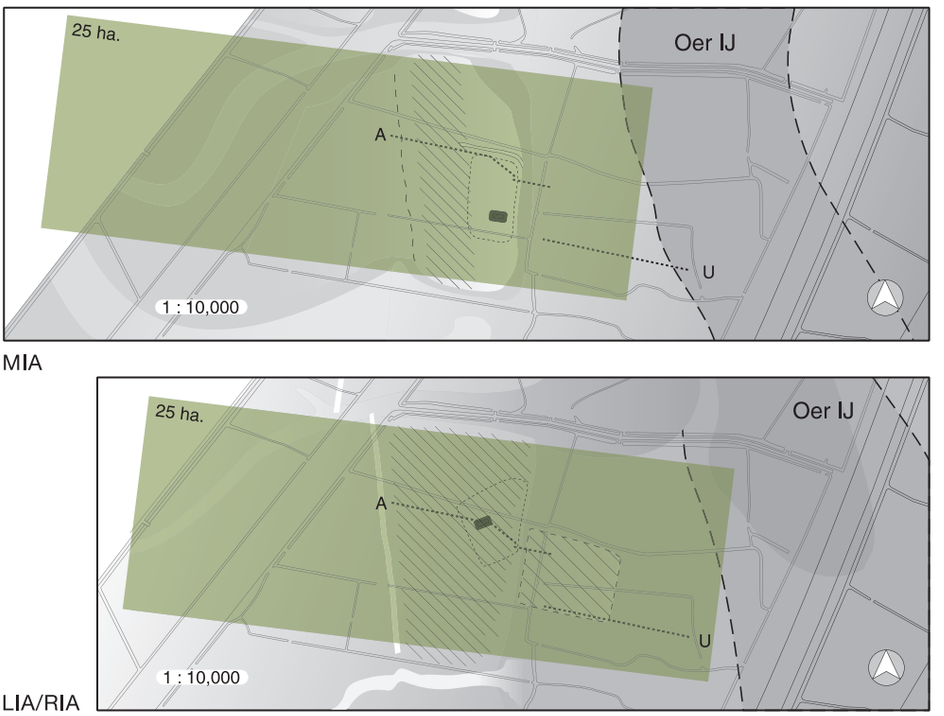
The above does not consider use of products gained from wild animals, wild plant resources or horticulture. Wild animals and fish are not represented to any degree, which is consistent with other excavation results in the Oer-IJ region, and the Netherlands in general, for the Iron Age and Roman Iron Age. Hazelnut and elderberry remains are in any case represented in the botanical samples and, as discussed, humans could have consumed many wild plants. Horticulture is certainly indicated: first by garden plots near to the farmhouses of trench 49 and trench 15, and by the Celtic bean remains found in the botanical sample from the Late Iron Age/Roman Iron Age.

The Roman harbour fort at Velsen, 4 km to the south, was occupied for about 35 years during the early 1st C AD. There, the bones of native cattle were recovered (Bosman 1997). They may certainly have been supplied by inhabitants of the Broekpolder, from the surplus implied by the broad calculations above. If we consider the needs of one family and the area cultivated, it is also obvious that the central segment at least has traces suggesting an area greater than would have been needed for one family. The banked fields, in particular, seem excessive considering the higher-lying area along the ridge within the central segment. Surplus production may have been used to supply the 'Romans' during the period of the harbour fort occupation. Again, what the Broekpolder inhabitants received in return is not obvious. A few 1st C Roman goods were deposited much later in the offering site, and perhaps it is this Early Medieval context that demonstrates some trade centuries earlier with Broekpolder inhabitants.

24 Prummel's herd composition cited above includes a total of 20 animals in 10 double stalls, whereby sheep would eat less than cattle, and pigs would eat offal.

25 Woltering (2000, 334) also found little evidence of reed harvesting on Texel; Brinkkemper however concluded for Voorne-Putten: 'Green, dried reed with many other herbaceous plants will have formed the dominant part of the winter fodder at Voorne-Putten' (1991, 129).

26 The authors cited consider their calculations to be a maximum, and consider surplus production possible with these figures. We have vastly simplified all calculations and discussion, based on numerous studies and types of calculation for livestock weights, calorific needs (of humans and livestock), and questions relating to fallowing, manure requirements for fields, etc. The various possibilities such as cereal production depending on various crop yields, number of plants per m^2, and methods and hours needed to harvest have also been taken into account.



Metalwork and metals are more or less entirely absent from the early Roman Iron Age traces. This could simply be due to inhabitants keeping these materials above ground, and passing them on to later generations. They were evidently not deemed worthy of deposit until centuries later.

Figure 74 shows an area of 25 ha superimposed over the central segment of the Broekpolder ridge, to give an idea of the scale of the maximum amount of land needed per family. *Figure 75* summarises the crop and plant spectra of the area in the Middle Iron Age and the Later Iron Age. By the later period, the type of salt marsh traditionally exploited was not included in this 25 ha area, but lay some distance from the farmhouse. Where exactly is unknown. People were venturing further afield to exploit a traditionally used habitat, as shown by the samples analysed. Thus, despite the changing physical conditions in the estuary due to the blockage of the marine outlet of the Oer-IJ channel, and subsequent changes in vegetation associated with the change from a marine-influenced to a freshwater environment, people retained a tradition of plant gathering. But although it might be tempting to regard this as one of the reasons why the Broekpolder became less attractive, given the tradition of shifting single farmsteads, there are clear indications that it was common to go some distance to gather other 'wild' resources. Wood for building purposes would certainly have been obtained from perhaps as far away as 4 km to the west, in the low dune area towards the sea. Salt marsh indicators provide evidence that those living in peat areas on the other side of the Oer-IJ exploited habitats even further away than the salt marsh available to the Broekpolder inhabitants, as determined from an Early Iron Age site and another from the early 4th C AD.[27]

The above does not take into account resources used for textiles, the number of sheep used to produce wool, or an area under cultivation for flax, the presence of which is shown in the botanical macroremains from the Middle Iron Age through to the historical period.

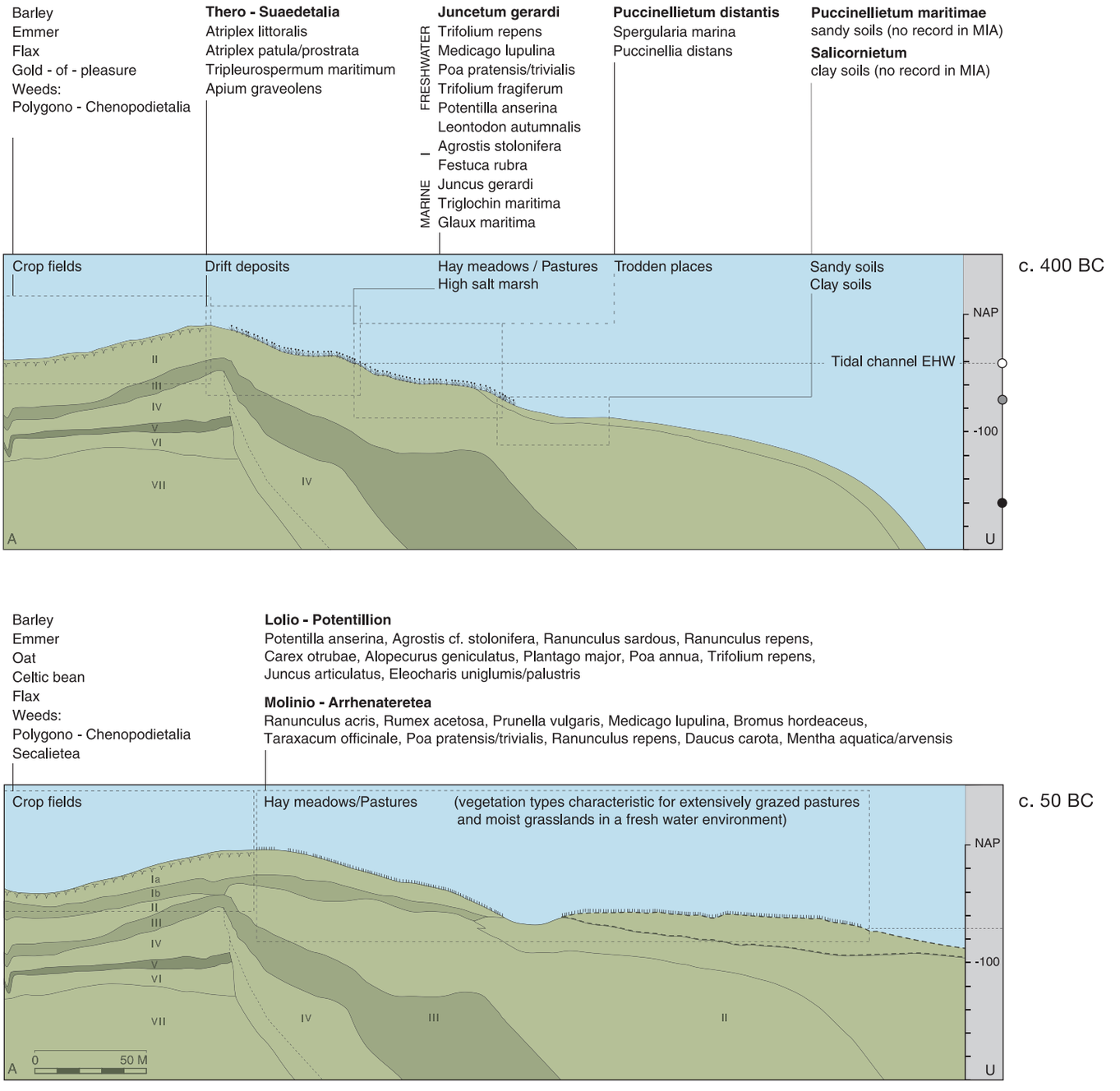
3.2.7 *Activities as other materials*

Aspects of wood

Worked wood includes stakes and posts and fashioned objects. One of the past landscape features of the Broekpolder was its relative flatness, with areas marked and defined by water, and low-growing plants rather than trees. Except for stands of willow and alder, which may have been present, all wood was probably obtained from the low dune area to the west, from 2 to 4 km distant. There were no traces of standing

Fig. 74 An area of 25 ha is shown superimposed over the central ridge area of the Broekpolder for showing the minimum estimated area needed for subsistence for one family during the Middle Iron Age and Late Iron/Roman Iron Age. See also *fig. 68*. The position of section A-U is shown for *fig. 75*.

27 At the Early Iron Age site Q in the Assendelver Polders (Therkorn *et al.* 1984, 368 – 372) there is clearly an admixture of salt-marsh vegetation in the cattle dung samples from the byre within the farmhouse, and although not explicitly interpreted as such at the time, the remains of winter fodder are undoubtedly represented. A salt marsh was even further away from the Schagen Muggenburg-I site of c. AD 300, located on peat, but vegetation represented in horse dung from a feature context near to the farmhouse was clearly from a salt marsh (cf. Van Haaster 1985).



trees in the excavated trenches, which would have been visible in the archaeological record as actual roots or tree falls if they had once been present.[28] In effect, the tallest and most visible features of the earthly material landscape were the farmhouses. From the roof of a farmhouse, one would probably have been able to see quite a few other farmhouses in the vicinity. Those in the Broekpolder left few post remains, and no stakes from the wattle used for the walls. A few broken points remained from posts that had been pulled from the postholes of dwelling in tr 15. They were made of oak.

Probable construction elements other than posts were found in f425 (fnds 323, 325) Other objects fashioned from wood included a large ladle from the Middle Iron Age pit (f3695) and a partial lathe-turned bowl (f4005, fnd 2666).

Fig. 75 The changing environment and plant communities is shown for the landscape of the Broekpolder, as sections with changing levels of regularly inundated land from the Middle Iron Age to the very Late Iron Age, when the Oer-IJ channel had been blocked. See *fig. 74* for section A-U position.

28 Only willow roots were recovered, *in situ*, around the area of the duck decoy from the post-Medieval period.

Rope woods

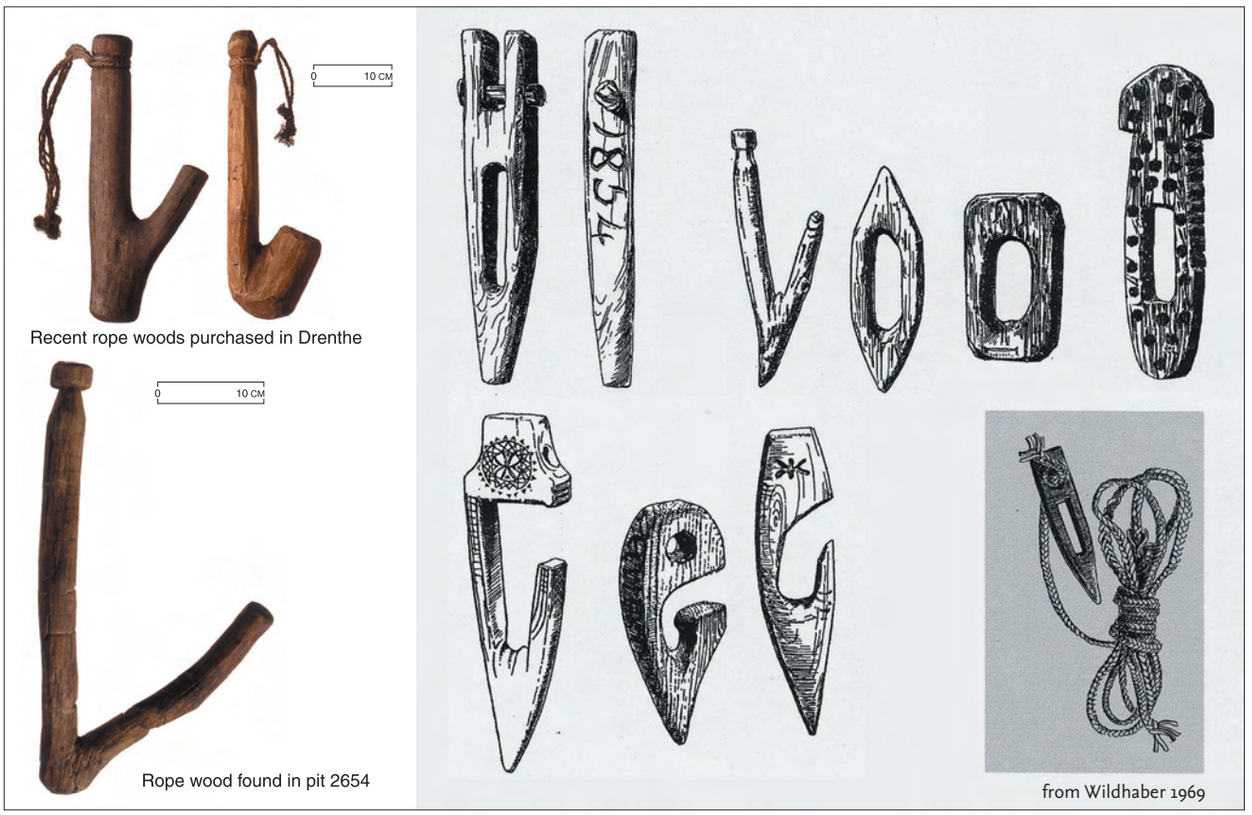
The Middle Iron Age oak object found in pit f2654 has near parallels in ethnohistorically known objects. These fall into the category of 'rope woods'. Wildhaber (1969) discussed their distribution in parts of Europe, but his area of study did not include the Netherlands.

Rope woods were used for binding loads – such as hay, sheaves, straw, leaves, logs, bundles of faggots – onto wagons and sledges, or when pulling these types of loads on the ground. Instead of tying and retying knots, the rope wood, permanently attached to a rope, served to hook onto the same rope, or the wagon, around the load. Rope woods come in various forms, and our type is the simplest, so simple in fact that other functions could certainly be considered. In terms of its form, our object is precisely paralleled in Wildhaber's article, although no size is given. We have however found near parallels, in terms of both form and size, in the Netherlands. The two semi-antiques shown in the figure were purchased in Oostmarsum, in the province of Overijssel. When asked about the function the elderly owner of the shop, Mr. Tenniglo, gave the same explanation as that in Wildhaber's article, but specified a use on hay-wagons. We also searched the archives of the Open Air Museum in Arnhem (NOM), and found records of wooden, hook-shaped rope woods from Oud-Schoonebeek, in the province of Drenthe (AA81265, AA9787). Called *binde* or *bien*, these examples were specifically noted as having been used for loading and binding the harvest onto wagons.

Most of the elaborately carved examples of these objects described by Wildhaber seem to come from regions in the Alps and the Pyrenees. We have also seen similar forms from the Ardeche in France. Wildhaber knew of only one reference from Denmark, a *hoestkrog* (harvest hook) which is shown in the figure, and examples he knew of from the Hamburg region also belong to the hooked type, though with a hole through which the rope is fastened (*op. cit.* 270, note 33). This type is probably very similar to one of the examples from the NOM. Although Wildhaber knew of only a few examples of the hook form, it does seem to be ethnohistorically the more traditional form in northwestern Europe. However, the more puzzling wooden objects recovered from various excavations in the region will be examined again in a future work with 'rope woods' in mind. No other hook forms made of wood have been recovered, though holed objects similar to those Wildhaber recorded have been found. Rope woods are an excellent example of the diversity of regional, traditional forms used for one apparently similar function.

A worked, hooked branch of oak deposited in f2654, a Middle Iron Age pit, is probably a complete 'rope wood' (see box).

Recovering wood is one of the great advantages of excavating in wetland areas. This is a facet of 'landscape', and where wood is preserved it has been an ongoing endeavour to chart patterns of occurrence. Worked and unworked, wood can yield specific information on various interrelated facets ranging from the environment to belief. Many of the wooden finds have been mentioned, particularly those found as pit deposits, in the later Roman Iron Age/Middle Age deposits in the shallow pool to the east of tr 34 and the 6th/7th C offering site deposits of tr 41 & 48. The numbers for all of the periods are shown in Appendix 5, with the archaeological contexts in which they were found. This section notes something on pattern definition,and how species enclosed, marked, divided and/or joined spatial entities. Therkorn *et al.* (1984, 362 – 3) drew on work done by Maria Garthoff-Zwaan (1987) who examined ethnohistorical sources for hypotheses on prehistoric and Medieval materials, within a long–term perspective using texts and other types of ethnohistorical referencing. Purging buckthorn *(Rhamnus catharticus)* had been interpreted as specially placed and marking points in an Early Iron Age farmstead structure on the other side of the Oer-IJ channel, in the Assendelver Polders. Ingesting it does have a 'purging' effect, but lengths of the wood set at particular points demonstrates how affectivity as presence might illustrate principles of sympathy. The wood was found (and all wood had been sampled and identified) at the corners of the sleeping area, and at the border of a stall box for young livestock. Ethnohistorically, it is known that *Rhamnus c.* was believed to have a positive influence, effective in warding off disease and vermin, and in the later Middle Ages, in keeping the devil and witches at bay. The distribution of willow in the same farmstead (Q) in the preserved wattle walling from the dwelling end to the stall end showed no willow in the stall. Again, Garthhoff-Zwaan was able to supply references for the use of willow from later sources, including in witchcraft, and for the use of a single oak for a dwelling *(ibid.).* One oak had indeed been split to make the principal posts of the dwelling end at site Q.



Symbolic and functional workings of materials form part of belief systems based on 'principles of sympathy', whereby the colours and characteristics of flowers, berries, wood and roots are taken, via analogy and association, through to belief in the effectivity of materials.[29] Signs of selection, and therefore patterns, can help us identify categories of meaning. and only parts of the landscape were selected.

Within an Indo-European perspective of 'World Tree' symbolism, finds of wood must be regarded as probably integral to a past belief system and folklore includes a plethora of beliefs surrounding species such as those found to varying degrees in the Broekpolder – including ash, birch, poplar, oak, hazel, yew, juniper, willow – which have both specific and general positive beliefs associated with them. Some do not, such as alder (however, see box by Lange) and elm, which may have somewhat negative associations; there are also species with almost no attributions, such as beech.[30]

The popular culture of 'trees' and beliefs associated with them is a booming business, and also forms part of a trend towards spiritual revivalism and belief in materials from the landscape. A longterm popular culture of 'tree symbolics' is therefore evident.

At sites with excellent preservation, such as those found in the region, the wood and the diversity of species represented can leave no doubt that they were deliberately selected for use and deposition. Features illustrating this in the Broekpolder include the wood deposits along the east, deposited in watery contexts, including the offering site and the stake row and horizontal finds of wood to the east of the central segment, which could date to the later Roman Iron Age or Early Middle Ages. These areas were described in Chapter 2.11.5 – 8.

The trackway (f549, etc.; *fig. 18* & Plan 3), which is certainly from the Early Medieval period, and a feature in the central segment, also showed a selection of wood species: willow (6), alder (2), and one each of oak, alder, buckthorn *(Rhamnus frangula)*, maple, elm, and pine.

Dug linear features might also encapsulate categories of meaning, primarily through deposits of wood. One good example is the E-W ditch (f4366; tr 47: Plan 6) dug along

29 See Thomas 1971 for the historical aspects and Tambiah 1990 for the theoretical, anthropological aspects.

30 See most famously: Mannhardt 1875 – 77, Grimm 1999 [1880 – 88], or more recent delvings into folklore, e.g. Milner 1992.

the northern extent of the central segment of the ridge. It bordered the creek depression and, as with many of the ditches, it seems to have no clear 'function' in terms of drainage, since the ground sloped away towards the north, and also to the west and east. The dug feature borders the central segment here, and this may be precisely why it was dug, and why deposits were made in it. 'Wood' is represented by nine species: alder (7), oak (6), willow (5), hazel (5), ash (4), beech (2) and one each of maple *(Acer campestre)*, hornbeam *(Carpinus betulus)* and bog myrtle *(Myrica gala)*.

These deposits of mainly worked wood were placed together with a few sherds, bones of horse (jaw), ox (single tooth, ribs, pelvis, sacrum, astragalus, metatarsal) and sheep/goat (radius, femur). Iron was also found in a form that appears to be a nail shaft, though smaller than the type found in the pool at the offering site. The date of this feature could be late Roman Iron Age/Early Middle Ages.

While species diversity can be used to argue for selection, seldom-occurring species can also be examined, taking the utilised landscape as the larger spatial context, and following on from marking at the small-scale farmhouse level, such as that found at site Q. Although the more commonly found species may certainly have been important, it is possible to differentiate when species were rarely deposited. Some, for example, have been ascribed medicinal properties, and also have a degree of toxicity, while other species are poisonous to varying degrees. Species recovered such as juniper *(Juniperus com.)*, elderberry *(Sambucus nigra)*, guelder rose/crampbark *(Viburnum opulus)*, rowan *(Sorbus aucuparia)* are slightly poisonous. Other more poisonous to very poisonous species are present in the finds of purging buckthorn *(Rhamnus catharticus)*, glossy buckthorn/alder buckthorn *(Frangula alnus/Rhamnus frangula)*, yew *(Taxus baccata)* and european spindle tree *(Evonymus europaea)*. They are also very seldom, but as well seem to have been selected and deposited in particularly watery places. They also have berries from a dark to red colour. They are listed as to context in Appendix 5; some overlap with the category 'evergreens.'

Evergreens

Yew and juniper are interesting deposits since they are evergreens, and in view of later attributions. Yew was represented by eleven finds. It seems to have been used more frequently in the Roman Iron Age and Early Medieval period. There was only one find of yew in an earlier feature (f552), at the end of a Middle Iron Age bordering gully. Other contexts were two pits from the Roman Iron Age which included only one other wood find (hazel), amongst many other types of finds. Seven of the finds were in trench 48, in the area of the large water-filled pit from the end of the Early Medieval period.

Juniper occurred in pits from the MIA, in contrast to yew, and was recovered in combination with other wood finds. The later RIA is represented by only two finds of juniper in pits, and only one was accompanied by another wood species (App. 5). The Bronze Age to LIA/RIA dug linear features yielded six deposits of juniper and, among these, other wood was also recovered in only two cases. In both cases these were single finds of willow.

Here in the Broekpolder, there might be some indication of differentiation between the two species yew and juniper. Yew is more evident in the later period and, considering the later features of the offering site, in trenches 41 and 48, yew was deposited only once in tr 41, but occurred seven times in tr 48, while the reverse was true of juniper.

Juniper was becoming scarce in the dune area, as shown by pollen studies (pers.com. J. de Jong). Juniper is certainly interesting because of its use in the Velserbroek-B6 offering site (Therkorn & Oversteegen 1994), where it was deposited in the later Roman period in such large quantities, in the watery context of a pool, that its scarcity in the pollen record may even have been influenced by humans.

Other evergreens are also represented, including pine, spruce (or larch), and fir, rather more than at other sites in the region. Taking only the pits into consideration, an interesting pattern can be discerned. It is clear from the seventeen pits dated to the Middle Iron Age through to the Roman Iron Age containing evergreens that juniper was selected in the MIA. In total, there is only one case where two finds of different evergreens occur together in one pit (f3374), unless one includes the shrub privet. This suggests that the species may have been interchangeable, and were selected for the general characteristic of being evergreen, possibly after juniper became scarce in the dune region.

The more common deposits of wood in the Broekpolder features, such as oak, willow and alder, could of course have symbolic value, as they do in the historical period. Lange has suggested that the morphological characteristic 'colour' also be analysed (see box).

Wood analysis should include colour

by Silke Lange

Wood was obviously an important resource in the past . It was collected for firewood, and for buildings, trackways, carts, basketry, tools, and so on. Woodlands had (and still have) a dominant effect on the appearance of a landscape. Archaeological evidence has also shown that woodland management was practised as early as the Neolithic period. In terms of the functionality of wood in daily life, there is no question about the choice of wood for tools or parts of tools, like the shaft of an axe. The choice of wood depends mainly on morphological characteristics connected to the durability and flexibility of the species, but tree species can also be examined for symbolic meaning.
Wetland sites such as the Broekpolder contain wood in various forms: twigs and branches, roots, trunks, artefacts and charcoal. After a time some of the cellulose structure of waterlogged wood under anaerobic conditions will be replaced by water from the soil. When excavated, wood appears as though it has just been buried, but the moment the finds are uncovered, the process of decay begins. It is then a matter of wrapping them quickly and well to slow down that process. After that, wood can be sampled for a broad range of analytical research, the first of which is species identification. In the Netherlands, until the 1980s, wood was examined mainly for purposes of habitat reconstruction, in combination with other types of analysis or, for example, to determine imported objects. The following aspects have since become more important:

Dendrochronology
Samples of ash, elm, oak, pine, fir, juniper and cedar, including both unburnt wood and charcoal, with at least 50 growth rings can be used for analysis. By analysing the width and frequency of the last annual ring, the date of felling can be given if a secure chronology exists for that period. In cases where bark – or a piece of bark – remains on the wood, the exact year of felling can be cross-dated. Intrasite dating is possible if one examines the growth patterns of some tree species (oak, pine, elm, ash and alder).

Woodland management
To find out if there is evidence of coppicing or pollarding, the entire diameter of twigs and branches needs to be sampled. Often 'wild wood' displays a great deal of variety in the number and width of annual tree rings. Wood from managed woodland generally shows little variation in growth patterns compared to natural wooded areas. One reason is that trees grown in managed woodland often seems to be chopped in a cycle of four or seven years, for example.

Woodworking
The methods by which wooden artefacts and timber were produced can often be established by studying tools and tool marks. On some worked wood, the 'signature' of the carpenter is still present in the form of tool marks. Tools leave marks on posts, beams, stakes, boards, and worked wooden artefacts. The tool which was used often can be identified by studying and comparing the shape of the tool mark. For example, the same tool might be identified on different pieces of timber. This kind of analysis can give us an impression of the standardisation of techniques, social differences in use and the development of woodworking.

Selection and symbolic meaning
It is possible to identify which tree species >>

Worked bone and antler
Worked bone and antler were examined by Maaike Verhagen, who catalogued the finds and performed a brief literature search for similar objects. The number of bone objects is small, perhaps surprisingly so, given the area excavated and the number of features. Only sixteen objects were recovered. Importantly, thirteen complete objects came from contexts considered as ritual, the offering site yielding eleven, most probably Early Medieval (see 2.11.5). Two objects were also found in Middle Iron Age pits. The three other finds include one antler tip, which is probably manufacturing waste, and two broken objects, the three recovered from the immediate vicinity of farmhouses.

Middle Iron Age objects from pits (Appendix 2a)
– *Awl* (f677, fnd. 1011): from the shaft of a tibia, with heavy wear on the point. Sellwood (1984) suggests a use connected to textile or leather working for such objects. Similar finds are known from the terp area, and Miedema (1983, 241 – 2) and Roes (1963, 36) consider them to be *spleutstekers* or weaving needles for straw bundles, such as used for beehives. These objects have been found in Iron Age and later contexts.

– *Cut antler* (f3695, fnd. 2580): fragment of a three-pronged antler, partially cut through and broken off. The remaining prongs have been cut, and then broken, and traces of use (polish) can be seen on the broken facets. There is little trace

were used for certain kinds of structure, objects and or unworked deposits of wood. Defining selection as part of patterning within various contexts can give us an impression of the symbolic and ritual use of wood.
Another often underestimated but important aspect is the symbolic meaning of the different species. Many longstanding traditions still exist in the countryside. For example, in the southern Netherlands, when a farming family moves house, they will place a broom made of willow twigs in a corner of the farmhouse to ward off evil spirits. In many folktales and fairytales willow has the power to bewitch. Some species, on the other hand, provide protection, including elder (cf. Grieve 1982, 265 – 276). Farmers planted elder in the farmyard to assure themselves of prosperity. Chopping or 'hurting' the tree would bring bad luck, however. 'There is a tradition that once when a child was put in a cradle of elder-wood, Hylde-Moer [Elder Mother] came and pulled it by the legs and would give it no peace till it was lifted out. Permission to cut elder-wood must always be asked first and not until Hylde-Moer has given consent by keeping silent may the chopping begin' *(ibid.)*
The archaeological evidence for the symbolic meaning of wood is not easily decoded. Nor will projecting recorded, ethnohistorical practices back solve methodological questions relating to prehistory. Unworked wood – twigs, branches and roots – in pits, graves, and watery contexts should be included in any attempt to define symbolic use.
Something that is often overlooked is the colour of different species after they are chopped (indeed, flavour and smell might also be considered). These aspects could well have played a part in the choice of wood, within a belief system context.
Alder, for example, is known to have a deep red colour after felling, which remains for several days. The red colour then disappears and the wood changes to a pale colour, almost white. Ethnohistorically, alder is known as the tree of blood (Schuyf 1995), linked throughout folklore to rebirth and the power of life. The impact of striking colours should not be neglected when interpreting archaeological features, or when considering the timing of the ritual in the annual cycle of nature. It may seem like a small detail, but in times of ritual practice, it could have been a decisive factor.
In Vlaardingen (the Netherlands) a prehistoric canoe was found without any traces of use. The tool marks were well preserved and very fresh, and the canoe was probably not long in use. Moreover, the canoe was made of alder. Most of the prehistoric canoes found in the Netherlands and elsewhere were made of ash. Altogether, it seems very likely that the canoe was used in a ritual context, once only. Perhaps the alder was used in part because of its red colour (Lange 2001). Both unworked alder and juniper – in the form of branches, twigs and trunks – were included in large deposits at the Velserbroek offering site. Alder was also recovered as worked beams used for deposits. Juniper, pealed of its bark and made into bundles, was deposited in the pool during the late prehistoric period. Bundles were also placed as deposits during the Medieval period, demonstrating continuity in practice. This might also connect with ethnohistorically known beliefs. While the blood-red colour of alder may have been part of the meaning of the deposits, the 'tree of life' is often associated with juniper (and yew). Freshly chopped branches of juniper have an intense yellow colour, and have been associated with 'eternity'. Their scent may also be significant.

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of wear on the remainder of the surface. The end of the longest prong shows wear to a high polish, which could be natural in origin. Suggested functions associated with agricultural activities such as making holes for seeds would have undoubtedly led to greater wear and use polish on the surface of the cortex.

Objects from the Early Medieval offering site (see figs. 55, 56)

– *Pendants/'Donar amulets'* (f4182, fnds. 3690 & 3691): The two 'Donar amulets' are described in terms of parallels, distribution and attribution of meaning as deposits in the offering site in section 2.11.5.

– *Pendant /'amulet'* (f4401, fnd 5088/50): The canine from a boar has a small hole (1.6 mm) for a very thin cord drilled at the broad end. Both ends of the tooth are damaged; the break at the point could have occurred during the lifetime of the animal.

Such pendants are known from later prehistory and were favoured by Germanic troops serving in the Roman army. They were usually worn in pairs, in bronze or silver. The power attributed to wild boars is associated with the symbolics of pigs and males. From the Early Medieval period onwards, pig canines are more often recovered in association with women, probably as fertility symbols (MacGregor 1985).

– *Gaming piece* (f3695, fnd 3147): A find identical to this rectangular gaming piece was made in the Frisian terp area (Roes 1963, 54 – 55; Pl. XLV-1). Comparable pieces do not have a standard pattern of dots, but the numbers three and nine are more frequent than other numbers. Similar objects are known from the terps of Ezinge and Aalsum. The total number of dots is twelve: nine on the top and one on the bottom and both sides. However, the Broekpolder gaming piece has nine on the top, two on one side, and three on the other. It is made of whale bone.

– *Gaming piece, die* (f4111, fnd 3096): A hollow cube die, made from the shaft of a lower leg bone (metatarsus or metacarpus) from an ox. These types of die often have (wooden) plugs on which dots depicting one and two appear (Roes 1963, 52; MacGregor 1985, 131). Two dots are engraved in the bone on one end of this example, however, making it unlikely there was a plug. The wood would have been preserved in any case. A black substance may have been rubbed into the dots to make them stand out against the originally white bone. On Roman dice the sum of the opposite sides is generally seven. The Broekpolder example has sums of three (once) and nine (twice). Germanic dice are usually rectangular. Roman Iron Age and Early Medieval examples are not standardised (cf. Hermsen 2000). The spread of the cube form of die in Europe has been attributed to the Romans (De Boer & Franssen 1994). Dicing was extremely popular in Germania and the Roman world, and later, and could lead to excesses. Indeed, rules were introduced against dicing. Dice were also used for predicting the future and in allotting activities (Van der Heijdt 1990, 30 – 31).

– *Pins or awls* (f3800, fnd. 3907 and 3912): These types of pins or awls are easily made and require little preparation or experience, so the users are assumed to have been the makers (MacGregor 1985, 115). Crummy (1979) describes examples from a Roman context. The file marks visible on the surface of one Broekpolder example (fnd 3907) have been polished away on the point and top through use. This might indicate that the object was used in the hair or for fastening clothing, though use for working leather or textile cannot be excluded. On the other example (fnd. 3912), the wear traces are on the point only, which might suggest it was used as an awl for working leather or textile.

– *2 horse bridle fittings (oesdoppen)* (f3136, fnds. 3245 & 3966/ 50): These two pieces are made of sawn and drilled femur caputs from cattle. Spindle whorls made of bone are generally flatter, and by the 6th/7th C they were usually decorated. The drilled holes in these examples are not straight, and one hole is not centred, which indicates they were not spindle whorls. The objects are therefore most probably *'oesdoppen'*, used for the side pieces of a horse bridle. These examples have wear traces or use polish in and to the side of the hole, which is considered by Van Vilsteren (1987, 67) to indicate that they were used as part of a horse bridle. They are known from 4th C and (early) Medieval contexts.

– *Handle or pounder* (f4219, fnd 4311): Made from a metatarsus of a horse, this object could be a handle or a pounding implement. If it was meant as a handle, it was not finished, as the distal end had not been hollowed out. The wear traces on this same end could point to use as a pounding implement.

– *Glider* (Dutch: *glis*) (f4668, fnd 5020): This is a well-known type of object of (late) Medieval date. Made from the metatarsus of a horse, this type of 'skate' has one or two transversal holes in the distal end and a hole in the proximal end, positioned longitudinally. This is type 6, according to Jacobi's (1976) classification. The holes make it possible to attach the glider to the foot using straps fastened by the wooden pegs in the holes (MacGregor 1985, 142).

Worked bone from other contexts (Appendix 2b)

– *Rope twiner or scraper* (f454, fnd 369/1): The sharp side of this object has notches that are greatly worn and the short side is rounded through wear. The three holes could indicate the approximate centre of the original object, whereby the total length would have been about 9.5 cm. If this were indeed the case, it is likely to have been a rope twiner (cf. Miedema 1983, 255; *fig.* 213.1). The function of the notches is unclear, but it could be that the object was secondarily worked to produce a rope twiner. A similar object, clearly not secondarily worked, with two holes and a clearly notched edge is illustrated in Roes (1963, Pl. XL 3-5). She does not suggest a function.

Other functions of notched ribs include:

a) rasp: a musical instrument usually a rib length with a long notched edge and an un-notched area for grasping. Sound is obtained by drawing a stick over the notches (Tamboer & Van Vilsteren 1999, 64);

b) bull-roarer (turndun, thunderstick): also a musical instrument usually made of drilled metapodia from pigs, though any drilled, flat material is serviceable (Tamboer & Van Vilsteren 1999, 64 – 66);
c) pottery scraper: the rib with a notched edge from Schagen is shown in Abbink (1999, 280) and compared with a modern pottery scraper made of wood which is used to remove excess clay from the pot wall; broken saws are used in a similar fashion in South America (pers. com. Dr. Ortiz Troncoso);
d) hide scraper or fish scaler (Roes 1963).

– *Offcut of antler* (f4899, fnd 5165): This roe deer antler tip appears to be an offcut, not a fashioned product. Relatively frequently found, they usually show signs of partial hacking or sawing through, and subsequent breaking (Miedema 1983, 240 – 1). The high polish on such antler tips is generally considered natural in origin, stemming from the deer rooting in the ground or rubbing their antlers against tree trunks.

Stone (Appendix 6)

The normal range of stone was recovered, both shaped – sometimes with utilisation traces – and as unworked stone showing no traces of use at all. A total of 614 stones were recovered. The stone was identified by Kier van Gijssel and Jaap Zandstra.

All stone was brought into the area, through contact and exchange channels, or by inhabitants going various distances to gather them. The nearest source of stone is 50 km away in the central and eastern Netherlands. Only seven stones derive from these areas however, recovered from two Middle Iron Age gullies (f714, f1136), three from a Roman Iron Age layer (f683) and two from Medieval pits (f4446, f4468). The remainder, weighing 129 kg, came from a distance of at least 150 km away.

Stones showing no traces of use made up 61% of the total. Of the utilised stones, querns (tephrite, volcanic stones) accounted for nearly half,[31] followed by whetstones (20%) and grindstones (14%). Perhaps surprisingly, 70% of the total number of stones were recovered from the offering site (tr 41 & 48): 72% of the non-utilised stone and 59% of the utilised stone. The quern stone fragments found in various contexts were bits of broken daily or seasonal activity indicators and were also deposited in ritual settings in both pits and at the offering site. These quern stones derive from the Eifel.

While some attention has been given to stone implements, little consideration has been given to 'stone' as a more symbolically-laden object. The deposits in the offering site were mentioned in Chapter 2.11, and in 3.5.5 (below) the 72% of non-utilised stone found at the offering site is interpreted in a religious context, in relation to a Thor-type deity, and in connection with deposits of iron.

Roman goods in native contexts dating to the Roman Iron Age (Appendix 7)

The Broekpolder Roman import materials are briefly discussed here, with an emphasis on sherds of the type most commonly recovered from Roman Iron Age sites in the region. In the Broekpolder, as at all sites in the region, there is little sign of Roman influence and no sign whatsoever of trade in complete Roman vessels, for example. The Roman harbour fort, 4 km to the south, was occupied during the earlier 1st C AD (cf. Bosman 1997, Meffert 1998). There are no signs that that this had any influence on habitation in the Broekpolder, though foodstuffs may certainly have been supplied to the fort, considering the probable surplus discussed above (cf. 3.2.5). In the Broekpoder, only 74 Roman sherds, two of which were reworked to make game counters, were recovered from contexts dating to the Roman Iron Age.

There has long been a suspicion that Roman sherds in native contexts represent 'pick-ups' from abandoned Roman sites, such as the harbours at Velsen (Bogaers 1968, Brandt 1983). Vons and Bosman (1988) demonstrated that sherds from the same individual pots occur in the Roman context of the harbour fort at Velsen and native settlement sites in the region. This of course raises the question of why Roman sherds were seen as interesting things to pick up. It is also becoming increasingly evident that Roman materials were often deposited much later than their manufacture date, and this is also the case in the Broekpolder. As has been discussed in the context of the offering site, most of the Roman materials – pottery, fibulae and coins – recovered from the offering pool were deposited during the 6th/7th C rather than centuries earlier.

Similar reasons for selecting sherds may have been applied from the Roman Iron Age through to the Early Medieval period. The colour symbolism of red is most often put forward to explain selection of the blood-red *terra sigillata* material, whether in a native Roman Iron Age or Medieval context (e.g. Brandt 1983, Erdrich 1999). However, other Roman sherds

31 Quern stones were highly fragmented and were counted as one when recovered from the same find number. They are not therefore overly represented due to fragmentation arising during excavation.

were also evidently selected and brought into the settlements. It has been suggested in connection with early 4th C Schagen sites that colour may also apply to the selection of other sherds of grey-black coarse ware and white smooth ware, as well as their representing 'foreignness' and/or the quality of hardness (Therkorn 2004). Furthermore, at these Schagen sites, refitting of Roman sherds showed that decorated Samian sherds had been broken to obtain undecorated parts of larger sherds, the undecorated part then evidently thought worthy of deposit in pits. Thus, Samian ware having been selected, there was further selection for specific deposits to obtain smooth, undecorated sherds. Decorated Samian sherds occur only on surfaces, not in dug features. Gerritsen (2000) analysed the depositional context for three sites[32] nearer to the Broekpolder, as well as the results of the first year of Broekpolder excavations (1998). Although the number of sherds per site is small in this region, some trends may be evident at these settlements situated outside the Roman Empire.

First of all, it is interesting that *terra sigillata* seems to occur more frequently in these native contexts than in provincial Roman contexts. At these three sites with few Roman import sherds, Samian ware accounts for 21%, 44% and 81% of the Roman import sherds. In the Broekpolder, the 1st – 3rd/4th century contexts show an occurrence of 20% for *terra sigillata* among imported sherds.

In contrast, Samian ware accounted for only approx. 5% of the Roman sherds at the nearest Roman context of the 1st C harbours at Velsen. Native settlements in the Roman Empire, below the Roman border *(Limes)* established along the Old Rhine by the mid-1st century also show lower relative numbers for Samian sherds. For example, at the native settlement of Rijswijk (Bloemers 1978, Gerritsen 2000), they made up just 14% of the Roman sherd assemblage. At farmstead sites in Midden Delfland, Samian ware accounted for about 8% of the Roman sherds at all sites combined, with individual sites showing little variation, ranging from 6% to 8% (cf. Van Londen 2006, tab. 11).[33] At this point there seems to be a clear difference in the relative occurrence of *terra sigillata* and other Roman sherds between sites above and below the Roman border, but there is little evidence that those sites above the border had complete vessels made from Samian.

While there does seem to have been greater representation of Samian sherds above the Roman border, there does not seem to be any differentiation between feature contexts examined by Gerritsen and many – if not the majority – of the Roman sherds are found in layers rather than in dug features. In the Broekpolder, 38% of the sherds were in surface layers and natural sediments. No pattern has been found between the type of Roman sherd material deposited in different types of dug features. In the Broekpolder, the contexts of 12 gullies (21 sherds, including one ring-gully) and 17 pits (14 sherds, including one postpit) contained a mix of sherd types. It does not therefore appear that there was selection for particular types or colours of imported sherds for particular contexts of deposit. Or it could be that the three dominant types, with a colour scheme of red, white and grey/black, were all important. Due to the lack of specific contexts of deposit this cannot be defined further. More information on patterning might however lead to a better definition of meaning.

The sherds were in any case used for making game counters. White fine ware sherds were never used for this in the region, however. Only two game counters fashioned from Roman sherds were recovered in the Broekpolder: one made from grey coarse ware recovered from a layer and a Samian counter deposited in a pit.

Roman Iron Age contexts contained very few Roman metal finds. Only small sections of four bronze fibulae, a segment of a lead strip and an unidentifiable coin were recovered from certain Roman Iron Age contexts, in both layers and dug features. The only near-complete fibula recovered, possibly from the late Roman period, had most probably been deposited in the mid-4th to early 5th century, relying on the one-sigma dating.

The number of Roman materials found is in any case low, and consistent with the picture of the region on the other side of the Oer-IJ depression. The Broekpolder inhabitants were on the same side as the Roman Velsen I and 2 forts, which were occupied during much of the first half of the 1st C AD (Bosman 1997). If pick-ups do indeed explain the sherds, the inhabitants of the Broekpolder do not seem to have picked up many. Their distribution in layers and dug features does not add to previous ideas of why they may have been picked up. Only the very occasional reworking into gaming counters is clearly functional, but very few sherds evidently underwent this. While the symbolic interest in colour has in the past been used for interpretation, this must apply to all sherds, rather than just the red of the Samian or colour-coated ware. We cannot determine any patterning in the depositional context and the most telling examples may be those that simply ended

32 Shown with the number of Roman sherds, the three sites are: 9 at Krommenie 145; 24 at Uitgeest 54; 93 at Uitgeesterbroek Polder 18.

33 Colour-coated sherds have been included in these percentages because of the 'colour'. Excavations in the micro-region of Midden-Delfland (Van Londen 2006, tab. 11) recovered a total of 3369 Roman sherds, among which Samian ware totalled 116, and colour-coated sherds 148.

up in trampled layers rather than dug features. Excluding Roman materials recovered from watery contexts – all probably from mid-4th C and later contexts – it seems reasonable to interpret all Roman materials as pick-ups, albeit of only passing interest.

However, absence of patterned deposits does not signify a lack of importance. Take, for instance, the simple fact that the Roman materials deposited in the mid-4th to 6th/7th C in watery contexts had been in circulation for up to four centuries. This would seem to imply some kind of 'importance', and might explain why so few materials were discarded or deposited during the Roman period itself.

There is little to suggest Roman materials were deposited in ritual contexts until the Early Medieval period, which then implies a transformation of the meaning attributed to these objects and sherds. It is crucial that we seek to establish exactly when deposits were made, rather than relying on Roman finds to date deposits, as has been common practice in the past, driven largely by budgetary concerns. A few remarks on deposits of these goods are made in section 3.4.5.

Metal processing debris and mystery cinders

All metal products (App. 7) must be assumed to have been sourced outside the Broekpolder. There is no evidence of any smelting in the Broekpolder in any period. Matthijs van Nie identified only six lumps of slag with certainty; one uncertain case remained.[34] All six are forging slag. They have a total weight of 950 g. The largest was 430 g. Four of the six, with a total weight of 790 g, came from the offering site of the Early Medieval period. The two other lumps came from layers in trenches 45 and 49, and could date to the Roman Iron Age; the less certain identification, a very small lump, was recovered from a Late Iron Age gully. There is in any case some indication of forging at the site during the Roman Iron Age and Early Medieval period. No production slag was found. Working of iron ingots into objects or reworking of iron products

Signs of mastering fire

by Matthijs van Nie

Classical writers such as Aristotle and Pliny, and Medieval writers such as Theophilus Presbyter *(De Diversis Artibus)* and Agricola *(De Re Metallica)*, and also many Central European 'Housebooks' describe in detail how to produce pottery, metals and glass. Aside from a much disputed passage in Aristotle, however, no mention is made of the waste material connected to these processes.

Experimental archaeology can give an insight into many ancient processes (cf. Pleiner 2000. Henderson 2000, Tylecote 1987, Norbach 1997, Joosten & Van Nie 1996, Boonstra 1994). Since the chemical composition of many waste products can be determined and the basic laws of science are known, we should be able to reproduce these waste products. In the past, however, all processes were based on experience. If a process worked it was simply applied without knowing why. Archaeological experiments are merely based on reconstructions of materials found during excavation, so one can never be sure they are correct, however clever the reconstruction. Thus, the major problem is that even if one can reproduce products made in the past this is no proof the process was actually used. For example, the most successful experiments in iron making have been performed not by scholars – despite all their knowledge – but by blacksmiths with an interest in archaeology. However, during archaeologically-based experiments modern blacksmiths are still not capable of reproducing the very large pieces of smithing slag such as those recovered from excavations. Nevertheless, experiments are very useful in helping us understand past technologies, whether performed by skilled craftsmen or in the laboratory. Mistakes can in any case be detected in reconstructions. Even a failed experiment can be valuable, providing information that improves the chances of success in subsequent experiments. Waste products from the processes can also be recorded to improve our understanding.

Every heating or firing process leaves its distinctive signs and characteristic debris which, as finds, are potentially of great importance in extending the interpretation of excavation data. Waste material is in many cases the only archaeological source available for reconstructing activities and metallurgical processes, as products themselves are not recovered at the production site. But much of the debris from various firing processes is difficult to recognise and is preliminarily catalogued as sinter, cinder, or slag. Although these descriptions may be correct in themselves, these terms give no information as to the production process. Glass production for example can lead to all three materials, but properly, the term 'frit' should be used for the sinter associated with this process. 'Slag' is a material arising during three different stages of producing and working metal. At each stage, a specific

34 A total of 85 finds, preliminarily catalogued as slag and cinders, were further identified by Van Nie as to possible evidence of metalworking. The more specific category of cinders discussed in the next section turned out to represent the vast majority of finds. Ten finds had been wrongly included in the 85 finds he identified, and he distinguished between burnt and 'popped' pottery. These finds have been assigned to the more general 'vitrified' pottery category.

could be represented, though not to any great extent, considering the small number of remains.

The offering site deposits, and the frequent deposits of spikes (see 2.11.5), but the lack of clear metalworking traces at the site, might suggest that the nails were imported. As posited in the offering site section (2.11), one nail may have been deposited each year, for a span of seven generations. Similarly, since the lumps of slag found at the offering site seem to be a later form of 'iron' used for deposit, supplanting deposits of nails, as discussed, the forging slag could also have been brought into the area from elsewhere, having been specially obtained for deposit. If this was the case, there is virtually no indication of metalworking whatsoever in the Broekpolder. All of the products and the few finds of debris could be indications of externally derived materials.

Another type of fire-related debris was also identified. 'Cinders' are finds with a molten appearance and a high silica content. Although regularly recovered at other sites, the purpose of the material still puzzles specialists, as do the process and activity that might have produced this type of debris (see box by Van Nie). The 68 finds in this category had a total weight of 4.9 kg. The lumps vary in weight from less than 10 g to 670 g. Only 455 g (11%) derived from the offering site, from trenches 41 & 48, making it unlikely they had any special importance.

3.3 Native pottery (Appendices 2 & 8)

The Broekpolder pottery was produced by the standard technique used in the periods under discussion. All the pots are built up from coils starting from the disc base. The objective of most pottery research in the Netherlands has been typochronological, sometimes combined with functional classification (see box). A few remarks will be made on the Broekpolder pottery in relation to these studies. Most of the work has however been directed at ongoing research in

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type of slag is formed. During the processing of ore to metal, the kind of slag formed is completely different from that produced during forging. The Broekpolder 'slag' is from forging, not production, which does have implications for site interpretation and the activities indicated at the farmsteads.
The interpretation of the cinders such as those found in the Broekpolder and as known from other contemporary settlements presents a greater problem. An amorphous, molten mass with a glassy appearance, the cinders can vary from small opaque, weathered lumps to large lumps weighing over 5 kg. The larger pieces are often less opaque and more glasslike in appearance. Although at some sites production of glass or metal is clearly associated with the smaller cinders, this is not usually the case with the large lumps. This also applies to the Broekpolder material.
The temperature needed to achieve such material must have been well over 1400° C, a temperature much higher than that required for regular smelting activities.
Large cinders are regularly found at coastal or slightly inland settlements from the Late Iron Age and Roman Iron Age. In terms of geographical spread, this type of cinder has been recovered from Ostend in Belgium, to Esbjerg in Denmark. The largest quantity, and size, was found at the north German site of Feddersen Wierde. Up to now only two inland settlements have been recognized as having comparable cinders: Gennep, with only very small lumps, and Heeten, both in the Netherlands. The cinders from Heeten (Verlinde & Veenegoor 1995) were subjected to chemical analysis and showed a remarkably high zinc content. Cinders from other sites found in the Netherlands have not been analysed.
The link between the cinders and any fire-related production process is still a mystery. Salt production does not require such high temperature and metal production, metalworking and glassmaking lead to other types of debris. A wide programme of chemical analysis combined with archaeological context interpretation of the material is needed to solve the problem. Even the distribution is unknown, as archaeological finds that cannot be determined are often not published, consigning them to the oblivion of an archaeological repository. Publications with photographs would help to draw attention to the problem and probably broaden the geographical distribution of recognised cinders – something that of course applies equally to other ill-understood materials. Knowing where and in what context the cinders have been found might give us more clues as to the process by which they were formed. Those from 'off-site' archaeology might be especially interesting. A systematic programme of chemical analysis could give us an insight into the range and distribution of the composition of the cinders, which is probably highly varied. Identification of differences between cinders found at coastal or inland sites, or wet and dry sites, would help us to interpret these special, and specific, types of finds.

Typochronolgical pottery research in the coastal areas of the Netherlands

Van Heeringen's (1992) analyses are based on characteristics relating to form, surface treatment, and technical features, mainly the nature of tempering material. The coast of the western Netherlands is divided into six areas, in which twelve style groups have been recognized. Noord-Holland is area 4, the beach barriers and Older Dunes between the estuaries of the Rhine and the Oer-IJ; area 5, the Oer-IJ estuary and its border zones; area 6, the coastal zone north of the Oer-IJ. There are three other areas on the mainland of Noord-Holland and on Texel.

The study by Taayke (1996) of pottery from uncontrolled digging in the northeastern Netherlands – Friesland (Westergo), Groningen (Oostergo) and the Drenthe Plateau – aims to give a fluid typology concentrating on general forms and avoiding sub-groups as far as possible (Taayke 1996, 122). His main groups are based on rims, smooth rims and rims with finger and fingernail impressions; sub-groups are based on visible morphological characteristics such as form, knobs, handles, decoration, and so on. Three indices are used in order to establish wide-mouthed and narrow-mouthed groups: the relative size of the mouth opening (rim diameter divided by the greatest diameter), the relative height of the neck (height of the neck divided by the greatest diameter) and the volume for the size ratio. The typochronology follows Waterbolk's Ruinen-Wommels I – IV for the Drenthe Plateau, from 600 BC – AD 50 (e.g. Waterbolk 1962). The main objective of Meffert's (1998) research on the Assendelft pottery was a functional classification. Six volume classes are reduced to four function groups, which are based on rim diameters and are classed as salve pots, beakers, cooking pots and storage pots. There is no clear division; cooking pots are also present in group 4. The function of the groups is in some cases confirmed by use remains: soot or charred remains are found on the cooking pots and are absent from beakers and storage pots. The pottery from Texel (Woltering 2000) is very similar to the pottery from the areas mentioned above. Woltering describes pottery for each site, feature and period, in order to establish a relative chronology for features and a typological sequence of pottery in combination with technical characteristics. His relative chronology is verified by ^{14}C dates. In order to establish the function of pottery, he distinguishes primary features such as size, handles and technological features; secondary features arising from use; and other features such as find context, differential breakage, and frequency of specific shapes or sizes. In a total of 74 pots he distinguishes 5 size/volume classes (vessel height plus belly diameter), but his functional groups such as cooking pots, bowls and jars are not included in these morphologically defined pottery groups. A summary of the decades of debate as to how pottery types can be linked to movements of people is also given, focusing on shifting contacts and colonisation of areas.

the Oer-IJ region (Van der Leeuw *et al.* 1987, Abbink 1999) focusing on form and function, manufacturing characteristics, and analysis of residues on the pots.

The typochronological research on indigenous, handmade pottery defines a much larger area from later prehistory through to the Roman Iron Age than one would expect for a 'tribe'. The use of pottery to define culture and cultural affinity has been studied by comparing pottery styles. Women undoubtedly made pottery (cf. Abbink 1999, 38), as a facet of gender and activity, which led to style affinities, in this case broadly designated as 'Frisian' – not as a tribe but as a style.

A 'style' would suggest interaction and learning among those producing the pots, and relate to the half of the population overlooked by texts indicating tribal territories. As the pottery producers, women would have related to area and social collectivity in a different way. An identity can clearly be seen in the very close similarities in pottery style and changes in it through the present-day coastal provinces of the western Netherlands and further to the north, and the similarities with some inland areas. Woltering has remarked, without going into the subject more deeply: 'The spread of fashions in pottery shapes and decorations might in general… have come about as women were married off into neighbouring population groups' (Woltering 2000, 366).

The implied exogamous nature of coastal tribes would, when interpreted through social perspectives of gender and identity, help us interpret a number of characteristics in the domestic sphere that show broad similarities across larger areas. Other types of remains, such as farmstead dimensioning and style of dug features, mentioned in preceding sections relate to the gender spheres and to territory, and also have a distinctive 'style'.

3.3.1 *Typochronological research*

This section is based on work by: Van Heeringen (1992), focusing on the western coastal area of the Netherlands from the Late Bronze Age to the Roman Iron Age; Woltering (2000) on Texel from the Middle Bronze Age to the Late Iron Age; and Taayke (1996), who produced an overview of pottery from the north and northeastern Netherlands from the Early Iron Age to the Roman Iron Age (see box).

Middle Iron Age

Chronology of form and decoration

During the Middle Iron Age, the development of pottery shape and tempering was similar along the coastal zone of Noord-Holland and Zuid-Holland (to the Old Rhine) and in the northeastern Netherlands (Woltering 2000, 368).[35] More southerly influences can also be seen, again extending to the northeastern Netherlands.

Shell temper is predominant, although quartzite was also used occasionally. Most sherds are from medium-sized tripartite vessels and the form repertoire is similar to other parts of the western coastal and inland areas. The belly-shoulder transition is mainly round; the neck is tall, concave and inverted (see for example pits f644, f877 and f3584; pot 233, f5673), corresponding with Ruinen-Wommels type 1. The undecorated dishes and bowls that are often associated with Ruinen-Wommels 1 in the Frisian coastal area are absent here. Large-mouthed vessels with no transition zone between neck and rim are present (pit f677). Ruinen-Wommels type III, with short necks and high shoulders, are also present (pit f2815, f3695; f2794). Small or medium-sized S-shaped vessels were regularly made, and deposited in pits (f677, f2796, f2815 and f3584), mostly in combination with high-necked vessels. Handles are rare in the Broekpolder in the MIA period (a total of three were found). Barrel-shaped vessels are present to a lesser degree (pits f644 and f3584, f3455, f4112). Small cups with and without handles are absent, as are pots with handles (Taayke 1996, type K1-2, G-1).

Two pots have forms similar to those known from more southerly regions. If these do indeed date to around 400 BC, these signs of southern-influenced pottery shapes predate Van Heeringen's 'intermezzo' at the end of the 4th C. The complete, black burnished pot with an extreme angled profile (pot 35, pit f1141) and the very partial profile, similar to the *situla* form of bronze vessels (pot 127, pit f3455), are forms known from the southern area of the Netherlands to northern Gaul. Another example of the *situla* form in pottery, though more roughly made and with a roughened lower wall, is illustrated in the Haamstede pottery style group (Van Heeringen 1992: *fig. 67.1*). The Broekpolder example is carefully manufactured, has thin walls, probably with a polished upper half, shell temper, and a grey appearance (neutrally fired).

In the Broekpolder, the wall of the pot was rarely decorated. As in other regions, fingertip impressions were made on the top of the rim. Several sherds with diagonal comb decoration probably belong to the same pot (102) from feature f2773. Other examples of geometrical comb decoration were found in pits (f2619, f3584 and f5240). The precursor to *streepband* – grooves around the neck – occurs in two pits (f644 and f2619) and in one gully (f5673). One special decoration type is the patterning of horizontally polished bands on the shoulder and the lowest part of the vessel, with four vertical bands on the wall in between, dividing the pot into four parts (pot 56, pit f644; pot 135, pit f3695; and sherds in pits f2796 and f3584). Examples from elsewhere are illustrated by Van Heeringen (1992, plate 81.24, plate 82.54). This type of decoration is known in the Hunsrück-Eifel Culture during the Early La Tène Period (MIA) as *Glattverzierung* or *Stralucido*, as it is also found in northern Italy (Haffner 1976).

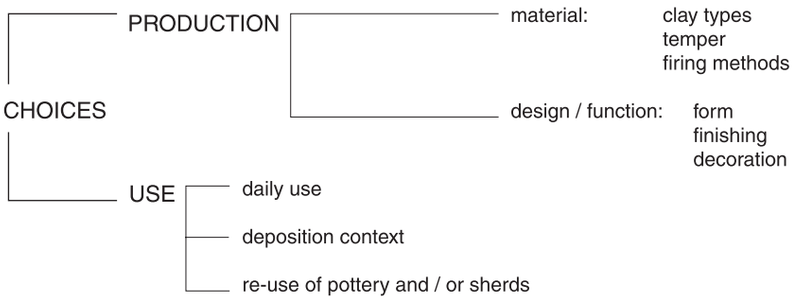
Late Iron Age/Roman Iron Age

Chronology of form and decoration

The entire coastal area of the Netherlands had a fairly homogenous style of pottery manufacture in the LIA/RIA. Simple tripartite, S-profiled pottery with high shoulders and short necks predominate in this period. The tempering is mainly organic. Normally the use of crushed shell temper provides a basis for distinguishing between the MIA and LIA. However, it does occur in later pottery from the LIA/RIA features in the Broekpolder (e.g. pot 210). It is possible that shell temper represents pottery specially produced for specific functions and/or occasions. Occasional use of shell temper has been established up to c. 300 AD at a Schagen site (Abbink 1999, 125).

Size/shape categories are used to postulate functions, functional use otherwise being indicated by occasional holes in the base and bowls with pedestals. The tripartite S-shaped forms in various sizes with handles, facetted rims, little 'decoration', fingertip impressions on the front of the rim are common, occasionally with a groove at the neck and small circular impressions. These circular impressions are found

35 In reference to the coast, Woltering bases this remark on Van Heeringen's Santpoort I and II pottery style groups. The absence of Ruinen-Wommels II is considered a local variation (arising in Westergo) of Ruinen-Wommels I, and is not found on Texel (Woltering 2000, 368).



on the wall, or near handles, and also in groups of three. One exceptional form not yet recovered in other parts of Noord-Holland is the thin-walled, grey, carefully fabricated vessels with angular shoulders (pot 260, pit f5462; pot 241, f4839; pot 329, f4944; and perhaps pot 286, f4958). The possible similarities or transition in style towards Early Medieval pottery represented by these grey vessels with an angular belly and faint marks of impressions, possibly stamped, was checked by ^{14}C dating, but the results indicated the 1st – 3rd C AD (f5462, KIA 16857).

Geometrical decoration with grooves is present (e.g. pit f309, f310, f648). The so-called 'walking stick' motif (pot 33, pit f2122) is found frequently in the coastal areas of the Netherlands. There was also one case with two grooves around an omphalos on a sherd in pit f5391, and two large hollow circular bands were found on a sherd from a postpit f4730. Finally, one type of pot with a row of fingertip impressions below the rim was found twice in an RIA context (pot 38, f4; pot 243 in pit f5790). Fingertip impressions covering the wall are rare (fnd 1993-3 in pit f5790; f123), as are large hollow grooves (f 4758, f4847). These motifs, except the hollow grooves, are represented in the pottery assemblage at the Uitgeesterbroek Polder site, a settlement 1.5 km distant, on the other side of the Oer-IJ (cf. Eggers 1993). This settlement has been mentioned in conjunction with possible specialisation by women across male-defined territories (3.3.5). The similarities in decoration across the Oer-IJ boundary support the idea of female relatives living in both areas.

The only other types of decoration certainly from the Roman Iron Age are the vertical grooves on the transition from shoulder to neck on pot 260 (pit f5462); the apparently stamped, rectangular impressions on a sherd in the same pit; and the horizontal row of horseshoe-shaped motifs combined with large grooves on pot 121 (pit f3374).

3.3.2 *Research into form, function and use*

The most recent study of form, function and use is that by Abbink (1999), who performed a structural analysis of RIA pottery from the sites of Schagen Muggenburg, 30 km to the north of the Broekpolder, and Uitgeest-Dorregeest, only 4 km away. Both sites are on the other side of the Oer-IJ (cf. *fig. 2* for locations). The objective of the Broekpolder pottery analysis was to compare the function and use of pottery with that of the sites in Schagen and Uitgeest, following Abbink's method of pottery description extending from theoretical considerations and the life cycle of pottery (*fig. 76*; and see box). The focus with the Broekpolder pottery was on pottery groups, shapes, assemblages and deposition patterns, in so far as could be seen in the features from the Middle Iron Age and Late Iron/Roman Iron Age period.

All pottery from the Broekpolder was documented as to number, weight, rims, bases, decoration, and feature context.[36] Abbink's method is based on analysis of complete and partial pots whose rim diameter and maximum diameter are known. The form of the upper half of pots gives a fairly reliable reconstruction of the entire pot, when compared with complete forms. The Broekpolder analyses involved the following steps:

1 Establishing pottery groups on the basis of size/shape classes in the LIA/RIA and MIA.

2 Analysing the relationship between firing method (firing in a reduced, neutral or oxidised atmosphere), surface treatment (smoothing with fingers, fine and coarse polishing, roughening, scraping), decoration of wall and rim, additions (handles, extended rims and holes), and the various size/shape groups.

3 Establishing actual use by means of the presence/absence of residues and by direct temperature-resolved mass spectrometry (DTMS).

All pots were documented using variable forms developed by Abbink.[37] These forms contain information on raw material; production technique; surface treatment; dimensions; characteristics of rim, shoulder, belly, base, handles; extended rims; holes in the base; alterations through use; residues; and completeness of the pot. In total, there were 51 complete (A) and 100 partial (B) profiles of pots for the LIA/RIA periods and nine complete and 22 partial profiles for the MIA period.

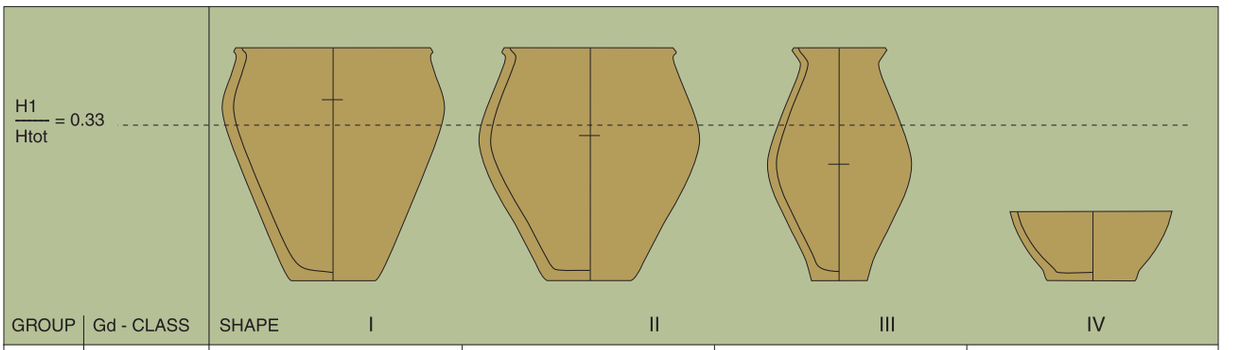
Pottery shapes and groups

The overall form of the complete and partial pots includes size and shape (see above):

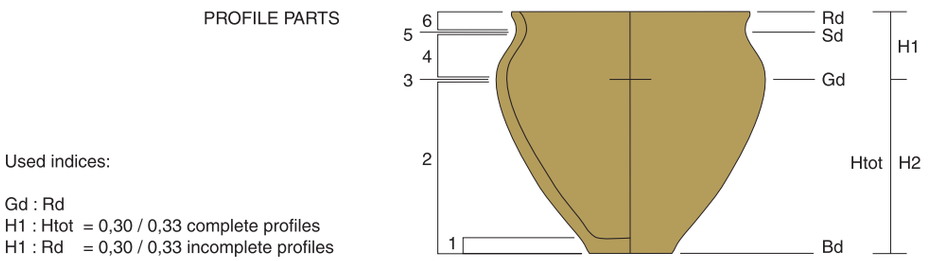
Fig. 76 Schematic representation of determinant moments in the life-cycle of pottery (after Abbink 1999).

36 For the number of sherds, weight and context per period, see App. 8 and the database

37 Not all pot numbers from the pottery dataset were included in the analysis, but only the pots with reliable measurements of upper wall, rim and greatest diameter.



GROUP	Gd - CLASS	I	II	III	IV
		Gd : Rd < 1.5 H1 : Htot ≤ 0.33 H1 : Rd ≤ 0,33	Gd : Rd < 1.5 H1 : Htot > 0.33 H1 : Rd > 0,33	Gd : Rd > 1.5 H1 : Htot > 0.33 H1 : Rd > 0,33	Straightsided bowls
1	≤ 200	1	2	3	4
2	201 - 300	1	2	3	4
3	301 - 420	1	2	3	_
4	≥ 420	1	2	_	_



– the size is based on the greatest diameter (Gd) and its relationship to other measurements;
– the shape is based on the diameter of the rim (Rd) and the greatest diameter (Gd), the height of the upper wall (H1), and the total height (Htot) as well on the indices Gd:Rd and H1:Htot or H1:Rd for the incomplete profiles. *Figure 77* summarises the definitions used for profiles and the class limits. Class limits of size groups are based on the relationships between all variables.

The distribution scatter diagrams presented in Appendix 8 are the result of balancing these variables in determining the different classes. The same applies to the scatter diagrams illustrating the established shapes. They are the outcome of a process in which all combinations of relationships between indices were compared. The limits dividing size classes and shapes are not constant. They have to be established anew for every complex and every period. In the following sections defining the size/shape groups in the LIA/RIA and MIA, only the most illustrative diagrams are presented in Appendix 8.[38] Because distinguishing between pottery from the LIA and RIA periods is difficult, as explained above, the RIA and LIA pottery are considered as one sample. Whenever a trend may be present in the LIA/RIA sample, it is noted below.

Late Iron Age/Roman Iron Age pottery shapes and groups

Most pots from the Broekpolder have S-shaped profiles. In our sample four straight-sided bowls with flat bases constitute exceptional forms: from pit f5137, nos. 205, 203; from pit f524, no. 223; from a postpit at house 7, f4957, no. 247. Two of the bowls (pots 230 and 247) have a hole in the base, and one bowl has a decorated rim. The latter has a diameter > 200 mm and has been classified in size group 2. The other three belong to size group 1. The straight-sided bowls have been assigned to shape 4, and are not included in the following analysis of the tripartite pots.

The next step was to differentiate the bulk of the sample, the tripartite pots with varying sizes of height and width and varying proportions of upper and lower wall. The main objective of the analysis was to establish size/shape groups, and the variables and values defining the shapes.

Fig. 77 Definitions of profiles of three-partite vessels. Pottery sizes and shapes in the LIA/RIA periods and the determinant indices (after Abbink 1999).

38 In contrast to Abbink's research, and on her advice, we did not incorporate the size variables Sd and Bd (diameter of neck and base) and H2 (height of lower half), as analysis proved that in our sample it added nothing to the results.

Research into the form, function and use of pottery

Abbink's (1999) pottery research takes an integrated approach, combining all aspects of pottery, technical as well as cultural. The basis is the complete or nearly complete pots from two sites in Noord Holland: Uitgeest-Groot Dorregeest and Schagen Muggenburg, which have been dated to the Roman Iron Age. The main theme of Abbink's research is the relationship between form, function and use, which she seeks to identify by establishing criteria for the original classification of the object of study. The life cycle of pottery, consisting of a series of interrelated choices in production, function and use, is the starting point for the research. The two key questions are: what was pottery made for, and what was it used for in different spheres of daily life?

The purpose of making household pottery is primarily to produce containers which are submitted to various degrees of thermal stress for food (vegetable or animal; liquid or solid; unheated or heated to various degrees) and other bio-materials with the same differential treatment and/or composition as for food such as organic or inorganic adhesives, paints, dyes, pigments or coatings and medicinal products, etc. Indications for these original functions are: technical characteristics (raw material, treatment of the clay, surface and rim, firing method), morphological characteristics of the vessel (form, height, volume), additions such as handles, breakage frequency, actual use (deduced from use alterations or residues) and depositional context.
Pottery manufacture is dictated on the one hand by the function of the vessel and the requirement in terms of quality and properties, and on the other by the socio-culturally embedded methods of meeting these technical requirements in the fabric and design of the vessel. Fabric composition, type of clay and temper, and firing method determine whether the vessel can withstand thermal stress. How these requirements are met, and the form/shape and surface treatment of the vessel are cultural choices. Variations in material, design, subsequent use and final depositional context can be related to customs and/or manipulation in specific circumstances or situations. Every step in the production process and use of pottery in daily practice represents a new selection from several possibilities in order to create an object that conforms to specific demands based on the norms and values of the makers and users. Life cycles should therefore be studied at several temporal and spatial levels.

Abbink's analyses of pottery focus on the combinations of size and shape variables, as well as surface features and use residues. She distinguishes five size/shape groups, based on morphological features: size measurements of single variables and the proportions between two variables. In order to determine function, she analysed the relationship between size/shape groups and specific variables such as surface and rim treatment, handles, extended rims and use residues.
The form-function groups based on the correlation between use residues and morphologically determined pottery groups (from Abbink 1999, 299).
The first four size groups determine the volume of the vessels. The shapes are a distinction within the size group between vessels with a relatively short upper wall (shape 1) and a larger upper wall (shape 2). In Abbink's classification, the third shape belongs to group 5. These jars are slender vessels with a relatively small opening in comparison with the greatest diameter, and also a high upper wall.
In most archaeological assemblages, the majority of sherds are from medium-sized cooking pots, as they were in Schagen and Uitgeest (size group 2 – 3). These pots were most frequently handled and underwent thermal stress. Storage pots are present in smaller proportions in the sherd assemblage: they were less frequently moved and were not heated. The special or multiple functions of the small vessel group 1 (for example the pedestal bowls) are suggested to have been used for storing food or liquids or for use on special occasions. The vessels with shape 2 were for storing and heating special substances like animal fats, vegetable oils, and tallow.
The relationship between use-residues and

Group	Gd-class (mm)	Shape	Function
1	<200	1	storing special food/fluids
		2	storing/heating non-edible substances
2	200 – 250	1	cooking
		2	storing/heating non-edible substances?
3	250 – 350	1	cooking
		2	cooking
4	>350	1	cooking, storing dry goods?
		2	storing dry goods, cooking?
5	–	3	storing liquids

the formal morphologically established groups proved striking in the pottery of Schagen and Uitgeest. Virtually all charred residues were on pots of size groups 2 and 3, the cooking pots. In only one case was similar charring found on a pot from group 1. Most of this group (the 'dirty cups', mainly shape 2) had use residues suggesting the heating of oily substances other than foodstuffs, in combination with soot on the entire exterior wall. A cream-coloured liquid residue is associated with soot and charring and was found mainly on pots from groups 3 and 4 in Uitgeest. By contrast, in Schagen this residue is associated with pots from groups 1, 2 and 5, though there is no soot or charring. The reddish-brown pigment, interpreted by Abbink as 'blood-paint', was applied mainly to pots from groups 3 and 4 in Uitgeest and in Schagen. All 'blood-paint' pottery was retrieved from ritual contexts in pits. However, the analysis of use alterations and residues suggests that the final use of vessels can differ from its original function as established through morphological features. The idea the potter had in mind during the manufacturing process does not determine the use of pottery in the final phase of its life cycle. If the aim of the pottery analysis is to define function in daily life, the analysis should always include the context of deposition. In Schagen, for example, some storage jars, which were not normally heated, have charred residues and were deposited in pits, while some cooking pots from pits are clean and were probably never used.

The depositional context largely determines the visibility of material culture and, therefore, the presence in the archaeological record. In ritual contexts the assemblage must be approached as a whole, as a conscious deposit of combinations and states of materials. Pottery in these assemblages is often complete or meaningfully incomplete, for example only bases (including 'feet', the pedestals of bowls), deposited alongside foot bones of livestock as part of a lateral categorisation of body parts of pots and livestock (Therkorn 2004, 47 – 49). On the other hand, pottery broken during use is discarded or reused, but not necessarily in the same context. Reuse of sherds, for example, is common in the construction of hearths and in heightening worn paths.

The H1:Htot index ≤.33 and >.33, based on complete profiles, was clearest for shapes 1 and 2. The H1:Rd index gave the same result for the profiles of the upper halves of pots. Both indices correspond to Abbink's analysis of Schagen and Uitgeest pottery. Shape 1 are the pots with a relatively small upper wall, shape 2 with a relatively large upper wall. The shape differentiation has increasing relevance in larger pots, because in small vessels slight differences between H1 and H2 influence the indices too much.[39]

Scatter App. 8-1 also illustrates that, in shape 2, several pots marked as shape 3 with a cross are clearly different from the other tripartite vessels with shape 2. By establishing the values for the size groups on the basis of the relationship between Gd and Rd, the same group is again separated (as crosses, App. 8-2). Here the partial pots are included. This shape (3) comprises the jars: slender vessels with a small opening and a relatively small maximum diameter in relation to the total height. The criterion for shape 3 is Gd:Rd index > 1.5 and H1:Htot >.33 for the complete profiles, and H1:Rd >.33 for partial profiles. In total, six jars were found: pot 43 from f416 (App. 8-2b); pot 259 from pit 5151; pots 201, 203, 204 from pit 5693; and pot 339 from pit 5790. Pot 204 from pit 5654 is an exceptional form because it is a small pot with an extremely wide belly. It is represented by the cross bordering size/shape group 2.1 and has a Gd:Rd index of just over 1.5. Other rim fragments from jars were found in pits f1066, f5160 and f5241. The last is probably from an indigenous copy of a *dolium*. Other fragments of incomplete upper halves from jars found in contexts other than pits are illustrated in App. 8-2b.

In consultation with Abbink, it was decided to depart from her five groups, in which the jars constitute group 5, in order to keep the distinction between size and shape groups clear. Furthermore, larger and smaller jars can be distinguished in the samples, and one could include bowls or dishes if a large variety of sizes were represented in assemblages.

The size classes in App. 8-5 are separated by the Gd class values of 220, 320 and 420 mm. The distinction between groups 2 and 3 is not very clear. One criterion for separating these two groups is the divergence between shapes 1 and 2. Size group 1 comprises some small vessels and two jars; size group 2 has four jars; in group 3 one jar fragment was present (pit 5160); in group 4 jars are absent.

All the sizes and shapes in the LIA/RIA sample are represented in App. 8-5, including the discriminating indices. Large bowls (4.4) and large jars (4.3) were absent from sample class 3.4.

Analysis of the LIA sample of pots showed that the H1:Rd index is the same as in the RIA sample, but that shape 1 and

39 The shapes are indicated by decimals after the number of the size group.

shape 2 are separated by H1:Htot/H1:Rd index ≤.30 and >.30. Bowls are lacking in this period, and only one jar fragment from size group 3 (the one from pit 5160) is present. The size classes also differ from the RIA sample: small vessels (Gd class < 100) and size group 4 (Gd class > 420) are absent, while in the LIA sample the value of the Gd class 250 clearly discriminates between size groups 2 and 3.

Middle Iron Age pottery shapes and groups

The MIA sample is small. The scatters have been interpreted with reservations and are to be verified by further analysis of larger samples from the region. As for the shapes, the H1:Htot value does not correspond with the later period. The H1:Htot/H1:Rd index ≤.375 and >.375 might be preferred if this period were independently analysed (App. 8-3). However, in order to facilitate a comparison with the size/shape groups of the LIA/RIA sample, we chose to maintain the same value of H1:Htot/H1:Rd ≤.33 and >.33 to distinguish shapes 1 and 2 respectively. This scatter App. 8-3 shows a striking clustering into two groups with no relationship to H1, Htot, Rd and Gd, meaning that the upper half of the vessel (H1) is an independent criterion and that all types of vessels can have short upper halves. This could be an important criterion for distinguishing MIA vessels in pottery assemblages from various periods.

As for shapes 3 and 4, the trend visible in the LIA comes to the fore again: the sample includes only one jar with the same Gd:Rd index > 1.5 as in the LIA/RIA period (no. 58 from pit f644), and bowls are absent. In App. 8-4, the jar is clearly separated from the other tripartite pots. This shows that the trend which was suggested for the LIA in fact started in the MIA: small pots with Gd class < 120 and large pots with Gd class > 400 are lacking. As for the size groups in the MIA, groups 1 and 2 should be distinguished by Gd class ≤ 200 and > 200. Size groups 2 and 3 are clearly differentiated in the MIA period, again contrary to the LIA/RIA sample. There are only two vessels in group 3, of which one (pot no. 127) is a *situla* with a large rim diameter and greatest diameter (Rd and Gd class) and a relatively small upper half (H1); the other is also a pot with a large opening and high shoulders (pot no.115). Compared with the scatter of the LIA/RIA period (see App. 8-2), the most striking feature is the relationship between Gd and Rd: the greatest diameter in the MIA is large compared to the rim diameter.

Conclusion

Summarising this brief overview of the pot sample from the Broekpolder, we can conclude that two trends manifested themselves over time. Firstly, a growing variability in the range of size/shape groups from the Middle Iron Age to the Late Iron/Roman Iron Age. Secondly, a simultaneous change in standardised pot proportions, especially the relationship between the upper wall height and the rim diameter and greatest width for the size group with shapes 1 and 2. Future research should address the question of whether this was an effect of more uniform use of household ware and/or more specialised production of vessels and/or if there was a change in the selection of pots for deposit. For the small number of MIA pots, at any rate, the features of the period represent a ritual context of mainly pits and associated short lengths of ditches.

The relationship between pot groups and technical variables

This section describes something of the relationships between form and function based on morphological and technical aspects of the firing atmosphere, surface treatment and additions in the two periods analysed, and their relationship with the various size/shape groups.

Late Iron Age/Roman Iron Age

– *Firing* (App. 8-6): Neutral and oxidised firing methods dominated in the LIA/RIA. Pots fired in a neutral or oxidised atmosphere are regularly distributed among all size groups, though oxidised firing was practised to a lesser extent for size group 1 pots. No patterns could be established as to distribution in shape. Reduced firing was significant for the smallest groups: of the 30 reduced fired pots, more than half were from size group 1; eight were from size group 2. This method was rarely employed for size group 3. As to the shape, no preference can be discerned, except the exclusion of shape 4, the bowls. In group 1, reduced firing was slightly more common for shape 2, while in groups 2 and 3 there seems to be a preference for shape 1. Half the jars had been fired in a reduced atmosphere.

– *Surface treatment and firing* (App. 8-7): Smoothing of the surface with fingers is the technique most commonly employed to finish the wall. It occurs mainly on pots fired in a neutral atmosphere (34 of a total of 47 pots) and on all size/shape groups except shape 4, the bowls. The treatment is

however rare in reduced fired pots. One striking phenomenon is the differentiated smoothing with the fingers of the upper and lower half of the wall, involving horizontal and vertical treatment, respectively (see for example pit f5151, no. 335).

Roughening of the wall – in this sample exclusively on the lower half of the pot – was employed on the larger pots from group 2 and 3, with a relatively higher frequency in size/shape group 3.2. Finger stripes vertically drawn through the roughened surface, usually with three fingers, are found exclusively on the larger RIA pots (3.1, 3.2; see pit f5345; f5654; f5693). Roughening is mainly combined with upper halves smoothed with fingers and fired in an oxidised atmosphere. However, it is also combined with coarse polished upper halves fired in a neutral and oxidised atmosphere (five vessels, including one jar) and with fine polished upper halves fired in an oxidised atmosphere (four vessels) or a reduced atmosphere (two vessels). The only roughened lower half of a pot in size group 1 is on one of the reduced fired pots. The special combination of polished surfaces and reduced firing of small pots fits in with the general tendency among potters in the region.

Fine and coarse polished walls in combination with reduced firing are mainly represented in the smaller size groups 1 and 2, though no preference could be established in terms of shape. The larger polished pots were mostly fired in a neutral or oxidised atmosphere. Two of the jars were coarse and fine polished. The coarse polished jar (pot 204, pit f5654) has an exceptional form, with angular handles.

In the LIA/RIA period, scraping the surface was rare, and occurs once on a reduced, and twice on neutrally fired pots. This treatment involves smoothing the surface with an instrument, resulting in a rougher surface, as the temper was smeared out over it.

– *Additions and firing* (App. 8-8): Handles are present on the smaller LIA/RIA pots in size groups 1 and 2 and on all shapes including jars and bowls. One size exception is the jar from group 3. In this sample, reduced fired pots with handles are in the minority; no preference can be discerned as to neutral or oxidised firing. Of the five reduced fired pots, four were polished, and the surface treatment of the fifth is not known. There is no preferential surface treatment for vessels with handles, and polished surfaces and finger treatment appear in equal number. The smaller pots generally have one handle, the larger ones two. One vessel (pot 224, pit f5241) has a partially extended rim instead of handles. One small pot and a bowl had holes in the base. Handles are restricted to cups in the LIA part of the sample.

– *Decoration and firing* (App. 8-9a & b): Only 16 pots had some form of decoration on the wall, and only one pot was decorated completely. The upper half is the most commonly decorated part. There seems to be no clear relationship with other variables, with size/shape groups, or with firing method (except perhaps a slight preference for the combination of reduced firing and decoration in size group 1). As to the relationship with surface treatment, decoration of the wall is found only on unpolished pots, except for *streepband* decoration (horizontal grooves around the neck). Only one pot has a decorated upper and lower half (pot 33, pit f2122).
Rim decoration consists mostly of fingertip and nail impressions on the outside of the rim. It is closely associated with pots from size groups 2 and 3, shapes 1 and 2 (11b). Shape 4 was represented once, in the form of bowl 204 from pit f5137. Rim decoration is lacking on jars.

Decorated rims are combined with neutral or oxidised firing and simple surface treatment. There are two vessels with roughcast lower halves, of which the largest pot had a fine polished upper half. This example of the combination of polished surface and decorated rims contradicts Abbink's sample, where she found polished surfaces on pots with smooth rims, probably for pouring liquids. In our sample three other (LIA) pots in size/shape group 2.1, 2.1. and 4.1 combined rim decoration and polishing.

One striking feature is the negative correlation between rim and body decoration: in only two pots out of a total of 152 vessels did the maker combine the two, and only once was rim decoration employed on a *streepband* decoration of the neck.

Middle Iron Age

The procedure performed on the LIA/RIA sample was repeated for the MIA sample. Additions such as handles, extended rims and holes in the bases are absent. The sample is small, with only 31 pots, 22 of which have only a partial profile.

– *Firing* (App. 8-10): In the MIA sample neutrally and reduced fired pots dominate; oxidised firing is nearly absent. Reduced firing is restricted to size group 1 and 2, in terms of shape, only size/shape group 1.1 is lacking. There are no jars among the neutrally fired vessels. As this and the next figure illustrate, the larger groups were nearly absent in the MIA period:

size group 3 is represented by only one pot and size group 4 is entirely lacking.

– *Firing and surface treatment* (App. 8-11): Nearly 50% of the MIA pots have polished walls, usually finely polished, and nearly 50% of the polished pots are reduced fired. The clear correlation between reduced firing and fine polished surfaces of the outer wall is striking. The combination is found exclusively on the smaller pots, in size groups 1 and 2. Fine polished upper walls are found on four vessels combined with roughened lower walls, and in three cases with reduced firing. Coarsely polished walls are present on the neutrally fired pots. Smoothing of the surface with the fingers and roughening are in the minority, the former being applied to vessels from size groups 1 and 2 and the latter to all size groups.

– *Decoration and firing:* Decoration of the body of vessels is rare. Of the 31 MIA pots, only three were decorated, all from size group 2. Decoration consisted in two cases of polished bands, both on polished pots, one fired in a reduced and one in a neutral atmosphere (no. 56 from pit f644, no. 135 from pit f3695). In one case, geometrical grooved decoration was applied to a neutrally fired pot (no. 102, gully f2773). Rim decoration is present on five pots from each size/shape group present in the MIA sample, with the exception of the jar, group 2.3.

Rim decoration was applied exclusively to the top of the rim and is a well-known chronological indicator of this period. Rim and body decoration do not occur together. All five pots with rim decoration were neutrally fired.

Conclusion

The difference between the pottery assemblages from the LIA/RIA and MIA periods in terms of firing, surface treatment and decoration lies in the increasing variability of surface treatment and additions, and the preference for vessels fired red or yellow in the LIA/RIA periods as compared to the black and polished vessels of the MIA period.

Use traces

Residues and previous analyses for the region

The main types of residue material distinguished by Abbink at Schagen and Uitgeest, a sample of which was submitted for chemical analysis (Oudemans & Boon 1993), were as follows:

1 *Charring*- solid residues with a dark-brown to black colour and a crackled or pitted appearance or without a structure: charred polysaccharides (cellulose or starch), some with strong protein or fatty acid additions. Such residues can form during cooking of thick liquids containing grains such as porridge or starch-rich stews with protein-rich material such as meat, fish or beans at a temperature in excess of 250° C.

2 *Soot*- a black, dull to shiny, solid residue: phenols, aromatic and aliphatic compounds (PACS), sometimes releasing CO_2, e.g. residues of smoke condensates or soot from cooking over a wood fire. Some samples in this cluster consist of aliphatic compounds resulting from the heating of oily substances such as oils, tallow or resins.

3 *Brown to light-brown film* without a clear structure, whose origin is not always clear.

4 *Red to dark-brown residues* 'painted' in the forms of drops or linear finger stripes: the dark- or red-brown 'paint' was a protein-rich residue very similar to the two samples of the cream-coloured layer (without fatty acids and charred polysaccharides and suggesting a lack of heating) . This led Abbink to the conclusion that the pigment was applied after firing during the manufacturing process and use in daily practice. Her hypothesis is that blood had been applied to the vessel in the last phase of its life cycle (see discussion Abbink 1999, 296, 298).

5 *A cream to light-brown layer* with the appearance of boiler scale: the same aliphatic compounds from cluster 1 were found in the cream-coloured layer, but here proteins were present. The source material was not established with certainty. The proteins may come from the content of the vessel; the aliphatic compounds may have been present in the vessel wall so are not part of the 'fingerprint' of the residue itself. Two other cream-coloured residues consisted of unheated protein-rich substances without fatty acids or charred polysaccharides. Abbink's supposition that these were dairy products such as milk was not borne out by the low quantity of organic material and fatty acids.

In the Broekpolder samples of LIA/RIA pots, most cooking residues, charring and soot are from the RIA period, and are found more often on pots from size/shape group 2 (about 50%), with



a slight preference for shape 1, followed by size/shape groups 1 and 3 (App. 8-12a). Soot occurs on pottery from all size groups on the outer surface of the pot, with the exception of group 4, and on all shapes, except shape 4, the bowl. Nearly all the jars showed residues of soot on the outside of the vessels: four jars from group 2 (from a total of six) and one from group 3; one jar from group 2 also had charring on the outside. One of the two pots with the cream-coloured residue on the outside is a bowl, with a hole in the base, which also has soot on the inside. Fewer residues were found on the inside of the vessels (App. 8-12b), with 40% or more of these pots being from size/shape group 2.1 (11 out of a total of 29 pots) or jars. Charring is the dominant residue on the inside of vessels and, on the outside, soot. Vessels of size group 4 have no residues.

Blood may be represented by the traces on pots with reddish-brown drawn stripes and dots, and stains *(fig. 78)*. These date mainly from the RIA, and were all found in pits: pot 71 from pit f457; pot 47 from pit f1018; fnd 5955 from pit f5345; pot 202 from pit f5693; in the LIA on pot 33 from pit f2122, and pots 206 and 222 (a jar) from pit f5160. 'Blood' traces are mainly found on the outer surface, often in combination with soot, but occasionally traces are also seen on the inner surface of the pot. The brown stains and stripes do not occur on small pots of size group 1, and there appears to be an overrepresentation of groups 2 and 3.

The 'blood' treatment occurred after the production process and during the use of the vessels. This is clearly visible in *Figure 78*, where the traces do not follow the direction of the finger stripes through the roughened surface.

When it comes to the correlation with firing and surface treatment, the pattern is very diffuse (App. 8-13a & b). Relatively speaking, all types of residues are found mostly on reduce-fired vessels (50%). Residues on the inside are found most often on oxidised pots (30%). As for surface treatment, most residues are combined with surfaces smoothed with the fingers, though all other surface treatments are represented in the sample. No pattern could be discerned in the combination of firing method, surface treatment and 'blood' stains.

The sample with residues from the MIA period is too small to show any pattern. As in the LIA/RIA sample, charring is found mainly on the inside of the vessels and soot on the outside in all size/shape groups (App. 8-14a & b). Other residues are lacking, except in one case (no. 133 in pit f3584), which has some stains of brown pigment. In terms of surface treatment, relatively more polished pots contain residues: three of the six pots have residues on the outside, and four with residues on the inside are completely polished or have polished upper halves in combination with roughened surfaces.

Broekpolder residue analysis by direct temperature-resolved mass spectrometry (DTMS)

A total of 15 samples with organic residues were analysed by direct temperature-resolved mass spectrometry (DTMS; see box). One of the main objectives was to delve deeper into the relationship between form and function. We decided to concentrate on the verification of some aspects of Abbink's research. Special attention was focused on the supposed 'blood' stains and stripes, and also on the nature of the cream-coloured substance, which was thought to be milk residue, as well as on the origin of charred residues. The samples came from the first two Broekpolder excavation campaigns (1998/99), from the MIA and LIA/RIA periods,

Fig. 78 Two examples of organic material, possibly blood, regularly encountered as finger stripes and dots applied – painted – onto vessels very ofter found deposited as complete.

Analysis of archaeological residues on pottery

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Complex solid bio-materials on pottery, including charred natural products and archaeological surface residues, have been previously studied by Curie-point pyrolysis gas chromatography mass spectrometry (Cu-Py-GC-MS) and Curie-point pyrolysis mass spectrometry (Py-MS) (Oudemans & Boon 1991, 1996). In this study we analysed similar charring with a higher resolution technique and a wider mass range. The technique of direct temperature-resolved mass spectrometry (DTMS) allows a better understanding of the nature of the charring and the volatile matter preserved in it. In particular, the dissociation temperature that can be determined by DTMS relates to the degree of condensation of carbonised solids. This proved valuable here because protein present in charred form shows different degrees of coalification as a result of differences in thermal exposure. Complex mixtures of soluble compounds and solid materials can thus be analysed in a single procedure. Volatile matter such as fats sequestered in the charring is released by evaporation. Large non-volatile molecular complexes such as charred food residues are pyrolysed to generate smaller, more volatile fragments, which are representative of the original macromolecules. DTMS also provides some information on inorganic materials associated with organic matter. For example, phosphates, included in heated carbon, are reduced at high temperature and reappear as elementary phosphorous P_2 and P_4, visualised in the mass spectrum as m/z 62 and 124. Another interesting component released is SO_2. At low temperatures SO_2 is an elimination product of oxidised sulphur in organic materials, while at high temperatures it is released from sulphates.

Sample preparation
A sample removed for analysis is homogenised in a mini-mortar and pestle with some ethanol. An aliquot equivalent to about 10 microgram of dry solids is applied to the filament of the analytical probe [Pt/Rh (9/1) filament]. The DTMS was performed on a JEO; SX 102 double-focusing sector mass spectrometer under low voltage electron ionisation conditions. The temperature of the filament is ramped at a rate of 16° C/s. The chemical interpretation of the DTMS data is based on interpretation of the low eV electron mass spectra by comparison with data from earlier studies and reference materials. The results are summarised in App. 8 – 17. Each sample (Sp1 from the outside; Sp3 from the inside) was accompanied by a control sample (Sp2 from the outside; Sp4 from the inside). Controls were chosen from areas without visible crusts or carbonaceous deposits near the sample location. The DTMS patterns of the controls were generally very low in recognisable organic matter.

Chemical archaeofossils as marker compounds
The lower temperature desorption area in the DTMS of carbonaceous residues provided information on evaporating fatty substances and other materials such as elementary sulphur and wood tar. The temperature range where pyrolysis took place gave information about condensed coal residues. At very high temperature after scan 80 (> 600° C) we saw evidence of inorganic materials such as chalk releasing CO_2 or sulphate releasing SO_2. SO_2 was released in all cases examined. We have indicated in App. 8 – 15 when we saw phosphorous (as P_2 and P_4) released from reduced phosphates. Phosphates are considered to be indicative of bone, but note that the excavation context, in proximity to dung for example, can be an alternative source of phosphates. Iron was also observed in two cases, which is unusual, as iron usually requires a much higher temperature, and consequently a different type of analytical filament, before it can be observed. The iron may already have been present as such prior to analysis in a reduced form complexed with organic matter, perhaps as carbonised blood on the pots.
Sample 10 (3584/7 sp3) is a good example of a weakly coalified protein with sequestered fats (see App. 8 – 15). Fats are thermally released at lower temperature corresponding to about 40 – 300° C (DTMS scan range 15 – 40). MS data from the fats point to preserved mono-, di- and tri-acylglycerols (coded MG, DG and TG). The low intensity of the TG MS data suggest relatively low concentrations of TG. The diglyceryl electron impact fragments are very prominent and can be used to read the type of fatty acid moieties present. For example, ion m/z 551 is indicative for a glycerol unit with two palmitic acid moieties (coded in the table as DG 16/16). Since the biosynthesis of fatty acids follows a C_2H_4 addition pattern, we can also recognize combinations of C14, C16 and C18 chains in glycerides of hard fats. Thus, the ions m/z 523, 551, 579, and 607 correspond to DG14/14, DG 14/16, DG 16/16, DG 16/18 and DG 18/18 respectively. These DGs are listed in the Table as DG 14/16 – 18/18 (see sample 10 sp1). Fatty acid moieties are confirmed by their acylium ions at m/z 211 (C14:0), 239 (C16:0), 264 (C18:1) and 267 (C18:0). Ions at

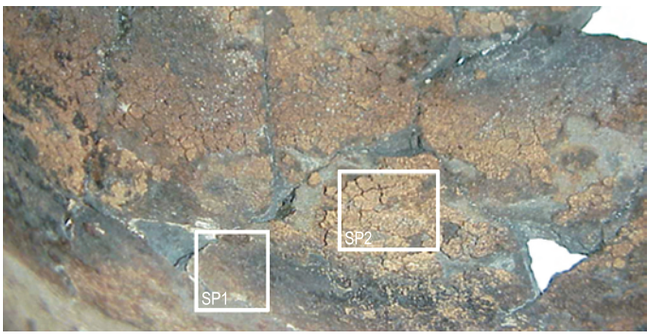
m/z 313 and 314 are monoglyceryl fragment ions with C16 and C18 fatty acid moieties. In most of the cases examined the fats are so-called hard fats that occur in the flesh of cows and pigs. The fatty acid moieties on DG's in sample 11 (4111 3152 sp1) point to very short chains: for example, the ion series m/z 467 (DG 12/14), 439 (DG 12/12), 411 (DG 12/10), 383 (DG 10/10: relatively high) and 355 (DG 10/8). These shorter chain, fatty acids originate from fat-containing products of goats and sheep (i.e. milk and milk-derived products) and to their body fats. The absence of evidence for fats in the 'controls' is an indication that fats in crusts are original and not due to post-excavation contamination.
In a number of cases, the fats correlate with low degrees of coalification, but there are exceptions (e.g. sample 9:275 132/1, crust on the outside of the pot). In this case fats must have been introduced after formation of the carbonaceous deposit. Ions indicative of sterols, such as bound residues of cholesterol, were found in many cases and are indicated as C27ST (i.e. m/z 368 from cholestadiene). Note that cholesterol is an animal/human specific sterol. In only one case was cholesterol itself observed, in sample 13. Considering the residue of elementary sulphur and soot from wood firing, we have doubts about the origin of this marker compound and have dismissed it as a contamination. In two cases (sample 12 and 14) we have tentatively identified an oxygenated cholesterol residue (m/z 384). Evidence for a C29 sterol residue (29 ST) is present in sample 9. C29 sterols are indicative of plants and fungi. The charred proteinaceous residues appear in DTMS data from sample 10 (3584/7) in the scan region 40 – 52 and 53 – 75, which correspond to 300 – 400° C and 400 – 600° C. The lower temperature scan region shows a MS fingerprint that matches that of intact protein. At higher temperatures, proteinaceous material was more carbonised and released mostly side chain fragments of amino acids in the form of toluene (from Phe), cresol (from Tyr) and indole (from Trp). A higher degree of coalification (i.e. a more carbonised form of charring) also leads to a higher pyrolysis temperature. This is very clear in sample 12 (3605 2361 sp1), which shows three types of preserved protein with a low, moderate and high degree of coalification. A coalified spot in sample 5 (677/3 1072 sp1) shows a DTMS of proteinaceous materials with aromatic amino acid side chains preserved. The pyrolysis temperature has shifted to a high value relative to the other cases.
In some cases aromatic polycyclic hydrocarbons with m/z 178, 202, 252, 276, 302 were observed. These same mass peaks were observed in soot from a 19th century chimney in rural France. These peaks are therefore considered to be a fingerprint of the tar released by wood fires heating the pots, or other ways in which soot can be precipitated on the pot surface through, for example, secondary use.

Tips for collecting pottery for analysis of residues (Oudemans & Erhardt 1996, 141)
Touch sherds or pots with residues as little as possible with bare hands; wash gently under running tapwater as quickly as possible after excavation to avoid degradation; dry quickly to avoid mould; wrap in aluminium foil (preferably solvent-cleaned); pack in a polyethylene Ziploc bag or glass container with a Teflon-lined cap.

and from different contexts. The main criteria for the samples were first of all the completeness of the pot and the quality of the residue, and secondly, that they came from the two periods and various deposition contexts present in the Broekpolder. The results of the chemical analysis are summarised in App. 8-15. Examples of the positions and nature of the samples are shown in *Figure 79*.

Samples 1 – 6 consist of the hypothesised blood stains and stripes. Sample 3 was chosen for the visual resemblance of the colour of the residue covering the lower half of the inner side of the vessel. These samples cannot be defined with certainty, but nor can the blood hypothesis be rejected. The substance is protein-rich and has been only moderately heated, if at all, and has much in common with intact protein (samples 2, 3, 4). The question is whether the vessel was treated with 'blood' just before deposit, or heated again before it was deposited. The charred blood residues were used, or at least heated, after 'blood' was applied, and sherds might be interpreted as deliberate breakage during ritual. However, the low degree of carbonisation of proteins (from 40 – 52) also occurs in some of the other fingerprints (sample 11, 12).

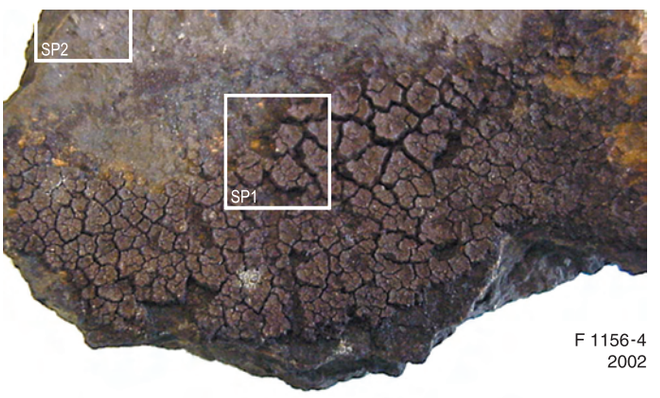
Other types of charred residues in or on complete pots could indicate deposit of cooked contents, only the charred remains of which have been preserved, as is the case with sample 12 (pot 134) and sample 13 (pot 121). Both pots are rather small, from size/shape group 1.2, and show variations in the degree of carbonisation. The high degree of carbonisation, in particular, suggests that water was evaporated or not present. Only oily substances could reach such very high temperatures resulting in such highly carbonised residues.



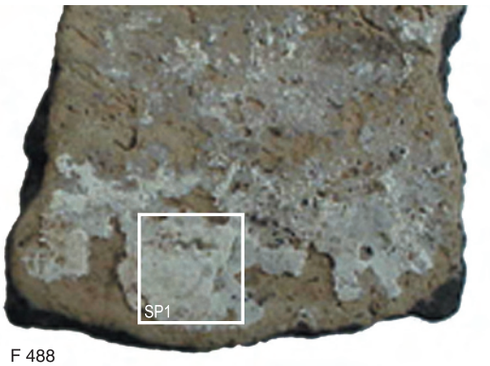
F 3605
2361



F 3374
1901



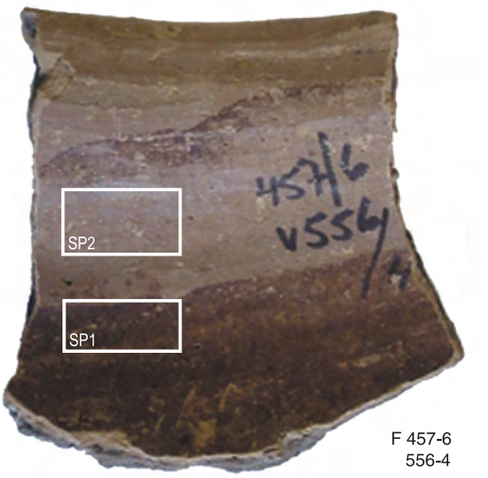
F 1156-4
2002



F 488
527-3



F 1018
985-3



F 457-6
556-4



F 677-3
1072

The part of the lower wall of pot 121, sample 13, which had split off, confirms the high thermal stress to which the vessel had been submitted. Evidently, just before deposition in the pit, the pot was used for cooking meat at a very high temperature on a wood fire. The presence of iron in samples 1 and 6 might be residues of charred blood, or could also stem from the soil conditions.

Samples 7 – 14 contained charred crusts. All showed carbonised proteins with various degrees of coalification, and fats. Compound specificity can be read from the DTMS data from the diacylglycerides (DG), for example, whereby fats from sheep/goat (DG carbon number 18/20) or cattle and pigs (DG carbon number > 30) can be distinguished. Most fats are from the latter category. The presence of phosphate in combination with proteins suggests the cooking of high-grade animal nutrients. The shorter chains of fatty acids (C8 – C10) in sample 10 and 11 suggest fatty products from sheep/goats, perhaps milk. The good preservation of these fatty acids suggests relatively favourable preservation conditions, with little degradation of the residue by oxidation or bacterial activity.

In addition, four bone samples from cattle, pig, sheep/goat and dog, derived from features, were analysed in order to establish whether animal fats were preserved and, if present, whether these fat patterns are related to the charred remains on pottery vessels. The organic material was removed from the interior bone structure to avoid contamination. Cholesterol and some oxidation products of cholesterol were present in all the samples. Only in the sheep/goat bone was there a DG pattern equivalent to that on the pottery. The low presence of fats in the other animal bones is remarkable. Boon suggests that fats are easily subjected to bacterial degradation, while the microenvironment in the charred residues on pottery is probably antibiotic.

Sample 9 showed traces of beeswax and perhaps traces of vegetal material (if m/z 396 has a C 29 plant sterol origin). Samples 8, 9 and 12 show the fingerprint of soot residues from wood fires on the outside and, in sample 10, on the inside of the vessel.

The presence of elementary sulphur in sample 13 is puzzling. Two soil samples were also analysed from the same pit: one from the material in the pot and one from a dung deposit in the layer above the vessel. Both samples showed traces of *Graminicaea* and sulphur; the sample from the interior of the vessel also contained wax compounds. The sulphur probably originated in a bacterial sulphate reduction *(Desulfovibrio desulfuricans)* through the presence of salt in the marine sediments. The great advantage of this phenomenon is the anti-oxidising agency of sulphur, leading to excellent preservation conditions for organic material.

Samples 14, 15 and the inside of sample 13 were chosen because of the presence of white residues. These proved not to be from dairy products. The white residue of sample 13 contained elementary sulphur, carbon and residues from a wood fire; those from samples 14 and 15 contained chalk and phosphate. Sample 14 also had aliphatic compounds, which might have originated from oily substances that were heated and then absorbed by the pot wall. The samples showed strong CO_2 emission in DTMS analysis. This is due to decarboxylation of acidic compounds in the organic material (if present), or to thermal deposition of carbonates (i.e. limescale). All three vessels most likely contained boiling, calcium-rich water with other additives. The gypsum on sample 8 is possibly the result of a chemical reaction of chalk and sulphates.

Final remarks on form, shape and use

Compared to other assemblages, the sample from the Broekpolder is consistent with the overall picture of pottery in the coastal areas of the northern and western Netherlands. The temper is in keeping with the tradition of the periods found in other areas. However, as mentioned above, the use of crushed shell is not strictly limited to the MIA/LIA, but continues – by way of exception – into the RIA period (see pot 148, pit f3645). The theory that this is a special production technique for specific occasions could be further investigated.

The forms, with some exceptions, do not differ from other pottery assemblages along the North Sea coast. As elsewhere, cooking pots in size groups 2 and 3 are dominant in the assemblage in the Broekpolder sample due to the breaking index and thermal stress. However, these medium-sized groups are difficult to distinguish. This is probably a multi-purpose group, used for both cooking and storage. Only further analysis of the organic residues will provide more evidence of their function. Some function/use of vessels from group 1 might be deduced from morphological features. Miniature pots could have been made for ritual use, beakers and small bowls for drinking, while some straight-sided bowls

Fig. 79 Examples of the samples from the pottery used for residue analysis (from Boon *et al*. 2002, Institute for Atomic and Molecular Physics).

(shape 4) suggest milk production. As for large vessels from groups 3 and 4, no conclusions can be drawn due to the lack of complete forms. The cooking residues on jars (shape 3) demonstrate the danger of drawing conclusions based on shape, leading to the interpretation that the jars were used exclusively as storage vessels.

Various combinations of pottery were deposited in pits: from one complete vessel (pits f3374 and f5695) to large and varied assemblages, which may constitute a household set (pit f5137). One example of a small set was deposited in pit f5151: a jar was placed on top of the layer which contained three vessels from group 1; two vessels were small cups. Two decorated lids with large knobs were found in pit 4766, probably belonging to pot 257, and in pit f5241, probably belonging to a dolium-like vessel.

Comparing our results with Abbink's research leads us to make a number of comments. As regards surface treatment and function/use, we can confirm the general trend. As she suggested, roughening was mainly applied to larger vessels, possibly to facilitate grip and increase capacity to withstand thermal stress. The high correlation between reduced firing, polished surfaces and – as we will see below – deposition in pits is also striking in our sample, especially in the case of the smaller pots. As in Abbink's sample (Abbink 1999, 310), jars also belong to this category of vessels with special treatment and deliberate choice of depositional context. In our sample, only the 'feet' from pedestal bowls are present. Furthermore, the lack of rim decoration on jars supports her hypothesis that smooth rims were used for storing and pouring liquids, explaining the high correlation with polished walls in her sample. According to Abbink, impressing the rim with the fingertips is a quicker way of finishing the rim of a pot than faceting. The lack of correlation between decorated rims and reduced firing techniques in all periods would seem to accentuate the practical side of this choice. However, in our sample (4 LIA/RIA, 1 MIA), decorated rims were found in combination with polished surfaces which probably had a more special meaning.

The function and use of the vessels differ somewhat from Abbink's sample. In contrast to her samples from Uitgeest and Schagen, there seems to be a preference for small cooking pots from size groups 1 and 2. Charring and soot were rare in group 3. The charred residue from flour products found in sample 10 (Sp1) was not established in samples from Schagen and Uitgeest, where the charred residues were often formed from polysaccharides.

The research method proved to be a good way of defining independent criteria for size groups and shape 3, the jars. This method can also detect anomalies within assemblages which could indicate culturally-specific sequences, possibly chronological. However, larger samples are needed to establish specific criteria. This leaves us with the question: what do shapes 1 and 2 mean? Since there is no clear correlation with firing method, surface treatment, additions, decoration and residues, this existing differentiation does not seem to refer to function. Was the decision as to the position of the greatest diameter and the height of the upper wall made on the basis of traditional ideas and knowledge? The different shape values in the MIA as compared to the later periods seem to confirm this suggestion. This could be a medium for comparing various local pottery traditions.

Due to the complexity of the residues, at this moment only broad classifications can be made on the basis of mass spectrometry: vegetable oil, dairy, mammal or fish fat and plant wax. The analytical approach should be used more often, as it is the only way to provide independent information about the actual use of containers. A larger and more systematic selection should be made for samples, in terms of quality of residues, context, soil conditions, and complete vessels from various pottery size/shape groups. More data would then be generated and experience acquired, resulting in more detailed information about the function/use of pottery in the final phase of its life cycle, as well as about diet and use of biomaterials in production processes and treatment of materials.[40] Furthermore, it has been shown that fats from ruminants (cattle, sheep) and non-ruminants (pigs, poultry) can be distinguished (Dudd & Evershed 1998). This could also provide information on animal husbandry and the exploitation of dairy products, and help to establish differentiation in farming attitudes from a local, regional or supra-regional perspective. It is also possible to determine the type of wood used for fires, giving supplementary information on the environment of pre- and protohistoric communities. In further research experimental research should be promoted parallel to analysis of archaeological pottery in order to compare the chemical values and the processes of compositional alteration due to decay during burial.

40 For example, there was insufficient time to analyse the white residue on the bowl with a hole in the base, which suggests it might have been used in cheese making.

3.3.3 *Remarks on pottery characteristics and context of deposit*

The Middle Iron Age features with pottery have in the main been interpreted in the context of ritual. Pits and the triangle of ditches to the east of tr 32 – 33, particularly f2773, were the most notable contexts of deposit. Shallow drainage ditches were not for example present, and the erosion factor makes it impossible to compare various contexts. Selection of particular types of vessels for deposit in pits might be assumed, but cannot be confirmed due to the absence of other types of features and layers. No complete pots – or sherds forming complete pots – have been found in contexts other than pits. There is then little to compare for relative occurrence. For the purposes of demonstrating the state and/or selection of pot types for deposit in different types of feature, the LIA/RIA features do offer some potential in terms of the most frequently occurring types of feature. This allows us, most importantly, to distinguish between deposit in gullies/ditches and pits, and to address the issue of why pits were dug and deposits made in them.

The numbers of pots in pits and gullies are nearly equal in the LIA/RIA sample. Comparing the presence of pottery in the various deposition categories – pits, gullies, ditches and other (depressions, layers, postpits) – some possible trends can be distinguished (App. 8-16). Most sherds (44%) had been deposited in gullies (44%) while only 19% of the sherds were recovered from pits. Moreover, the smallest pots from size/shape group 1 and the specific shapes bowl and jar are more often found in pits than in the other contexts. This might suggest a trend in selection.

As is usual for the region, house ditches and gullies near farmhouses contained the most sherds. Two small pots were deposited in f471. Considering the irregular shape and the small fingertip impressions in the neck of pot 37, a child probably made this miniature vessel. Pottery was also placed in postpits/holes. A nearly complete pot lacking a rim was deposited in a postpit, f2003, and a miniature pot (pot 252) was found in f4931.

Pots: decorated, black, 'blood', selection

The importance of black-burnished (reduced fired and polished) pots is shown by a clear correlation between the depositional context in pits (App. 8-17). Vessels with decoration, except 'decorated' rims, were also more frequently deposited in pits than in other contexts.[41] In addition to reduced/polished surfaces and decoration, a potentially highly symbolic or special connotation may also be associated with the presence of brown stains and lines drawn on vessels. Previous work could not establish with certainty whether these stains were made with blood, and our samples did not add anything to the discussion. There is a correlation between brown pigment residues in the LIA/RIA periods and deposit in pits (App. 8-18a & b).

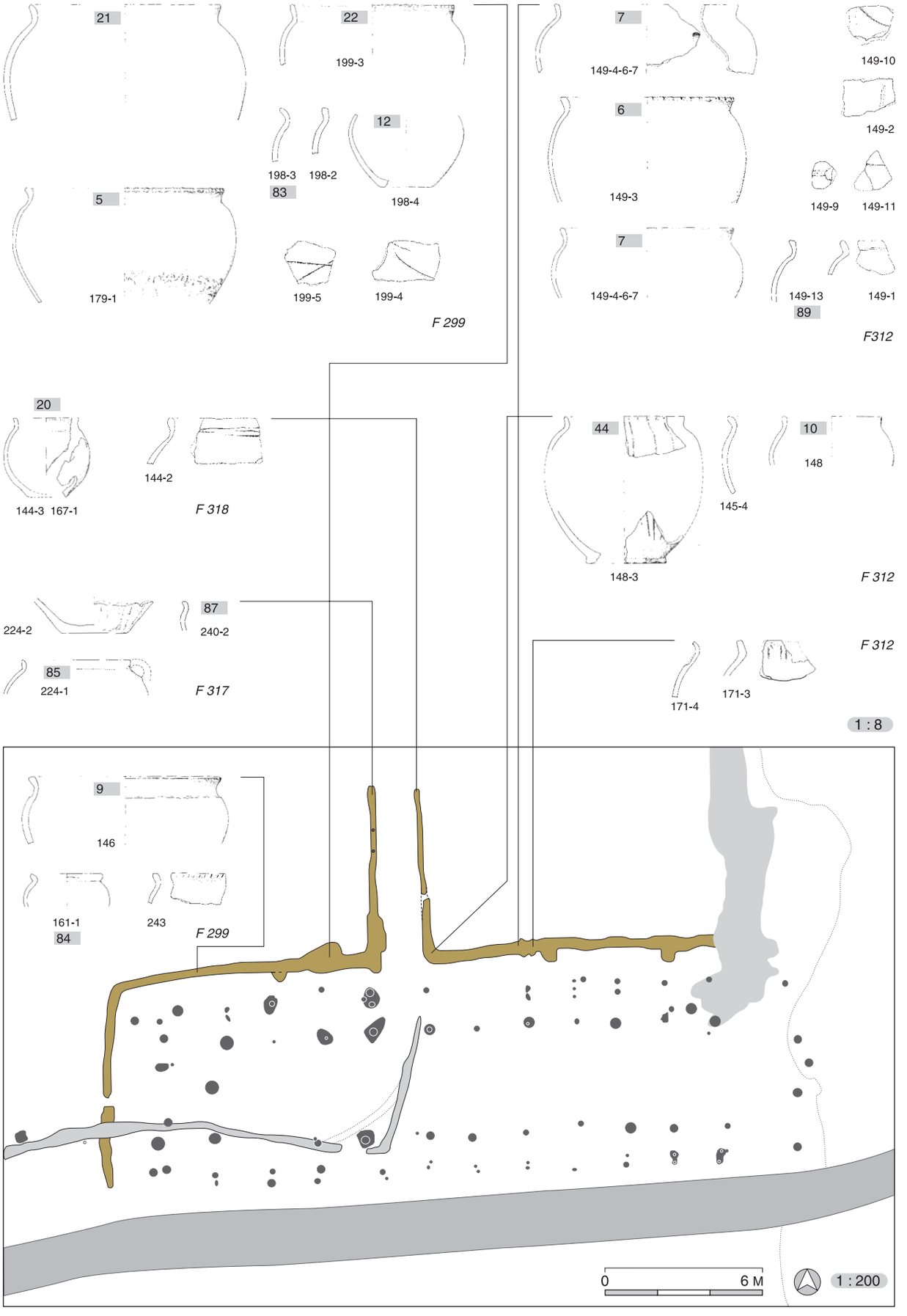
If Abbink's hypothesis that the red/brown stains and stripes are residues from blood proves to be correct, the treatment with blood might be a ritual practice defining the final phase in the life cycle of vessels before deposition, or before their last use as a cooking utensil before deposition in pits. As at Schagen and Uitgeest, it was applied to the larger vessels from size/shape groups 2 and 3. Other residues from both periods are also found more often in pits than in other features, indicating that pots were often used before being deposited in the pit (see for example pot 121, pit f3374).

It is clear that some pits contain a carefully selected inventory, some elements of which underwent special treatment before deposit, or showed a specific combination of material culture. For example, the depositing of complete pots with wooden objects of nearly the same form and dimension in the lowest layer of two pits, f2122 and f4534, in the LIA period, is worth noting. In f2122 the decorated pot has 'blood' traces; the wooden object was deposited with the 'head' down in the pot *(fig. 21)*. There was a similar combination for the RIA period. In pit f5695 the pot was accompanied by sherds and bone, and the wooden object was found in the layer above. In the RIA, pots were regularly deposited in the lowest layers of deep circular pits (f457, f3374, f5137, f5151, f5152, f5418, f5654 and f5693). But for the MIA, too, complete pots were mainly found in the lowest pit layers (f644, f677, f1141, f2815, f3344 and f3695). In f3695, both the pot, decorated with polished bands, and the wooden ladle had been broken before being deposited with the complete antler object.

Features of the farmhouse in trench 15

The only house plan that can be related with certainty to contemporary features is house plan in tr 15, which therefore serves as an example of the types of pottery recovered from one family generation. A large number of sherds were deposited in the gullies along the northern wall and in the entrance gullies of the house. Complete pots are absent. The NW entrance gully (f317) contained two polished rim fragments and one roughened lower wall with base *(fig. 80)*. Five sherds

41 This may confirm Abbink's (1999, 204) idea that this type of finishing of the rim is more functional than decorative.


21
22
199-3
7
149-4-6-7
149-10
12
198-3
198-2
83
198-4
6
149-3
149-2
149-9
149-11
5
179-1
199-5
199-4
F 299
7
149-4-6-7
149-13
149-1
89
F312
20
144-3
167-1
144-2
F 318
44
145-4
10
148
148-3
F 312
87
224-2
240-2
85
224-1
F 317
171-4
171-3
F 312
1 : 8
9
146
161-1
84
243
F 299
0
6 м
1 : 200

are black-burnished (reduced fired and polished), and one *streepband* sherd was found. The sherds probably belong to small pots from group 1. Apart from sherds, one fragment of a baking plate was found.

The NW wall gully (f299) contained the upper halves of four larger cooking pots, one with a roughened lower belly, two smaller pots, the upper half of a small, black-burnished vessel (84) and a medium vessel with the rim missing, resembling fnd 144-3/167-1 in f318. Some decorated sherds with grooves, seven polished upper walls and one polished base were also deposited here. The NE entrance gully (f318) contained five rim fragments, one pseudo-*streepband*, two polished wall sherds and one polished base. Small pots are represented here.

The NE wall gully (f312) contained sherds from five upper halves from various pottery groups. One vessel (fnd 148-3) is decorated with vertical grooves all over the wall and rim, while another had a circular impression on the shoulder. In this gully more sherds of upper walls were found (10), but bases were absent. Other decorated sherds with grooved necks *(streepband)* are represented. Seven upper wall sherds are from polished, mostly medium-sized vessels, and one is from a small pot. The decorated sherds probably belong to the medium-sized vessels, as does fnd 148-3. Two pieces of pot slag and six pieces of daub were also found.

To summarise, we can conclude that remains of small pots dominated in the entrance gullies. The larger pots were found in the gullies along the wall. The form of the latter pots suggests they were cooking pots, though residues are restricted to charring on a sherd in the NW wall gully and another – a brownish residue – in the NE wall gully. Polished sherds were mostly found in the NW part of the house, while decorated sherds/pots were found in the NE ditch, including the decoration with *streepband* and impressions. Decorated rims were found in both wall gullies. Handles are rare in this assemblage, one having been found in each of the gullies along the wall and one in the western entrance gully.

Trenches 41 & 48

Area of the Early Medieval offering sites

Many of the sherds from the offering site layers are isolated, very small and eroded and do not relate to use of the area for deposits. They may be associated with the previous LIA/RIA phase before the pool had formed in and on top of layer f4112 and subject to trampling, by people and livestock. However, the apparently late prehistoric, larger native sherds recovered from Early Medieval deposits f4111 do seem to have been thrown into the pool, along with the Roman pottery sherds of coarse and smooth-walled, colour-coated Belgian ware and *terra sigillata* which were also mainly found in layer f4111. Most (42 out of 74) of the construction materials – brick and roof tile fragments – also came from f4111. A figure has been included in the Offering site section *(fig. 61)*. Two of the three pedestals from vessels were also found along the southeast. One lower half of a larger pot (156) without its base lay 5 m from the border, while three upper halves lay 5 m, 7 m and 8 m from it. Two larger rim parts and one base were found near the linear feature (f4182) in the eastern area of the offering site. The context of these materials is Early Medieval, 6th/7th C (see below, section 3.4.5). Certain Early Medieval pottery is fairly scarce, 120 sherds coming mainly from depression f4182. Other pottery material is restricted to fragments of building material.

Late prehistoric features were few in number, and complete or nearly complete profiles were found mainly in one feature, dug into the higher-lying area of tr 41: pot 148, 147, 146 and pot 144 from pit f3789, all small vessels from groups 1 and 2.

3.3.4 *Clay objects*

Objects made from clay, other than pots, were also were also recovered, from most categories, but mainly from pits. This category includes game counters/playing discs, spindle whorls, loom weights, lids, fragments of baking plates, clay rings for supporting large pots and fragments of what are probably oven walls. These finds were mainly fragmentary. See App. 2a & b and App. 8-19, 20 & 21 for drawings and context.

Game counters were interestingly deposited in pits in groups of nine (f457) and five (f488), only one was from a gully (f4839). Three small clay balls were found in one pit (f4825). Spindle whorls have been discussed under 3.2.6.

3.4 Facets of cosmology: *towards an interpretation of landscape ordering and final life of materials*

Obviously, the reason why most materials are archaeologically recoverable lies in the preservation conditions *below* the surface inhabited by past users. Most materials were intentionally buried in the ground or in a situation covered with water. All the materials, we assume, were deposited in dug features (pits) and the lower-lying watery places along the west of each of the ridge segments.

Fig. 80 House plan in tr 15 with pottery recovered from associated features.

These are the places where materials were consistently recovered from later prehistory to the Early Medieval period.

An interpretation of these types of deposits, especially in pits, has been suggested whereby the earthly landscape is regarded as a representation of the celestial landscape, during the period 700 BC to AD 350 (Therkorn 2004). Interpretation of five single farmstead sites[42] and one offering site, situated on either side of the Oer-IJ, took indications of Germanic seasonal ritual in the features as marking the high-points of the economic year.[43] The earthly landscape is proposed to have marked by the digging and filling of pits through the habitation span of the single farmstead sites, replicating constellation patterns whereby stellar movements were used as time tellers for high points marking the year. Orientations were in-built by the patterned pits, corresponding with the same constellations in the sky at the horizon before dawn.

A general conclusion stemming from the marked landscape of the settlement area is that it can be likened to the three areas of the heavens: the two areas to either side of the Milky Way, and the Milky Way itself.[44] Briefly, a scheme of inversion was put forward for the reason behind digging and depositing materials in pits whereby the view downwards replicates the view upwards, to the stars, which were seen as 'holes' in the shield of the night sky for which there are later textual indications. The pit depositories have been interpreted as containing materials mainly to be used in the afterlife, with some admixture of remains from ritual activities, or 'ritual rubbish', after Ross and Feachum (1976).

This division is suggested as a hitherto unrecognised, though very probably one of the main structuring facets of the long-recognised tripartite ordering of life and spatiality in Indo-European tradition (cf. Mallory 1989). Though this evident tripartition of space is rarely considered in Indo-European studies, it does help clarify a number of facets of mythology and the place of action described in myth (cf. Therkorn 2004, 221 – 245). This constitutes a bridge between cosmological space, mythology and directionality, with time succession, which has been discussed in depth as an earthly aspect of cosmology (cf. Lyle 1990), though without the physical, 'visibility' factor of a division of the sky as subdividing time into shorter cycles. Haudry (1987), for instance, does consider the three celestial areas, but he does not address the associations with practices carried out on the earthly landscape.

This section attempts to pull some of these diverse aspects together for the context of the Broekpolder, considering texts and actual indications of the materiality expressed through texts. 'Ritual' is regarded as having been part of cosmology.

While the interpretation came from the comparison of the sites in Noord-Holland, and flowed from seasonal and ritual indications suggesting concepts of regeneration, the dual nature of the deposits have been interpreted as revealing conceptions of the afterlife. This was also specifically noted much later. On a historical note, then, Snorri Sturlusson made the following remarks in the 13th C, as premise and practice:

> Odin set in his land the laws which had formerly been upheld by the Asa folk; thus, he bade that they burn all the dead and bear their possessions on to the firebale with them. He said that every man should come to Valhalla with such riches as he had with him on the firebale and **that each should use what he himself had buried in the earth**. They should bear the ashes out on the sea or bury them down in the earth; for a renowned man they should build a howe as a mark of remembrance, and for all men in whom there was some manliness they should raise standing-stones, and this custom held good for a long time after. Near winter's day they should sacrifice for a good season, in the middle of winter for a good crop, and near summer's day it was the sacrifice for victory. Over all Sweden they gave Odin scot (or taxes) for every nose, and he would protect their land from war and do sacrifices for them for a good season (Snorri Sturlusson, 13th C *Heimskringla, Ynglinga Saga* 8; trans. Monsen 1990, 6; emphasis added).

For some reason, this text, and many others indicating similar landscape phenomena are not well known, although clearly they could advance the pit and offering site discussion, as well as clarifying the nature of and reason behind standing stones. The defined ordering is spatial, and temporal, and part of the landscape.

Importantly, the time of ritual is indicated: Monsen notes the times as 'mid-October' for Winter's Day, mid-January/ Yule for mid-winter; and mid-April for near 'summer's day', although he does not state whether he took more modern Norse festival dates as reference points for assigning these periods. The Noord-Holland regional study, however, places ritual at around the beginning of the slaughter period (early November), with the rise of the constellation Hercules/Thor; the winter solstice (Monsen's mid-winter) as important for the entire coming year and the rise of the Pegasus – the Horse –

42 The sites date from the Early Iron Age (Velserbroek-Hofgeest), Late Iron Age/Early Roman Iron Age (Uitgeesterbroekpolder 18), the early Roman Iron Age (Velserbroek-B6) and the later Roman Iron Age (Schagen Muggenburg-I & III).

43 For Celtic regions, and the major Celtic calendar festivals at crucial moments in the agricultural cycle cf. Ross 1996.

44 These areas are textually marked in the Eddas, it has been suggested, as Utgard, Midgard and Asgard *(ibid.)*.

constellation; and the summer solstice, highly important as it falls at about the end of the calving period, rounding off the livestock birthing season. This economically important time was marked with pits set out in the pattern of the head of Taurus, interpreted for the Germanic situation on the basis of deposited materials and texts as a 'cow', rather than a bull. The fourth pattern – the Great Dog/Canis Major –references the harvest period. These 'times' are given by orientations to the horizon on the heliacal risings and settings of the actual constellations (Therkorn 2004).

At the sites from later prehistory that were analysed, the winter solstice is most forcefully 'stated' through settlement features, and the precedence accorded to horses, probably in reference to an Odin-/Wodin-/Wotun-type deity. This is not found in the Broekpolder, and the only patterning yet found – that of the Early Medieval offering pool and smaller water feature (tr 41, 48) – is probably referencing a Donar/Thor type of deity.

This section considers various depths in comparing traces in the Broekpolder with this 'model', regarding deposits of human bodies (or parts thereof), livestock burials and buried materials, including parts of humans and animals, as features marking the landscape. The old topic of circles engraved into the landscape will also be approached through this framework. The latest features – the 'offering pool' and the large well – conclude the section.

3.4.1 *Human remains*

Human remains were recovered from dug features and watery areas. Much of the human bone was recovered as fragmentary elements. The human bone was found in 24 features, of all feature categories, including 9 pits. There were six human single elements from the offering site, and in the same area, the partial skeleton of an infant, 3 – 7 months old (see 2.11.5). The two concentrations of cremations have been described under 2.9.1. Relatively, the distribution of human bones in feature types is very similar to the percentages shown for the domesticated species (see section 3.2.2; App. 4).

Single body parts were regularly used as pit deposits, both around 400 BC and in the Roman Iron Age. Short curved ditches were the only other type of dug feature where human bone was deposited apart from pits. The human dead, at least as token deposits, take their place in areas used for the activities of daily life, particularly when deposited in pits. In the MIA period, the remains were situated in pasture and later arable land, and there is one other context for human remains, also in the east, in the form of the short ditch at the border between high and low ground. The two recovered cremations from the RIA period were deposited in arable land, while non-cremated bone was found as pit deposits in the vicinity of the dwelling. It is unclear whether the disturbed bundle of child bones was deposited in a pit disturbed later by the Early Medieval (visible) bordering/structuring feature by the offering pool, or if it was deposited much later than the date of death. Right through to the most recent prehistoric traces, therefore, human remains were deposited at focal points or near/on eastern borders of economically exploited areas, while the single human bone elements from the EMA were recovered in the low-lying pool.

Marking places with single human bone elements was a regular practice, and it is certainly known in other areas (e.g. Hessing 1993,Ter Schegget 1999, 204 – 205, Bradley 2005, 169 – 171). Unfortunately, for the Netherlands, no analyses have yet been performed on isotopes or other indications of origin; currently, the usual assumption is that remains are from inhabitants of the settlement area in which they are recovered. Obviously, although there was a practice of regularly depositing human bone in the Broekpolder, most of the humans are absent. The problem continues in the issue of why there are no cemeteries in the coastal area of the Netherlands. We wholeheartedly agree with Woltering (2002, 363, and note 608; Hessing & Kooi 2005, 633) that none will ever be found. If features regularly include human elements, and the nature of the features can be interpreted, this at least gives us some notion of religious belief/practice, rather than relying (on the basis of what is probably a more Christianised mentality) on burial grounds. The answer could simply lie in the coastal position. The connection also has to do with circles (3.5.4), without human remains, found at many sites situated along the coast.

3.4.2 *Animal burials*

The emphasis on cattle as an economic resource is also a facet of ritual, and for the sites of the region, interpreted also through yearly life and death cycles, particularly the cyclical rise and fall of the constellation of Taurus, interpreted as a 'cow' on the basis of Germanic texts. The heliacal rising slightly after the summer solstice, and the heliacal setting – dying – at the beginning of the slaughter season in early November, frame important times of the economic year.

As usual, there are more cattle burials than any other, followed by horses, which could be related to the cycle of the constellation Pegasus/Horse, as suggested for other settlements. In both cases, they could be sacrifices. Very few prehistoric burials were however recovered in the Broekpolder. Animal burials parallel the situation with human burials, in being too few in number even to represent a natural life cycle, and as with humans, single elements of animals were also found in the same types of feature in which human bones were deposited. While the two types of deposit are categorised as two completely different phenomena, perhaps there should be a greater emphasis on what the two types – burials or single elements – may indicate in terms of marking the land, and of how the afterlife was perceived.

As with the human dead, secondary manipulation of animals is a common phenomenon in all other areas of the Netherlands and Europe. Legs and skulls are replaced or taken away, whether it be here in the Broekpolder, or further afield. This was a widespread tradition. In the Middle Iron Age in northern France exactly the same elements are missing from graves, and are found in other graves, in settlements or sanctuaries (Diepeveen-Jansen 2001) right across Europe (Bradley 2005, 177 – 180) to the East European steppe (Mallory & Adams 1997, 138). The tradition in the Broekpolder carries on into the post-Medieval period, where epidemics may certainly account for many of the cattle burials, but not for the material inclusions, or the removal of limbs and heads which were placed in the grave in various positions, as described in section 2.10.2. The post-Medieval tradition is basically the same as the prehistoric. The secondary manipulation of carcasses is possibly related to concepts of fertility, traditionally linked to the cow and associated with field systems and grazing land.

The use of more or less complete pigs, and pigs with missing elements, as deposits differs from other sites in the region. This occurred during the MIA, a period that has not been well researched in the broader region, however. To the north of the Oer-IJ channel near-complete, very young pig deposits are known only from the 3rd and 4th C AD, recovered from pits also containing complete pots and wooden objects.[45] Even though the pig deposits buried in pits containing other complete buried objects in the Broekpolder do contrast with other sites, they are not overly represented, especially compared to cattle bone elements deposited during the Middle Iron Age. The deposition of beasts of different species in the context of burial traditions, though ritually inspired, is not a reflection of their relative importance in the herd.

3.4.3 Pits: buried materials and regeneration

Filling pits with deposits of objects used in daily life and remains thereof has been interpreted as part of a belief system involving storage of goods for the afterlife within a conception of a lifetime cycles from the worldly to the heavenly. This interpretation does not in fact differ greatly from that assumed to be the main idea behind depositing 'grave goods/gifts' with a body – a practice not known in the region and indeed, as mentioned above, graves are in any case almost non-existent in later prehistory. The passage by the Icelander Snorri Sturlusson quoted at the beginning of this section – *'that each should use what he himself had buried in the earth'* on arrival in the heavenly landscape – might apply to these types of pit deposits. The Europe-wide discussion of pits indicates the very broad occurrence of the phenomenon, if not the belief system behind it.[46] If one has made deposits during one's lifetime, there is no need to deposit good/gifts at the point of one's death. Certainly with the wooden objects and unworked wood, an added dimension of what people were depositing is given.

The extensive interpretation of pits for other parts of the region (Therkorn 2004) will not be gone into in detail here. Suffice it to say that some points therein made, cannot be made for the Broekpolder, for reasons unclear at this time. It is however still very possible that the tiripartite division of the year, general to Indo-Europe, applies to the times of the year marked by ritual of digging and filling pits here in the Broekpolder. They are also the highpoints of the economic, subsistence year – in the beginnings (winter solstice), of the end of the livestock birthing season (for cattle, near the summer solstice) and at the slaughter season, early November. There is some evidence that some of the pits in the Broekpolder were reopened to add more deposits, which is something making it difficult to read the deposits that were recovered. Along with the tripartition of the ritual year, the tripartite division of the physical landscape is evident, but will be gone into more fully with the time-telling aspect of the orientations of the offering pool (and see *fig. 81*).

Another aspect hindering the analysis is that the Late Iron Age and Roman Iron Age pits cannot be assigned to a particular generation, as they could for other sites in the study. The contents of the pits are however certainly similar to those

45 Schagen-Lagedijk (Therkorn 1988) and Schagen Muggenburg-I (Therkorn 2004, f223).

46 For examples over the years see: Becker 1970, Wegewitz 1955, Ross & Feachum 1976, Hill 1995, Chapman 2000, Kok 2008.

analysed previously. The MIA pits in the central section are perhaps most interesting, both in terms of their content and for the fact that they illustrate the marking of places over a wide area of pasture and arable land near to the farmhouse. The round form of the pits, and the carefully chosen contents, including complete objects, is very reminiscent of the pits at the Early Iron Age site, Velserbroek-Hofgeest (Therkorn 2004). There are also signs that these pits were reopened and further deposits made.

In contrast to the mainly grave-shaped pits at the 4th C Schagen sites, to the other side of the Oer-IJ, the Broekpolder pits from the Middle Iron Age to early Roman Iron Age (c. 400 BC to AD 100) are round. While the grave-shaped pits at Schagen were interpreted as 'burying time' through the year, leading to a clusters of three 'time graves' per year, there are enough clear instances at least for the earlier period in the Broekpolder to suggest ritual moments throughout one year centred on one pit. Time cycles would then be represented upwards, in the sense of vertical placement, as at least some pits were reopened through partial re-digging and the addition of further deposits, followed by backfilling. The later pits (2nd C) recovered in trench 49 show some grouping into threes, but the patterns defined for the Schagen sites, with a characteristic deposit per pit within each group of three, could not be defined for the Broekpolder pits.

Sameness includes the backfilled quality of the pits, and certainly there is again no evidence for any of these late prehistoric pits having been open for any length of time. The various complete deposits (animals, objects) along with broken bits and pieces of daily life–in the body parts of animals and pots are all very similar. In the Broekpolder, more work than previously was done on the samples of the deposits in pits of cow pats and/or intestinal contents (cf. 3.2.4). Perhaps these could be conscious deposits, and perhaps 'Winter' would be implied by those characterised as fodder remains, eaten by cattle when stalled inside for the winter. Or, the dung could have to do with fertility of arable; and/or wattle dwelling walls are often assumed to have been covered with a mixture of dung and straw and perhaps this is a function referenced. Number 13 of *Indiculus superstitionum et paganiarum* cited in Chapter 1 mentions dung used evidently in divination, although how this could apply is certainly unclear. Uneaten fodder was also delineated, and this could also refer to putting materials on deposit for a future. The amount of materials and their state will gain more attention in the future, with more complete comparison to other pit complexes.

3.4.4 Back to circles: a simple sign

The shallow, narrow gullies dug in the form of circles at northern coastal sites from the Bronze Age onwards have been a subject of debate for decades. Because of their occurrence during the MIA and RIA through to the Medieval period here in the Broekpolder, we will briefly address the subject again, but then in relation to burials, buried materials, and as another way of marking the landscape with an engraved 'sign', in the possible context of cosmology.

Where known (see below), these features occur mainly in arable areas, which is of course the reason why functional interpretations were put forward in the first place. These have entered the mythology of archaeology as somehow a settled issue. A brief summary of the actual indications that these features have anything to do with draining haystacks would therefore be in order. In brief: circles can probably more appropriately be linked to, or seen as interrelated with, marking and burials, and in this respect, we note again the striking fact of the absence of urnfields in the province of Noord-Holland. Only the occasional cremation or inhumation has been found in the coastal area of the northern Netherlands in general (cf. Hiddink 1999). Mortuary practices are effectively not understood for the Middle Iron Age through to the native Roman period, because of the absence of cemeteries, and only the occasional find of a burial or cremation, and single human bone elements in pits. Spatially, this accompanies the general absence of circles at settlements in inland areas. These areas do, however, have cemeteries with cremations surrounded by dug features of circles.

Circles posited as drainage gullies around temporary stores for cereal crops in coastqal area of the Netherlands is an interpretation based on botanical remains in only a few features at the Bronze Age settlement site Het Grootslag in Bovenkarspel, Noord-Holland (Buurman [1979] 1996). Concentrations of carbonised grain were found in one circular gully and in one of the pits forming a circle. These deposits included unthreshed grains and stems of *Hordeum vulgare* and *Triticum dicoccon*, along with a variety of weeds, some edible. Two concentrations were also found in four postholes belonging to two dwellings, and these consisted of threshed grain. Another concentration was found in a ring gully at the Hoogkarspel Tolhek site. The Bovenkarspel samples prompted

the somewhat mythical idea that these circles were definitely for draining haystacks, but this is the extent of the reasoning:
The concentrations of grains suggest that in the circular structures and in the houses piles of grain were present. Mice must have been attracted by these grain piles; in the samples, apart from the grains, a large number of bone remains of various species of mice, especially the House Mouse were found. …To understand the meaning of these grain piles in relation with their archaeological context, not only the composition of the samples but also the state of preservation and the dimensions of the grains have to be investigated (Buurman [1979]1996, 212).

The carbonisation remains unexplained in both contexts. Buurman summarily dismisses one of the better, earlier, suggestions by Hatt (1953) relating to similar features in Jutland, based on a pit within a circle containing charcoal, in combination with ethnological parallels:
…Hatt suggested that the ring ditches had a function in a seasonal agricultural rite. He puts forward the theory that they may have enclosed interments of the last sheaf. According to the evidence here presented this ritual explanation can be rejected' (Buurman [1979] 1996, 217).

The only 'evidence' actually presented is that cited above – that carbonised grain was deposited in two different types of feature context, both settings where people had something to do with 'grain'. Buurman relies on historical practice to argue the 'haycock' hypothesis, but these were not accompanied by dug gullies, she admits.

Ethnohistorical and ethnographical examples are cited in a later work to show how various people stack harvests in fields, but again there is no parallel for the digging of circular gullies. In this later article, Buurman regards it as less likely that the gully was dug to provide drainage and soil for a low platform, as stacking would be difficult if the gully had already been dug. Citing various works, her conclusion is:
Yet it is well-known that piled-up grain, threshed or unthreshed, was always placed [on a] layer of vegetal material (branches, clippings, straw, chaff, planks) or stones in order to keep the base of the stack dry and ventilated' (Buurman 1989, 29).

Hundreds of circles, drawn or in the form of small pits dug in circle formations, have been excavated and only four were noted as having burnt grain deposits. Again, why the grain was burnt or why it was placed in pits or gullies is not addressed.

Woltering (2000, 59 – 71, 101 – 108) provides a summary of the occurrence of this phenomenon and a balanced discussion of various interpretations of pit circles and circular gullies. He does so on the basis of dozens of features on the then open heath and at later farmstead complexes dating from the Middle Bronze Age to the Late Iron Age at Den Burg on the island of Texel, Noord-Holland, where there were more than 170 pit circles on 11.5 hectares. The economic functions put forward by various authors are discussed and all found to be unlikely for a number of clearly argued reasons. In connection with a possible magico-religious significance, Woltering notes the association with barrows, and suggests they 'could have functioned as a starting-point for pit circle construction'; postholes surrounding some of the pit circles were interpreted as traces of an extra enclosure made of stakes or wattle fencing. Arguments against a ritual function include the fact that they are not clustered as circular structures in urnfields and that heathland was first ploughed during the Late Bronze Age or Early Iron Age (*op. cit.* 71). Any landscape that had been marked through ritual would not have been ploughed is the assumption.

The 129 circular, oval and squared gully features on Texel that Woltering discusses date mainly from the Early to Middle/Late Iron Age; dating does extend into the later periods, but circles occur only sporadically from the Roman Iron Age into the Late Middle Ages. They do, however exist for these periods, as in the Broekpolder.

Woltering draws a distinction between two main types of circular features formed by dug ditches and gullies. The former have larger diameters, are wider (up to 1.5 m), deeper (up to 1 m) and contain many finds. These substantial ditches occur in the second half of Middle Iron Age, and are associated at times with four- and six-post plans of small buildings or platforms within the ring ditches. Due to the quantities of potsherds in the fill, Woltering considers that they were situated in farmyards associated with wetter conditions beginning at the end of the Middle Iron Age, and he suggests they were so wide and deep to keep out vermin. But: 'it seems unlikely that these circular ditches served the same purpose as the smaller circular ditches, dug into arable fields outside the settlements' (*op. cit.* 105). This second type on Texel, similar in all respects to those found in the Broekpolder, are formed by

shallow gullies, with no finds, and are dug in arable fields. They are never found enclosing post structures.

Woltering sums up the occurrence of the features. In inland areas of the Netherlands, circular gullies are associated with cremations at urnfield sites. Circular gullies unrelated to funerary practice – i.e. not enclosing cremations – seem to be confined to Noord-Holland. 'Further inland, on the sandy soils of the eastern, central and southern Netherlands, they are not identified with certainty' (*op. cit.* 105). Outside Noord-Holland, they are known only in Jutland, dating to the Roman period, and on the island of Sylt (Germany) from the Middle Bronze Age, Iron Age and Roman period. The squared ditches, however, lack parallels. Inland they occur only in urnfields. At the Texel site, a chronological progression is seen from round to squared, whereby the squared shape begins around the second half of the Middle Iron Age, in addition to circles. The rather vaguely squared Broekpolder example is Late Iron/ Early Roman period (*fig. 19*).

Woltering (2000, 101 – 108) discusses various possibilities – including enclosing corn stacks, haystacks, straw stacks, reed stacks, grass sod composting/dung processing piles – for the function of the circles on cultivated land. He concludes his discussion of the Texel circles with: '…if we rule out explanations in terms of magic or religion, their location in the fields leaves few alternatives except the processing or storage of certain types of produce for human or animal consumption' (*op. cit.* 108).

It is not clear if Woltering actually rules out 'magic or religion' as he does not discuss it in connection with circles in cultivated area. Two of Woltering's possibilities can at any rate be ruled out for our examples. Processing dung and sods for compost would have left traces in the humus content of the fill. One good shower would wash loose organic material out, forming lenses in the gully, and none was found. Nor were any found in the circles Woltering describes.

Bakker (2004, 97 – 120) remarks that he is (still) convinced circles were dug to facilitate drainage around corn stacks. Although he does not exactly argue why these must be features marking corn stacks, he has done much to illuminate various aspects and collate studies on the phenomenon, as well as summarising the findings of author-archaeologists searching for the meaning behind them. Bakker's overview can be briefly summarised: Despite extensive research of ethnohistorical practice, including that shown on iconographic materials of agricultural scenes, only one instance was found of a ditch or gully dug around a haystack. These were dug in modern times, after the draining of the Wieringermeer Polder, when storage sheds were not yet available. Very deep ditches were dug around very large corn stacks. Despite this lack of any pre-20th C indications, however, Bakker still maintains the prehistoric examples were dug only for a functional reason: draining water.

The 'functional' arguments always break down when it comes to the question: if these features are so very useful for drainage, why were they limited to certain periods? And although a mortuary association has been suggested for inland sites, these same sites with dug circles surrounding cremations also include numerous circles *not* surrounding cremations (cf. various site plans in Gerritsen 2001). In other words, circles were evidently drawn in urnfield cemeteries, but not specifically for surrounding cremations. Since the cemetery aspect and bodies in the form of cremations are the focus of study, circles apparently surrounding nothing gain little or no attention. It would seem more likely that, since the context of 'ritual' is the cemetery, circles not surrounding cremations must also be a form of ritual-contextual marking in themselves.

The varying number of circles per settlement site is also revealing. The authors of the studies mentioned above do cite settlements where only one or very few circles were dug. People at these sites evidently had the tradition, but the digging of a circle was a rare occurrence. This also apparently applies to the Broekpolder. In the central ridge segment, there are LIA/RIA features spanning at least 350 years, but there are only 19 circular gullies. Following Bakker and Buurman, are we to assume that a circle was dug about once every 18 years, on average, to drain water around one haystack on one rainy day during the harvest?

Alternatively, one could regard the digging of a circle as a type of special event marking the land, while also marking time, perhaps in the form of a natural occurrence, having in the first instance an association with 'circle'. Domestic and ritual cycles associated with the sun and moon are attracting more interest as a means of interpreting layout (cf. Bradley 2005, 169 – 171, Williams 2003, 239 – 242); it might be wise to start widening the perspective of simple types of features as marking certain occasions, for example, whether eclipses or some sort of atropoteic meaning. The preponderance of

openings towards the east/southeast might suggest the season of sun's rise–thus, March, or September to winter solstice rise. The directionality is similar to the orientation of openings in some urnfields (cf. Tol 1999, 99).

The dichotomy that arose in the Netherlands in the mid- to late-20th century between symbolic aspects and functional usage provides food for theoretical discussion. However, taking an inclusive approach might be useful, seeing 'circles' as part of millennia of tradition, in different styles and using various materials and techniques, including engraving on/in land. Again, it must be emphasised that 'urnfields' are unknown in Noord-Holland. However, circles do exist in areas used mainly for growing crops and grazing livestock in the Bronze Age, and sites with one or more circles that existed into the Medieval period. There are as yet no indications from ethnohistorical practice in the Netherlands that circles were dug around haystacks.

While there is no evidence (except the 20th C Wieringermeer example mentioned above) of haystacks within circles, there are numerous examples of the importance of the circle as an ancient symbol, used variously in rock carvings, stone circles, and very large post settings as central places (e.g. Goseck, Saxony-Anhalt), and also as a way of marking farming areas, of which the Noord-Holland circles are also examples.

Though we have not performed an extensive study, we have noted that further afield, ethnohistorical use of circles in fields is a known practice. Use of the circle symbol in Slovakia, for example (Roman 1990), has been found in various materials and places. Farmers made circles of twigs plaited to resemble a chain. Circles were drawn with ashes or sand, marked with water, and painted with whitewash, charcoal or chalk on stable doors. Poles or stakes were planted in the ground in a circle. In these practices, the purpose of the circle was to protect man and property from evil. Circles were most frequently used in fields where animals grazed and crops were grown. They are also associated with averting lightning. While these types of practices may be pagan holdovers to a certain extent, there are also Christianised examples. Dewilde (1983, 47 – 49) mentions the tradition of marking flax fields in Flanders in historical times with a cross before or after sowing. The figure was made by slapping a spade onto the field, forming the cross as a shallow depression. In some areas the field was marked with four palm branches at the corners. These Christian symbols may well have replaced others. Dewilde (1983, 43) also cites a German historical practice of placing sticks in the flax field 'for influencing the gods.'

Even if it is accepted these circles are associated with areas where some type of plant material was stored, there is still not necessarily a 'functional' (i.e. mechanical) explanation, such as gullies dug for drainage. The either/or debate is in itself outdated. A dual alternative might be more appropriate, whereby temporary haystacks (or whatever) were also marked with the sign of a circle, which itself has a meaning in the context of ideological concerns. Perhaps the best reason for regarding them as having symbolic meaning is their occurrence at inland sites associated with cremations. Religiosity is not however confined to mortuary practice. The fact that circles consistently surround cremations in earlier urnfields (with or without urns) is the best argument that they did have a singular importance for the people of the period, and later. In the Netherlands, there has certainly been more discussion of these circles on arable land than of circles around cremations, as if there were something 'natural' about surrounding cremations with circles throughout much of western Europe in certain periods. Some of those on arable land have clear openings, as do urnfield circles, and these must be regarded as consciously made at directional points, which were probably also imbued with particular meaning.

Marking out a space was associated with intent, deliberately engraving the landscape with a sign, perhaps for the purpose of reification. Exactly the same intent could also be associated with engraving circles around cremations in urnfields. The use of circles in fields and pastures noted in the Slovakian example is associated with 'protection against evil', but is an example of folklore in Christianised Europe. Of course, example and meaning cannot be projected back to the pagan past. Inverting meaning from the pagan to the Christian era, one might perhaps start with a general attribution of 'opening towards welfare/good', as being the opposite of 'protection against evil'. Various possibilities might be associated with using the same sign in both mortuary practice and economically important areas like fields and pastures. Since so much in mortuary practice is attributable to belief in eternal life, the afterlife as everlasting life, both a field containing dead bodies (urnfields) and grain fields/pasture were therefore similarly marked with the unending, 'everlasting' circle, symbolising fertility and the regeneration of crops and livestock.

In the Broekpolder, excavating expanses of arable land did uncover the two cremations contemporaneous with at least some of the circles. Cremations are therefore indirectly associated with circles here, but inhabit used space. Both features – circles and cremations – are directly associated with a setting on the edge of arable land and, as suggested above, the place where some of the winter fodder for livestock was obtained. The circles are somewhat to the east of most of the traces. The area further to the east was the main area of pastured livestock in the dryer months, and to the west of the arable area there was more pasture. Thus, cremations and circles are situated in a higher-lying zone between, but linking, the physically lower to the higher part, in the horizontal plane as annual cyclical use of areas exploited for subsistence.

These circles, representing an intentional signing of the landscape, could very well have replaced the circular, more deeply engraved pits from the Middle Iron Age. All of the MIA pits were dug as large circles. Erosion had occurred beyond the depth of circles dug between the MIA and LIA, so we cannot say with certainty that pits were replaced by circles, and then circles by pits. Fewer pits with 'interesting' contents were in any case dug in arable land from the Late Iron Age through to the earlier 1st century AD; pits appear to have been dug closer to the dwelling at that time (cf. tr 49). This is also a general characteristic of sites in the region. In terms of ritual viewed from a longer-term perspective, engraving one's economically important landscape with circles could simply be a (later) facet of ritual action that replaced digging and making deposits in large circular pits.

Finally, post and stakeholes are most regularly associated with the circles. They do not often form patterns, and cannot easily be interpreted as structures such as granaries. They could simply be single posts erected to mark an area. As posited in the offering site discussion below, the dozens of stakes and posts in fields could be related to part of an Early Medieval homily rejecting various actions, including the pagan practice of fixing 'coloured rods in the earth by digging' (quoted in Meany 1981, 12), and the offering pool and large water feature in the Broekpolder are examples of this. The interpretation of rubbing post in wood and whale bone, the first with an accompanying deposit in a small pit, extends the Broekpolder tradition into the historical period.

Considering the long-term view of the Broekpolder circles, the translation of tradition is visible in the Broekpolder from the Middle Iron Age onwards. In the Middle Iron Age, there were circular pits, with wood deposits; in the Late Iron Age/early Roman period there were fewer pits, but there were circles, engraved in the earth and marked with wooden stakes/posts placed in the vicinity, protruding above the ground. Mainly round pits nearer to the farmhouse were used for deposits in the 1st/2nd – 3rd C AD. During the Medieval period two large circles were dug in the central ridge section, and there were very few pits. It appears therefore that there is a connection between burials of animals and humans, pits and circles. Rather than regarding these as separate categories of features, a case can be made for a 'ritualised' settled landscape, with differentiation linking areas of economic importance by marking the actual landscape, in a way that metaphorically reflects the celestial landscape.

Assuming 'religion' to have been the motivating force, the spatial connections reiterate ideas of continued life, and signs of ideas of the afterlife, time and fate[47] at the site of use, to which this statement by Williams might apply:

> Their aim was to situate social reproduction in the timeless and unchanging cycle of agricultural production. If people could show that they were as permanent as the land upon which they lived then possibly they could claim that land with equal permanence and, there-after, keep it as their own (Williams 2003, 223).

In Noord-Holland, there are no later prehistoric 'special purpose sites', but it appears that settlement sites are imbued with various features referring to ritual, and the landscape of cosmology. The offering site from the Early Medieval period is however a 'special place', where ritual activities came together.

3.4.5 Offerings: materials under water

Each low-lying area in the east, along the three ridge segments, is characterised by deposits. The deposits of wood, a spike/nail and a fibula in the central segment *(fig. 17)* probably date from the 4th C AD, a period not represented in the house plans in the areas excavated. The few deposits are however the same as those that feature in the large offering pool dating to the 6th/7th C, also a period from which no house plans have been recovered. It can be assumed, on the basis of other finds, features and arable layers, that the area was settled, and farmhouses were possibly situated as close as the area covered by the monument. As far as was understood at the start of the Broekpolder excavations, when lower-lying areas in the region

47 To draw a parallel with the earliest Greek philosophers on circles (Onians 1991, 247 – 251), and with the later ethnohistorical texts mentioned above.

are excavated adjacent to housing, deposits tend to be present. In the Broekpolder, these lower-lying areas were deliberately excavated quite extensively precisely because of the few indications known from other sites in the Oer-IJ area.

Disregard for lower-lying areas in settlement archaeology before the 1990s led to only a few such areas being recognised in the Netherlands, in contrast to the many offering sites known in neighbouring countries, and up through Scandinavia. The subject is now being addressed more fully.[48] Considering all the types of materials deposited, as well as the orientations suggested by the structuring elements of the pool and the large watery feature, we arrive at a deity ascription suggested by textual evidence on materials, to a Hercules/Thor figure. This also allows us to pinpoint the time of the year when deposits were made in the watery features.[49] In this section, therefore, the Broekpolder 6th/7th C pool with deposits (tr 41) and the large dug water feature (tr 48) are interpreted on the basis of the materials recovered, and indications as to meaning and association through comparison with historical texts, which also mention deity attributes. Built-in orientations structuring both watery features are also linked to celestial phenomena as we postulate how and in which season the deposits were made. This approach is based on the framework defined for earlier sites, interpreted in terms of landscape and cosmology, which also include two sites with deposits in watery areas.

Remarks on low-lying offering sites in the region

Prior to the Broekpolder excavations, two areas once open water at sites in the micro-region had been interpreted as offering sites *(fig. 2)*: Uitgeesterbroek Polder-18, 1.5 km to the north of the Broekpolder site, on the opposite side of the Oer-IJ channel; and Velserbroek, site B6, 7 km to the south, where a large channel was dug in the peat to form a long pool in later prehistory. Another candidate for the status of offering site is certainly the creek bedding, containing numerous types of materials, including human remains, that runs alongside the settlement of Uitgeest-Dorregeest (Woltering 1982, 1983; De Koning, forthcoming). Kok (2008) performed a literature and findspot search which suggests many more offering sites are indicated in the Oer-IJ region, and predictions have been made as to where these types of sites might occur.

In contrast to the Broekpolder, the materials deposited at the Uitgeesterbroek and Velserbroek sites were thrown into open water from northeast to southwest. At the first site, the period of use seems to have been limited to two generations in the 1st C. AD. The find categories were limited to highly corroded coins and fibulae, though there were also two complete quern stones. Preservation was very poor, and bone and other organic material, if deposited, had not been preserved. The dug and redug ditches and gullies at the border zone between 'land' and water were however similar to the Broekpolder.

During the late prehistoric/Early Medieval phase at the Velserbroek site, materials were deposited in a self-dug channel which became open water, through peat winning. People stood on the eastern bank of the dug channel and threw materials, including many 'spears' of juniper, towards the southwest. Metal objects – including fibulae, coins, arm rings, and fittings – were also deposited, as well as wooden objects, and some animal bone, including antlers and a horse skull. The combination of materials selected for deposit, especially spears as the only form of weaponry in wood and metal and the overrepresentation of 'horse', in the form of bone and harness fittings, is linked to the god Wotan/Wodan/Odin, as he was known in other areas. Interpretation of the time of deposition is based on the directional indications built into the constellation pattern of pits forming the figure Pegasus/Horse, adjacent to the dug channel, in line with analysis of other sites in the region. The end of December is indicated, possibly the setting winter solstice sun, as well as orientations towards the rising of the constellation Pegasus/Horse in January (Therkorn & Oversteegen 1994, Bloemers & Therkorn 2003, Therkorn 2004). The deposited materials and directional aspects are in contrast to those of the 6th/7th C Broekpolder pool.

The dating of the larger Velserbroek offering site is somewhat uncertain. In light of the dates from the Broekpolder, the dating of Roman goods cannot be taken at face value. The latest Velserbroek Roman coin in the area of open water was from the late 2nd C. Although many of the 1st C Roman finds have been linked to the use of the Roman harbour works at Velsen, and even use by 'Roman' soldiers (Bosman 1997), this was based only on the Roman manufacture date. More ^{14}C dates are needed to address the problem at the Velserbroek site, and this will be the subject of future work.

The number of metal Roman imports at the Velserbroek site was substantial, but there was a distinct lack of both Roman and indigenous pottery, and this was also the case at the Uitgeesterbroek site. This contrasts with the later Broek-

48 For various periods and different perspectives, see e.g. Van der Sanden 1995, 1997, 1998; Fontijn 2003, Van Vilsteren 2004, Van den Broeke 2005, Kok 2008.

49 While deity ascription is common in offering site interpretation in northern Europe (cf. summary in Kok 2008, Chapter 2), little consideration appears to be given to the directional aspects, or to anything but some orientation towards the sun (e.g. Carlie 1998). Initial plans were abandoned to compare orientation and the direction from which materials were thrown, one of the facets known for the region, with other offering sites of northern Europe. It seems this approach has never been taken, and in many cases, the place where people stood to deposit materials has seldom been excavated. Furthermore, the published results do not allow comparison of species of wood and distribution of species through bone (cf. Kok 2008).

polder offering pool, where both imported Roman, native RIA and Early Medieval sherds formed part of the deposits. The late deposition of Roman materials in the Broekpolder pool has a parallel, although the context seems to be settlement features rather than an offering site.

The deposit of Roman materials in later contexts

The length of the use of the pool in the Broekpolder is important and a note on the much later deposit of Roman materials in this watery context is in order here. The Broekpolder pool is the second site in the northern Netherlands with this very noticeable divergence between the Roman import manufacture date and the date of the feature context.

The site of Wijnaldum, Friesland, was the first case established. There, Roman materials including tiles, pottery and metal, including coins, were recovered from an Early Medieval settlement context. remarked of the Wijnaldum coins:

The difference between the date of production and the date of context sometimes amounts to several decennia occasionally even more than a century. In extreme cases the difference may even span more than five centuries! So far, no evidence for this phenomenon has been found in the Netherlands apart from Wijnaldum (Van der Vin 1999, 186).

In terms of other metal finds:

Only a small proportion of the Roman bronze finds was found in a context dating, on the basis of native pottery and stratigraphic considerations, to the Roman Period. The majority of Roman bronze finds, militaria, fibulae and bronze vessels were found in a definitely post-Roman context. These objects must be regarded as scrap metal for recycling, in view of the almost ever-present cutting marks (Erdrich 1999, 180).

This explanation could certainly apply to the metal recovered, but it does not account for why many of the Samian sherds are also from an Early Medieval context, apart from the suggested selection for the shiny red colour (cf. Volkers 1999), or other types of Roman sherds and tile fragments with a reliably dated context (cf. Galestin 1999). This subject certainly warrants further study in light of the Broekpolder offering site, as more interest is now being shown in actually dating contexts, rather than assuming the date to be 'Roman Iron Age' on the basis of the date of manufacture. A good point of departure would be other available types of information such as that presented by Bradley (2000, 2002), and consideration of how people in the past dealt with their past. We have also noted (section 3.3.3) that the sediments in the offering pool included re-deposited native sherds which were also earlier than the 6th/7th C, and it may be more difficult to imagine that these were 'heirlooms'.

The coin with the image of Hercules (and cf. his Thor connection, below) may have been recognised, and have harkened back to the Roman period. The other legible coin is of a standing Aequitas holding scales and a cornucopia. Aequitas was a minor goddess of honesty and fairness in contracts and negotiations: fair trade, fair dealing, in other words. If the meaning of the coin lies in the illustration, both may have been selected and saved for deposit because of attributes and of parallels with seasonal, economic activity. But did the people who deposited the coins attribute any meaning to the illustrations, or is it just happenstance that they wound up in the pool?[50]

Evidently, Roman coins recovered from contexts much later than their production date are a feature of northern sites, up to southern Sweden. On Gotland, thousands of Roman denarii from the 1st and 2nd centuries were recovered from 4th and 5th C contexts (Van der Vin 1999, 186).

Offering sites represent a different use of the landscape than the Wijnaldum site and comparison of the different archaeological contexts could further the discussion on the interpretation of late deposits of Roman materials. At this point, we can do no more than make some suggestions as to the meaning of these deposits after considering the far more prominent forms evident as deposits and their associations.

From pits at Schagen, constellations of Hercules/Thor and Great Dog, to materials of myths in the Broekpolder

First, we focus here on the framework of tradition, from the later prehistoric period onwards, with an interpretative assumption that practices of a ritual nature occurred within a sphere of religious definition over wide areas. In conclusion a few suggestions are put forward regarding the inclusion of Roman materials in a 6th/7th C context. Pagan texts such as those cited in the first chapter are more or less contempor -aneous with the main period of use of the Broekpolder offering site. The number of texts is finite, and they are frequently cited in an attempt to unravel meaning.[51] Some discussion of specific reference to points along the horizon – celestial phenomena – defined for earlier sites of the region serve as the starting point. Orientation to the sky, combined with the deposited materials and the work done on identifying

50 Unfortunately, the other coins were not legible, but studying the 'image' on the reverse side of coins more widely could reveal patterning, in the form of selection for the illustration, or otherwise.

51 In addition to the works by Davidson cited here, see De Vries (2 vol. 1956/1957) or Hagberg (1967) who also cites relevant texts, including the classical writers, or Hauck (e.g. 1980, 1984). For recent summaries of northern offering sites see: Müller-Wille 1999. However, for the connection between specific types of materials and mention of them in texts, Meany's compendium (1981) seems the most useful.

the referents embedded in pits dug at particular places can potentially help in interpreting practices referred to in texts.

The constellation known as 'Hercules', and interpreted as an image associated with the Germanic belief in a Donar/Thor figure, was 'found' in the pattern of the pits, as was the Great Dog constellation at the two Schagen Muggenburg sites dating to AD 300 – 350, along with two other figures.[52] At both sites there is only a partial pattern, and only at one of these, Schagen Muggenburg-I, could specific finds belonging to the Hercules/Thor figure be characterised: single pots, placed standing in pits, poplar wood *(Populus* sp.*)*, including a standing post in one pit, and stones or whetstones. The only spike/nail at this site was in one of these pits belonging to the pattern. Both the stones and spike are shared with the Broekpolder pool materials. Importantly, at the Schagen settlement, the righthand position of the constellation pattern on the ground contained a long-handled wooden hammer lying next to a club-like, near-complete tibia from a horse. The figure is directly associated, in spatial terms, with the dwelling at both Schagen sites.

The Great Dog (Canis Major) constellation was also distinguished only at the Schagen sites, thus not at the sites pre-dating the 4th C. It is near-complete at the Schagen Muggenburg-I site, and indicated at the Schagen Muggenburg-III site. Burials of very large dogs and single bones from dogs were found in pits and linear features particular to this pattern. One pit associated with the Great Dog pattern also contained a large quantity of burnt, unthreshed grain with stems and burnt twine, probably the remains of sheaves, deposited with complete unburnt wooden objects. The pattern overlaps the Hercules/Thor pattern, and the dog burials are adjacent to the dwellings.

Both patterns have 'inbuilt' orientations to the horizon, and the pits and burials making up the patterns seem to have been positioned with this function in mind. The patterns refer to the actual form, in the sky, near the horizon at specific points in the year during the heliacal rises of Hercules/Thor during the slaughter period (early November) and the harvest period with Greater Dog (August/September). These orientations are also in some ways common to the Broekpolder offering pool. They may therefore also indicate when deposits were made, as well as something about the intention behind them, as associated with the sightlines oriented to the rising and falling constellations of Hercules/Thor and Great Dog. The orientations will be discussed after consideration of the general indications, such as materials and texts, for the 'mythical' figures of Hercules and Dog.

Hercules < > Thor/Donar general associations

Two types of finds from the 6th/7th Broekpolder pool deposits can be read as referring directly to 'Hercules'. One of the two 'legible' Roman coins depicts a standing Hercules, leaning on his club, near a rock formation. In Rome Hercules was associated with trade. Although originally at Tibur/Tivoli he seems to have been above all the patron of wandering herdsmen (Derks 1998, 104), he became associated more generally in Italy with cattle markets, water and transhumance routes, which were marked with shrines to Hercules along the way (Santillo Frizell 2004, Williams 2004, 135).

The other finds with an almost direct association with Hercules were the two 'Donar amulets' (section 2.11.6). These amulets have a very wide distribution indeed, and are so called because of the inscription of *'Deo Her…'* on an early German example and the similarity with illustrations of Hercules' club on these early versions. There appears to be a direct chronological sequence from examples very like this club, to those with a prismatic form, such as the pair recovered from the Broekpolder pool. In the 1st C Tacitus wrote that: 'Above all other gods they [Germani] worship Mercury, and count it no sin, on certain feast-days, to include human victims in the sacrifices offered to him. Hercules and Mars they appease by offerings of animals…' (Mattingly trans. 1970, *Germania* IX).

Tacitus also mentions worship of Hercules in a forest (*Annals* II, 12). Hercules became one of the foremost gods of the legions, probably through allegiance and the cult of the emperor. In Gallo-Germanic regions in the Roman Empire, numerous votive alters and inscriptions, very often associated with water, are dedicated to Hercules (Derks 1998, 105 – 114). Generally considered to be like the Germanic god Donar/Thor, other characteristics and identification with 'Hercules' may have spread fairly quickly to more northern regions (Nordgren 2004, 128, 134).[53] How much the earliest nothern writers were influenced by the Roman 'Hercules' is unknown, but since the offering pool is from the 6th/7th C and included the coin and, more especially, the amulets, both may have been recognisable, as an amalgam of referencing and various types of direct and indirect identification and attribution to both the Roman god and the figure known from High Medieval texts onwards.

Donar, god of thunder, on whom little textual material

52 Therkorn 2004, 95 – 97, 98 – 100, 171 – 218; the head of Taurus, interpreted as a cow in the Germanic context through associated finds in pits, and Germanic myth; and Pegasus/Horse. Both of these patterns are interpreted as having been set out in the earlier sites studied dating back to c. 600 BC, with pits having specific deposits and marking specific places within economically used settlement space.

53 Divine status attached to the emperor started with Augustus. The contextualisation of both 'Jupiter' and 'Hercules' is interesting: 'When you [Maximian] crossed the Alps your divine aura shone forth over all Italy and everyone gathered in astonishment… People invoked, not the god familiar from hearsay, but a Jupiter close at hand, visible and present, they adored a Hercules who was not a stranger but the emperor.' *Panegyrici Latini*, III (ii), in Price (1984, 247).

exists, was the Germanic predecessor of Thunor or Thor (Davidson 1988, 214; 1993, 47). Thor is described most fully in Scandinavian literature. He is associated with the seasons, fertility, crops, and lightening as positively influencing crops. In the 11th C Adam of Bremen wrote of the belief in Thor: 'They say he rules the air which controls the thunder and the lightning, the winds and showers, the fair weather and the fruits of the earth… Thor with a sceptre seems to represent Jove [Jupiter]' (cited in Davidson 1964, 84).[54]

In terms of 'function', and in translation, however, Thor could be either Jupiter or Hercules (Davidson 1993, 47; Simek 1993, 322). Interpretations of the Thor/Donar figure, based mainly on Adam of Bremen, quoted above, emphasise the harvest connection. The slaughter connection in texts is indirect, taking the form of an association with fertility and regeneration. Snorri Sturlusson in the Prose Edda (*Gylfaginning* 44: Faulkes 1997, 37 – 38) tells the story of how Thor first slaughtered two goats, then brought them back to life the next day by waving his hammer over the remaining bones. Slaughter, as well as the resurrection of animals, can be seen as part of Thor's powers, and there is a direct reference to careful treatment of gnawed bones to ensure a healthy animal when it is reborn. In general, the basic power of the figure of myth is one of regeneration, something applying to livestock as well as to crops. Hercules certainly has a better connection to livestock, particularly cattle, than the northern texts possibly indicate for Thor. Undoubtedly, the economic importance of agriculture – from arable farming to animal husbandry – is the focus of the regional honouring of this important deity.

Medieval Scandinavians were apparently confused at times when translating 'Thor' into Latin, using both Hercules and Jupiter, and although some even denied that the Roman (demi)gods were to be identified with the northern gods, at times the acutal planets were designated as the gods (cf. Battista 2000), as they were as far back as Ancient Greece.

The literal association and naming is what is important here. Taking the c. AD 300 Schagen pattern interpretation: the image is the constellation named Hercules, while in his hand position formed by pits, he most noticeably holds a hammer, certainly an attribute of Thor, though there is also a club-like bone which might indicate the more southern identification.

Iron nails to hammers and stone

The two most notable materials deposited in the offering site are nails – large spikes and smaller studs/nails – and stones. These are best related to Thor through Medieval textual indications and on the basis of the exceptional importance of nails/iron and stones in later recorded ethnohistorical practice. Both materials are certainly textually evident, just as they are very evident as archaeological finds in the offering pool.

Iron nails/spikes might also be regarded simply as the material iron, which can be used along with stone to create fire. It has been suggested that the spikes recovered from the pool were specially made for deposit. The process of manufacturing is evident in the few deposits of slag. 'Nails' as objects have Roman cultural associations of the end of the year/death and curses. Evident in much later use, as early as the 8th C, iron and nails are specified in pagan practice as being powerful materials:

> And all who place a ring and iron bracelets to be worn on his body [i.e. that of a demoniac] or place in his house something of iron in order that demons may be frightened, and fix coloured rods in the earth by digging; and iron nails beneath the bed of a demoniac and thinks to expel the demon from a man by means of this magic, are not Christian, but pagan (anon. Merovingian homily quoted in Meany 1981, 12).

In the Broekpolder, the earliest iron staff is from a Middle Iron Age pit, and through the Early Medieval period, other than at the offering pool, large nails/spikes are found in features; the small pit of the post-Medieval rubbing post contained 15 nails (2.10.4 & box). Looking at the long term, the archaeological context of 'nails' would seem worthy of greater attention than it is generally accorded. 'Nails' are certainly evidenced in various texts, but they rarely gain notice when recovered from archaeological contexts. Here in the Broekpolder offering pool they are one of the outstanding features, along with stones. Nails, hammers and stones come together in the discussion of what weapon Donar/Thor wielded.

> It is possible to roughly equate Jupiter with the Germanic thunder god Donar (later known as Thunor and as Thor)… We cannot, however, assume that such identifications [of Germanic gods depicted in Roman style] can always be relied upon; the thunder god with his club, for instance, may sometimes be represented by Hercules' (Davidson 1993, 47).

A club of oak, fitted in one account with iron 'studs' – thus, nail-like objects – is also Thor's weapon, and is interchangeable with a hammer, as related by Saxo Grammaticus in

54 From *History of the Archbishops of Hamburg*, IV, 26.

the 13th C (Book V2; Davidson & Fisher 1979, I-203, 222). Simek regards the possibly better known short-handled hammer attributed to Thor as a northern continental tradition, and he sees hammer amulet finds becoming popular as a symbol of a Germanic-heathen religion during the final decades of the pagan era, at the same time that converts wore the Christian cross (Simek 1993, 317). Long-handled hammer amulets have been found in England (Davidson 1964, 81). Texts referencing a Thor figure in England also specify a stone as a weapon (Simpson 1973). A connection between the whetstones found in Anglo-Saxon graves and the cult of Thunor is also suggested, because of the link between sparks and lightning (Simpson 1973, Meany 1981), and with texts, mainly the combination with a myth told by Snorri (Faulkes 1987). This account relates how, in battle, Thor's iron hammer met the whetstone of the giant: the hammer killed the giant but a piece of the whetstone flew off, and became imbedded in Thor's head, where it remained.

As mentioned in relation to the Schagen Hercules constellation pattern, interpreted as a Thor figure in the Germanic context, stones or whetstones were a characteristic feature of the pattern, and in the pit marking his raised right hand, the deposits were both a long-handled hammer and a club-like bone.

The Broekpolder pool and watery pit contained various types of stone: whetstones, grinding or pounding stones, fragments of quern stones and, most notably, unused pebbles, many of them white. White pebble stones are found regularly with iron staffs (thus, nail-like objects) at large offering sites such as Illerup (Denmark) and Skedemosse (Sweden). These 'strike-a-lights' are considered part of an entire set of personal equipment, along with the vast number of weapons, belonging to slain warriors. Of course a 'Thor' warrior association could also apply, in the context of stone+iron used to create fire and as part of a warrior's equipment. Deposits of single stones not interpreted as having a strike-a-light function are suggested to have been involved in ritual stone throwing, by analogy with Swedish ethnohistorical practice, as well as the throwing of stones into fires lit at midsummer on the Baltic island of Runö (cf. Hagberg 1967, 36).

Stones specified as white are variously associated in Norse sources with good luck and kingship, and with taking oaths (Lönnroth 2002). In Scottish and Welsh ethnohistorical practice they are associated with divining impending death, whereby the white stone/pebble laid in the ashes of a fire symbolises a person (McPherson 1929, 9 – 13). Meany (1981, 88 – 104), in her summary of deposits of pebbles in graves from the prehistoric to Anglo Saxon period in Great Britain, also includes continental examples, and she enumerates the texts mentioning a pagan practice whereby stones/pebbles were specifically designated as 'amulets'. Usually condemning the practice, the texts sometimes suggest a compromise: 'To one afflicted by an evil spirit, it is permitted to have stone and [or] herbs [*petras et holera*] without incantations' (Archbishop Theodore, 7th C, quoted in Meany 1981, 13).

White stones are often associated with healing properties, as well as being protection against lightning; the Grágás collection of 13th C Icelandic law texts stipulated:

> People shall not have stones about them, or fill them with magic power in order to tie on people or on people's cattle. If people put trust in stones to ensure their own health or that of cattle, the penalty is minor outlawry (quoted in Meany 1981, 102).

Evidently, some church officials were divided on the issue:

> He who carries one [a thunderstone] will not be struck by lightning, nor will houses if the stone is there; the passenger on a ship travelling by sea or river will not be sunk by storm or struck by lightning; it gives victory in law-suits and battles, and guarantees sweet sleep and pleasant dreams (Bishop of Rennes, Marbodaeus, 12th C, quoted in Varner 2004, 20).

Stones were also thrown into wells or cattle troughs for protection and to ensure a continued water supply *(ibid.)*. An example of water and pebbles is shown by centuries of practice associated with St. Fillan, in Medieval Scotland: to promote healing, walk around the well three times and throw a pebble in (Varner 2004, 33). The powers attributed to ordinary stones are legion, and when they were dipped in water, the water was also believed to be imbued with healing powers.[55] Black (1893) collated records and himself recorded hundreds of 'famous' stones and their uses in Scotland, and also Icelandic texts, where they are known variously as 'curing stones', amulets and charms. Semi-precious stones, but also very often ordinary pebbles could, for instance, be carried about the person and passed down for generations, since they were believed to be efficacious in healing humans and livestock. Icelandic texts and Swedish customs mention stones affixed to swords, which were used to 'heal' wounds, and the

55 Black (1893) collated records and himself recorded hundreds of 'famous' stones and their uses in Scotland, and also Icelandic texts, where they are known variously as 'curing stones', amulets and charms. Semi-precious stones, but also very often ordinary pebbles could, for instance, be carried about the person and passed down for generations, since they were believed to be efficacious in healing humans and livestock.

56 No mention has yet been found in these northerly regions for the facet of marking and judging time found in the well-known Roman custom: 'Albo lapio notare diem', to mark the day with a white stone.' According to Pliny the Younger, this practice dated back to the Thracians. A happy day was marked with a white stone, an unhappy day with a black one, whereby at the end of each day, a black or white stone would be placed in an urn, and at the end of the month, it could be judged as good or bad (Ehrlich 1986, 222). 'For the Romans, white was the symbol of happiness, black of misfortune. Thus, in a trial a vote for acquittal was cast with a white stone, for condemnation a black one' *(ibid.)*.

57 Davidson (1993, 83) translates the term (reginnaglar) as 'gods' nails' rather than holy nails.

healing powers of stone 'axes' kept in the house were also believed to afford protection against lightning (Black 1893, 440, 469).[56]

Lightning/lighting fires, iron and stones, and weapons of various materials as attributes, along with the healing powers attributed to them, could over time be extrapolated to people and the welfare of livestock, and back again towards a Donar/Thor figure. Again, it must be emphasised that deposits at the two other offering sites of open water mentioned at the beginning of this section do not include stones/pebbles or nails/spikes, a very marked difference with the Broekpolder pools. And, again, all stones of whatever type were imported into the neighbourhood.

Certainly in contexts where there is no doubt about the non-local occurrence, stones should receive more attention; they are often discounted as a category of interest. Texts suggest otherwise, however, as do the combinations of stone and iron in the Broekpolder offering site. Iron was also imported. Though apparently very ordinary, the amount present and the fact that these materials were imported, evidently mainly – if not exclusively – for deposit, down the generations suggests they were a characteristic deposit with a long tradition.

Posts and nails and stones

Posts, too, seem to have more textual associations with Donar/Thor than any other deity, and occur textually in combination with stone and iron. The pillars of Thor, possibly roof support posts, are mentioned several times in *Landnámabók* and the sagas (Davidson 1993, 101). One passage from *Eyrbyggja Saga* quoted in Chapter 1 to illustrate landscape concerns mentions the nails, the gods', or holy nails, in the pillar ('Just inside the door stood the high-seat pillars with the so-called holy[57] nails fixed in them…'). The Lappish thunder god was Horagalles, thought to be derived from *Þórr karl*, 'old man Thor (Davidson 1964, 83).[58] Conversion of the Sami to Christianity began late, and the designations of gods are similar to other Scandinavian areas. The nails fixed into these 'high-seat pillars' may be explicated by 17th C accounts of a Sami religion – which included a thunder god – that connects nails, fire and thunder:

> They are said to have kept an image of the thunder god in the form of a rude block of wood, with a man's head carved at the top, and two sticks for arms, one holding a mallet. Into his head they drive a nail of iron or steel, and a small piece of flint to strike fire with… (Davidson 1964, 78).[59]

Alternatively, it has been suggested that these 'high-seat' pillars could refer to the constellation of Hercules/Thor sitting on high – i.e. in the sky – and, as at the Schagen settlements, associated with the dwelling and, at one of the sites, the standing 'pillar' of poplar by the dwelling (Therkorn 2004, 185 – 187). In other words, the landscape described in *Eyrbyggja Saga* could be metaphorically and mythically referring to the constellation 'sitting on-high' as part of the celestial landscape.

Standing posts might be general, but the large number at the Broekpolder site to the side of the 9th/10th C dug feature (tr 48), are extraordinary in terms both of their sheer quantity and of the species selected. Perhaps they are reminiscent of Ibn Fadlan's observations (c. 921) on Viking customs, after witnessing traders in Bulgar: they set up upright a piece of wood with a face like a man, surrounded by other smaller figures and placed a number of long stakes in the ground behind them; the traders would make individual offerings of sacrificed sheep and cattle, leaving some flesh beside the figures and setting up the heads of the slaughtered beasts on the stakes (cited in Davidson 1993, 94 – 95). Already quoted is the injunction against 'fixing coloured rods in the earth by digging' (Meany 1981, 12). This might indicate that posts/rods/stakes were just as important as those with the skulls of animals on them, evidently signifying pagan practice, and so quite possibly associated with a pagan god.

While the 'pillars of Hercules' refer to the straights of Gibraltar, Tacitus makes mention of the 'Pillars of Hercules' north of Frisian territory (*Germania xxxiv*). In addition to Thor's pillars, texts also mention 'Jupiter' pillars, which could be analogous to the wooden columns known in more northern areas as 'Irminsul' (cf. Davidson 1988, 22 – 4). Both are connected by texts and actual recorded examples to a sky god and watery places. The northern references are not clear as to deity, and Irminsul has been linked with both Tîwaz (usually assumed to be Mars) and Thor/Donar *(ibid.)*.

A welter of texts exists on beliefs associated with trees, groves, wooden columns and different attributions to a sky god, mainly by classical writers and missionaries in various parts of Europe.[60] The mixed attributions could well be a direct result of all gods being 'sky gods', because they are in the sky, visible as the planets, sun and moon, and also related to earthly material, to various trees associated with different gods and goddesses, as recorded by Pliny in Roman traditional belief.[61] Pliny made the 'poplar' connection to Hercules, which

58 See Bradley (2000, 1 – 13) for further discussion of Saami practice, ritual and sacrifice within a landscape-oriented discussion.

59 Quoting Scheffer's *Acta Lapponia* (English trans. 1674).

60 Jacob Grimm included two chapters of source materials on tree belief and symbolism, and many ethnohistorical practices, in his *Deutsche Mythologie* (1835; expanded in 1875) translated as *Teutonic Mythology* (reissued in 1999 by Routledge with new appendices). See Dowden (2000) for many texts on aspects and use of the landscape, especially trees and stones, and recent translations.

61 'Once upon a time trees were the temples of the deities, and in conformity with primitive ritual simple country places even now dedicate a tree of exceptional height to a god; nor do we pay greater worship to images shining with gold and ivory than to the forest and to the very silences that they contain. The different kinds of trees are kept perpetually dedicated to their own divinities, for instance, the chestnut-oak to Jove, the bay to Apollo, the olive to Minerva, the myrtle to Venus, the **poplar to Hercules**; nay, more, we also believe that the Silvani and Fauns and various kinds of goddesses are as it were assigned to the forests from heaven and as their own special divinities' (*Naturalis Historiae*, xii, 2; H. Rackham trans. 1968, 5).

is certainly remarkable given that this genus is specific to the constellation pattern formed by the Hercules/Thor pits at Schagen Muggenburg-1, as mentioned above. The only large standing post was in a pit in this figure at this site, near to the dwelling. Poplar is not often recovered from settlement contexts in the region. The connection to the constellation at the early 4th C Schagen site, in terms of tree and image, could be borrowed from a specific Roman belief.

In the Broekpolder pool, various tree species, including oak and beech, were used for the stake rows, and various lengths of wood seem to have been deposits in themselves. The co-occurrence of cornel and birch (section 2.11.5) is certainly remarkable, and it must be assumed these species were fastened together and deposited with some conscious intent. Later in the 9th/10th C, beech was used almost exclusively around the large watery pit, for posts and stakes set in uneven rows *(fig. 62)*.

Rather remarkably for such a stately tree, there are few ethnohistorical references to beech as a species. As yet, only a few indications have been found: Thor could slay giants while taking refuge under an oak, this species being sacred to Donar/Thor, but when under a beech tree, he had no power over them; the devil got wedged in a beech tree; witches held dances on a great beech tree (Grimm 1999, 1341, 1572, 1621). Many interpret the hardwoods mentioned in the late 10th/11th C Anglo-Saxon charm *Æcerbot* as oak and beech. As sacred trees, their twigs could not be placed on the sods cut from the four corners of a field to be ploughed, as those of other trees were (Rosenberg 1966). Beech is also believed, in English folklore, to be 'proof against lightning' (Milner 1992, 17).

Apparently, where a pagan association was recorded for beech, the referencing might be taken as having something to do with a Thor/Donar figure, as well as being indirectly associated with him through his later connection to the Devil.[62]

There is no reason to assume that beech was more prevalent in the Broekpolder area than in later prehistory. Its use seems to be a new tradition, and the wood–as all wood deposits except willow and alder–must have been gathered some distance away from the Broekpolder. The orientations of the rows, at both the pool and large water feature, can also be 'read' as pointing, literally, to Hercules/Thor, in the form of the constellation, as well as to the Great Dog constellation.

Indications for Great Dog

At the Schagen sites, in addition to bone from dogs and dog burials, one pit in the pattern forming part of the constellation of Great Dog was filled with burnt grain. Large dogs are also associated with the harvest in texts. In the Broekpolder, there are few direct indications for Great Dog, except perhaps for the dog bones recovered from the pool sediments. Dog bones are overrepresented in the offering site sediments, compared with other types of features.

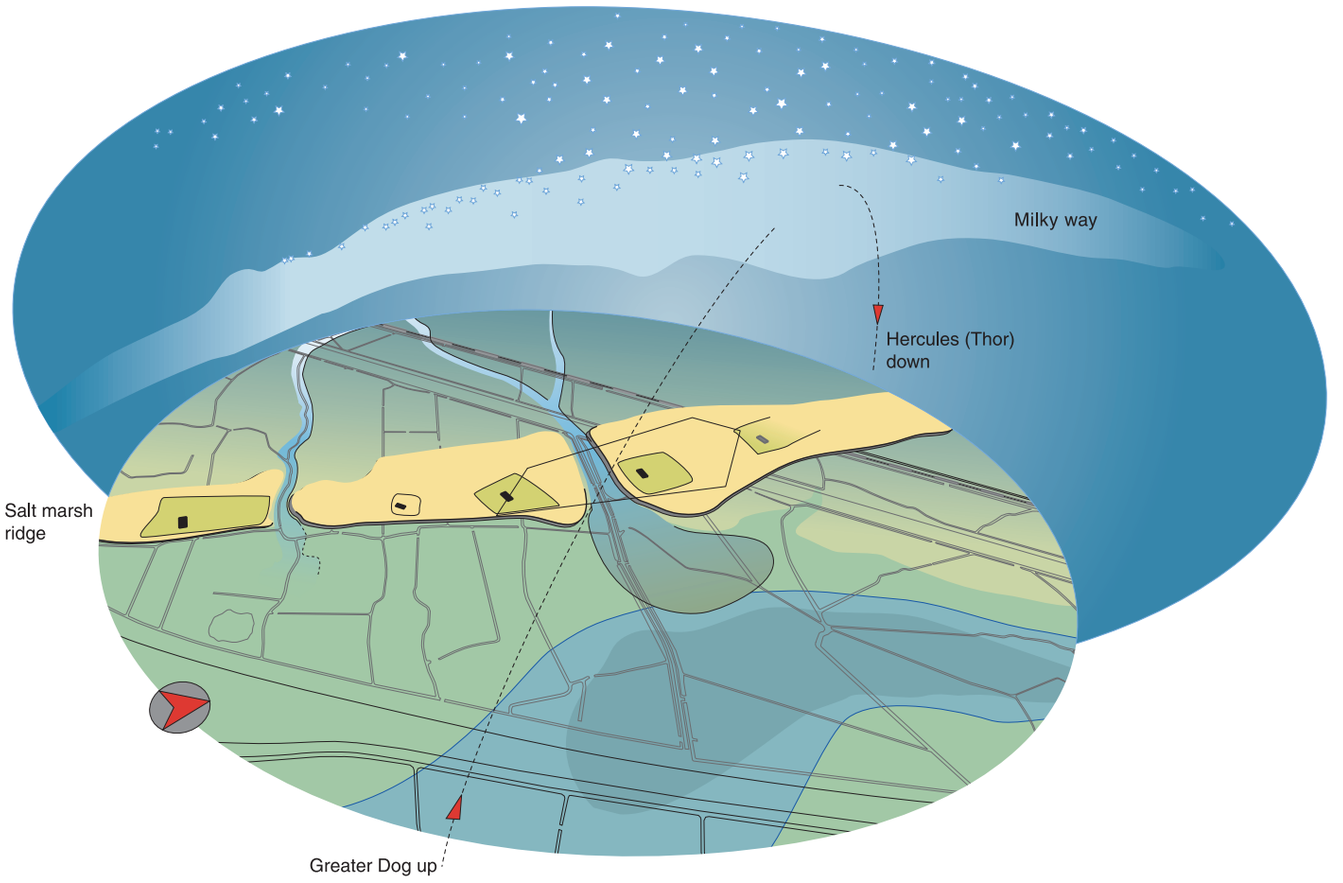
The single elements of dog are few, and they are very evenly distributed from south to north in the pool sediments (cf. *fig. 54*). Again, they span the generations of use of the pool for deposits. 'Grain' was not recovered from the pool, although flax was found in one of the very few samples taken; sediments were not sampled adequately to show deliberate deposits of grain. Along with the Donar/Thor indications, Great Dog can be seen as orientations referring to the harvest period.

Greek authors associated the star Sirius with the time of harvest.[63] The dog Cerberus is connected to Heracles and his twelfth and final labour, where he brings the dog back from the underworld.[64] Perhaps the dog general to Indo-European mythology, the 'hellhound' (cf. Mallory & Adams 1997, 265 – 266), is Sirius or more inclusively, the constellation Great Dog, referring to time and the harvest and positioning in the sky. Those later European ethnohistorical practices involving a large dog or wolf might be transformations of this belief. They are clearly associated with harvesting, particularly practices concerning the last sheaf. A number of practices have been summarised by Frazer (Fraser ed. 1994, 456 – 9) as the Rye-wolf or Rye-dog rushing over the fields as the embodiment of the corn-spirit. He collated variations on sayings such as 'the big dog sits in the corn', 'the mad dog sits in the corn', and references to cutting the last sheaf as 'catching the wolf' or 'killing the dog'. The customs including a dog/wolf seem to refer in part to the crops and the areas where other animals are ascribed special meaning in connection with harvest activities. Cockerels, hares, cats, goats, bovines, horses and pigs have similar folk practices associated with them in connection with the harvest. They are also symbolically slain as the last sheaf. Aside from the hare, and 'wolf', domesticated animals are thus also represented.

The constellation is not noted as consciously referenced in this tradition, but the connection seems obvious. In short: the Rye-wolf /Rye-dog 'runs over the fields' at the time of harvest.

62 In more southerly areas, the Greeks somewhat confused oak and beech, and they became interchangeable as the oracles of Jupiter (Rosenberg 1966, 432). There was evidently a Celtic god, Fagus (Latin for beech), as evidenced by inscriptions found in the Pyrenees. Reference is also made to a wondrous beech in Belgium, as described in the life of the 8th C St. Lioba, admitted to the Church for accounting for its own miracles; a convent was subsequently founded on the site where it stood (cited in Grimm: from *Vita S. Lioba, Acta* ss.o.s.b., 11.841). There is also the beech tree about which Joan of Arc was questioned in 1431; it stood by a spring with water known for its curative properties, and the beech was hung with garlands (cf. trans. by Barrett 1932, 53 – 54).

63 Homer (*Iliad* 22.25 – 31) gives the time association with harvest, and as an evil sign. Other authors emphasise the heat at this time of year (cf. Horace, *Odes* 1.17; Virgil, *Aeneid* 10.272).



This could well be the constellation itself, as the original referent, running over the fields, across the sky. 'Dog Days' is quite a general expression in western Europe, and may also be related to the wheat-/rye-dog. 'Dog Days' are specifically related to the rising of the constellation of Great Dog, particularly his head, represented by Sirius, the brightest star in the sky. These later practices and legends are interrelated with the 'hellhound', and this seems better aligned in mythical texts with the metaphorical landscapes, including the possibility that it is in the sky. As Mallory and Adams (1997, 265 – 66) point out, the bordering aspect between life and death is a feature of the Indo-European belief in the hellhound standing at the border of earth and hell, and also found in northern texts. This is the position of the Great Dog constellation if the Milky Way is regarded as the earth – Midgard – and the area of the sky to one side as the sea/underworld – Utgard (Therkorn 2004, 228 – 236). It could be the same setting applies to the ridge of the Broekpolder, with lower areas to either side *(fig. 81)*.

Orientations and materials, time and economic activity

Without going any deeper into the confusion arising in texts 'matching' the Roman gods with others of the Indo-European language families, the subject is here explored on the basis of the literal visibility of celstial phenomena, whereby the visible planets (and their different aspects/times) are the gods, and a constellation is the image of a god. It is hard to tell time by the planets, but constellations are more useful in this respect because of their annual cycles, and they can be used to tell the time if their position is related to the rising or setting sun, as well as to their place along the horizon. The rising and falling of constellations can be charted as 'dates' throughout the year, as can the sun, on the basis of alignments.

Of course there are many orientations one can draw a line through at the offering pool, but the more outstanding materials deposited in the pool point, to a greater or lesser degree, to a Hercules/Thor connection, and these orientations can also be found pointing to the consetllation in the sky, in combination with the Great Dog. At the offering pool, the

Fig. 81 The Broekpolder ridge and lower lying area divisions and sky divisions perhaps applying to the concept of earthly and heavenly landscapes. The offering pool of the 6th/7th C is shown and the fall and rise of two constellations – Hercules/Thor and Greater Dog – which may explain the main orientations and finds materials.

64 Ovid specifies that during the festival of *Robigalia* (25 April), (*Fasti* IV, Woodard & Boyle trans./eds. 2000) a dog was sacrificed to protect the harvest against rust. The dog placed on the altar was intended specifically to avert the effects of the heliacal rising of the Dog Star Sirius at the time the harvest might become parched, thus in the summer. The April 25th date would be in line with visibility of Sirius in the SW just after sundown, and subsequent setting.

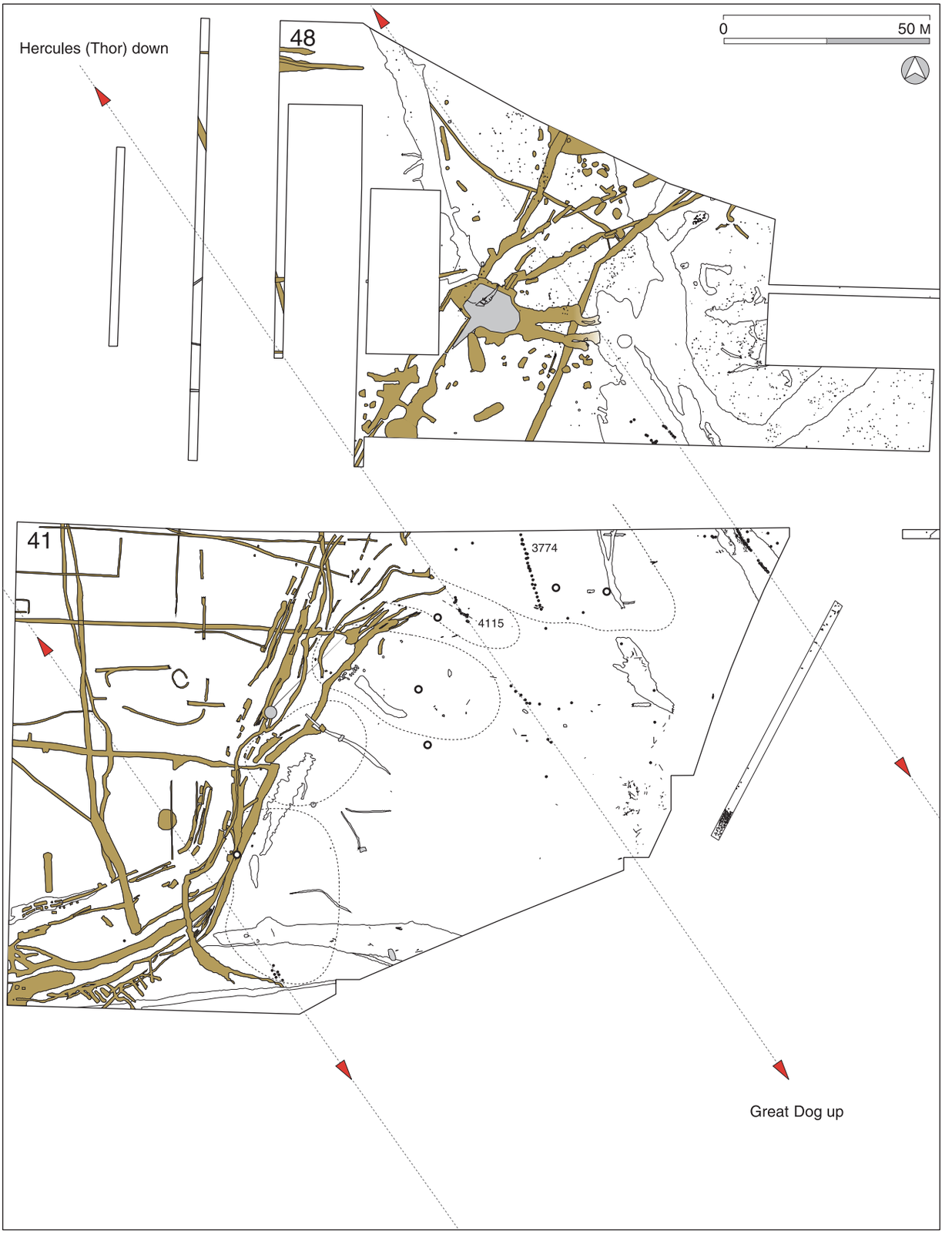


Fig. 82 Alignments suggested by the remnant stake rows in the offering pool reproduced through the generations of use.

constellation of Hercules is found at its lowest in the northwest somewhat before the Great Dog rises in the southeast, at harvest time. There is some indication of alignment towards the slaughter period in November. The constellation of Hercules is found differently aligned through the post/stake rows of the adjacent but later watery feature.[65]

Orientation and stake rows in the pool

The even distribution of dog bone elements among the clusters may suggest that they were not annual deposits, but were important precisely because of their regular (per generation) deposition. The Great Dog, as a constellation, is brought into the equation primarily because of the orientation of the stake rows, as the 'backsight' is to the constellation Hercules, distinguished as the Thor/Donar figure at the Schagen sites.[66]

In the Broekpolder, using the constellation sequence as the guide to the alignments, the rows of stakes in the pool tell the time. The alignment of the remnant rows of 6th/7th C stakes is between 143° and 145° to the southeast. In the other direction, towards the NW, they have an azimuth of 321° to 323°. This points to the place along the horizon where the constellation of Thor/Hercules sets around August 19th. The heliacal rising (at approx. 118°) of the star Sirius is a few days later, and the constellation of Great Dog is fully risen by mid-September, at around 143° – 145°, which is the sightline of the stake rows to the SE. The constellation of Thor/Hercules would have disappeared fully by this time. It is interesting that it is this figure's 'demise' that brings in the harvest season, while his heliacal rising in the east starts the slaughter season in early November. The connection to the mythical figure of texts is therefore not only found in the materials deposited, but is also indicated in the sky, in the backsight of the stake rows from mid-August to late September *(fig. 82)*.

The corn-spirit as a dog/wolf as known from ethnohistorical sources is a rather threatening figure, accompanied by rituals mainly involving offerings of appeasement, as is the earlier hellhound of wider occurrence. Perhaps the need to gather in the harvest before the constellation is fully present – risen completely – in the SE is also part of the message. The connection between a 'dog' and Thor/Donar is not readily apparent in mythology although, as mentioned above, it does exist for Hercules/Heracles. In this northern context, they are however linked as two ends of the same stake rows, to the SE for the Great Dog rising and, in the opposite direction, to the NW, for the setting constellation of Hercules/Thor.

Looking to Rome for a date, it may not be coincidence that the two festival dates of Hercules were around August 12th and 13th – Hercules Invectus at the Ara Maxima and Hercules Victorus near the Porta Trigemina – which is also about the time the constellation is at its lowest, before disappearing. Dates do not feature in northern texts, but the harvest period is specifically stated in connection with 'Thor'.

Bone elements in the pool – orientations?

Another type and direction of alignment might be suggested in the finds of bones, particularly in the combination of horse and sheep/goat bones for clusters 2 – 6 *(fig. 52)*. These could refer to the slaughter period coupled with the rising of the sun. The orientations to the southeast vary from an azimuth of 116° (3 & 5), to about 120°, 124° and 125° for areas 2, 6, and 4 respectively. The earliest, 116°, is at sunrise on about October 30th, and the latest (125°) about November 20th. The line of cluster 3 is most satisfying, as it is also the same as that generally indicated by the direction of the clustering of cattle bones *(fig. 53)*. The constellation of Hercules rises at this same time (heliacal rising) in the east, as the constellation of Great Dog sets in the west. Great Dog is next to the constellation Taurus – 'cow' in a Germanic context – which also sets at this time, the slaughter period. Both images metaphorically 'die', as the hero/god rises. While the Schagen sites, and earlier sites, were well marked with the pattern of the 'cow's' head, there seems to be no reference to this figure except – importantly – in the deposits of cattle/livestock bones in the offering pool, as slaughtered beasts.

9th/10th C standing posts and alignments associated with the large, water-filled pit, f4446 (tr 48)

Given the similarity in the associated materials and its position adjacent to the offering pool, a primarily ritual interpretation is deemed most likely for the large, dug water-filled pit f4446. If there is a continuity of tradition, though not actual use, the alignments of stakes and posts in the large pit feature could have been set to the constellation figure of Thor/Hercules. Posts could have been set each successive year. As mentioned above, the fact that they are almost exclusively of beech is remarkable.

Though there were few material deposits, they were similar to those in the earlier offering pool, although slag seems to have replaced the iron nails. The element of 'fire' or 'firing' has thus remained. Continuity of tradition is not certain because

65 The orientations in this section are corrected for AD 600 and 1000, with the sun at 15 degrees below the horizon.

66 This connection, as outlined above in reference to the coincidence of the rising constellation of Great Dog in the southeast with, in the 'backsight' to the northwest, the 'demise' of the constellation of Hercules/Thor, was not stressed for the harvest connection. The key economic asset emphasised was livestock, in the rising of Cow (Taurus), at the beginning of July, and her demise during the slaughter period. Harvest activities were only briefly mentioned, in the form of the Great Dog alignment and the pit containing kilos of grain.

of the lack of demonstrated continuous settlement, but an interpretation based on the same constellations suggested for the earlier pool is possible. The posts associated with this large pit are aligned with the heliacal rising of the constellation Hercules/Thor, to the northeast, in early November. At the same time, the backsight is towards the Great Dog going down in the southwest. This would constitute an inverted relationship in constellation movements, as for the orientations suggested for the offering pool of three to four centuries earlier. The directionality, based on the period of the movements, would seem to indicate an emphasis on the slaughter period, rather than the harvest period. Thus, whereas the stake rows of the large pool were aligned with the harvest period, the slaughter period being directly indicated by the bones of slaughtered animals, and indicated in the vague lines to the horizon, the stakes and posts associated with the watery pit can be interpreted as pointing to November in a more direct way as the slaughter period. Here there was relatively little bone material. The quern stone fragments might indicate a harvest period. Deposit of harvest products cannot be concluded from the few remains of flax recovered from the pit sample, but can not be discounted.

3.4.6 *Conclusion regarding sites under water*

Textual references to the deposited materials, and to some degree the wood species, point to a Thor/Hercules connection for the features on the eastern side of the northern segment. The demise of Hercules/Thor as a constellation brings in the harvest season, as the Great Dog rises. Thor/Hercules' rise, however, heralds the slaughter period, with the simultaneous demise – to the west – of the constellation of Taurus, identified in the Germanic context as a 'cow', and evidenced archaeologically up to the early 4th C in pits and orientations in a settlement context. It could be that either the focus on the cow was disappearing by the 6th/7th C, with referencing only through the bones of livestock deposited in the offering pool, or the people inhabiting the Broekpolder in the Early Medieval period had a different tradition, brought from the northern Netherlands. Great Dog is found, in terms of time/season, as an orientation and pit pattern at the Schagen sites dating from the 4th C, to the 10th C water feature here in the Broekpolder.

In all, a number of suggestions have been made based on the various structuring principles interpreted for the features and stake rows of the offering pool. The openings in the dug gullies along the slope of the ridge and the clustering of materials in the pool, along with the stake row remnants, suggest continued use by consecutive families down the generations (2.11). The orientations of the stake rows suggest the seasonal aspect was connected with the harvest season, at the rising of the Great Dog and the descent of the constellation Hercules/Thor in late August to early September. The deposited bone material and the orientation of livestock bones and these linear clusters towards the rising of Hercules/Thor early in November also suggest the slaughter period. These, and the other most notable materials deposited – stones and nails/spikes – can be related to this Hercules/Thor figure, as an image in the constellation and probably as a 'deity', and were very probably given in propitiation and in response to a belief in his regenerative powers, an association with the cyclical nature of death and renewed livestock resources, in combination with the cyclical nature of the year, and the rise and fall of the constellation.

A number of other complete objects of bone and metal were recovered *(figs. 55 – 59)*: the 'Donar amulets', gaming pieces, fish hook, awls and bridle fittings. These are all considered to be from the Early Medieval period, and could have been made at the same time as the creation and use of the pool. The complete spiral ornament would seem stylistically (much) earlier, although it could also be contemporaneous. It is simply rolled bronze wire with a hook for fastening. We might also draw a distinction between things given to the god, and things 'stored' for oneself in the afterlife, whereby Snorri's admonition: '… that each should use what he himself had buried in the earth', quoted more fully in the introduction to this section, would also refer to some of these materials, albeit deposited in a watery context, rather than buried in pits in the earth.

The Roman coins and fibulae were certainly manufactured earlier, and here we encounter the question of why they wound up in a 6th/7th C context. There are various possibilities, which might be influenced by the fact of whether or not the area had become almost totally depopulated. Jan de Koning (see box, p. 128) has suggested the possibility of a 'Frisian' migration to the area, whereby the tradition of collecting and/or saving up Roman materials could be related to the pattern recovered in Wijnaldum. Alternatively, or additionally, these materials could have been ploughed up at this Broekpolder site during the 6th/7th C, possibly by newcomers to the area, and deposited in the pool. The meaning could lie in harkening



back to a remembered past, in various and contiguous ways, through 'knowledge' of the area passed down through oral history:

- of the Roman harbour-fort only 4 km distant, occupied in the early 1st C AD, and possibly something of the Frisian revolt (AD 28);
- of a time when men from groups to the north of the empire – the border through the Netherlands being the Old Rhine – served in the Roman legions;
- and/or of past generations living in the Broekpolder, who were 'recovered' through recognisable materials churned up while the land adjacent to the pool was being worked.

This last possibility is in any case referenced, as not only Roman items were deposited, but also many native potsherds. Little mention has been made of these, as they occur at the lowest level of the pool sediments, and could therefore have been on the surface in the late prehistoric period. However, the distribution of native pottery not found in features is higher than encountered anywhere along the ridge which makes deposit likely.

Fig. 83 *Knight, Death and Devil*, 1513, by Albrecht Dürer, shows what had become of two pagan gods: Death as the transformed Wotan/Wodin/Odin and very probably the devil, once Donar/Thor, with his poleaxe and grisly 'livestock' face.

The 'state' of the Roman fibulae is also a case in point, whereby the complete examples may have been 'heirlooms', while the fragments (not all of which have been illustrated) may have been ploughed up. This may also explain why only two of the coins recovered were in good condition, if some were ploughed up and others had been saved and passed down. Any particular meaning must be related to similar patterns at other sites, but this information is simply not currently available.

Perhaps the harvest connection lies in this last suggestion that the materials were ploughed up. As past generations lived on the land, these inhabitants depositing materials in the pool were at the same time ploughing up old surfaces, in preparation for growing crops. The cycle of agrarian life, if the orientations to celestial features are accepted, is marked by the re-depositing of materials, the materials in themselves referring to past generational cycles. In the case of the Schagen pits, it was suggested that deposits looked towards the future afterlife, in the other world of the heavens, rather than being offered in propitiation of a 'god'. This might also be true of the materials in both the pool features in the Broekpolder, though the past of many of the materials deposited, such as the Roman goods and the late prehistoric native pottery, takes the cyclical one step further, as looking back is looking towards the future. Finally, the very few single but evenly distributed human bone elements also refer to relics, as far as they have been dated, and to the past, and generational succession as deposited in successive clusters during use of the pool.

General Indo-European indications suggest that a broad base of religious similarity has a bearing on any connection we might make, at this stage, between actual ritual as reflected in the materials used and the time, and the figures referred to in the sky and in texts. *Figure 83*, of Dürer's *Knight, Death and Devil* (1517) is an example of pagan gods demise, but also in retention of earlier attributes–the horse, spear, controller of life to death for Wotan/Wodin/Odin; and, Donar/Thor with a pole axe, and the livestock connection in his grisly head, as the Devil. Seasons, sacrifices, the afterlife and goods 'buried in the ground' during one's life, were also integrated into shorter-term economic cycles and the telling of time through regarding the celestial landscape. A few ideas with the accompanying materials and engraved Broekpolder landscapes have been put forward, here.





Fig. 84 The first blocks of houses within the Broekpolder, from the south, 2002. *Photograph: Fotostudio Honing Beverwijk.*

Evaluation of an archaeological process

4

Analysing what you have and knowing what is preserved

As of 2002 houses within the southern part of the Broekpolder were nearing completion *(fig. 84)*. By now the Broekpolder has more than three thousand new homes where people live, and communal spaces where they shop and meet, or walk their dog in the park created over the archaeological monument. What inhabitants could know of the past beneath their feet is not only determined by the researchers who created the history by first choosing to excavate certain areas of the Broekpolder and analysing the remains of the past communities from certain viewpoints and using certain methods, but also by the partners in the project, each with their own responsibilities and their own personal and political agendas.

4.1 Introduction

Recent studies about the dialectic relationship between history and nationalist movements, in Greece for example, show how the past can be manipulated: ancient monuments become an indispensable vehicle for ritual, commemorative ceremonies, and become the setting for, and powerful emotive icons in, performances evoking national memory in the continuous process of imagining and dreaming the *topos* of the nation (Hamilakis & Yalouri 1999, 132). In the creation of the classical history of Greece, heritage management neglected 'Barbaric' remains. This sacralising of the past is not a static practice. In long-term history, there is a continuous reinterpretation of meaningful phenomena (Kolen 1999, 285). Both the historic places and the people involved define the social, religious and political value of a place.

The Broekpolder festivities in 2000 which surrounded the driving of the first pile for the construction works included bonfires, fireworks and other ceremonies. The invitation to the event consisted of a folder which evoked a certain mood, citing the myths of legendary figures. An abject, a-historical sense of the more recent past could be sensed in the use of Gothic letters and the red, white and black colour scheme. The tone may have put many in mind of esoteric, Druidic or Viking mysticism, with perhaps even a whiff of the Nazi

occupation. This exemplifies – perhaps completely unintentionally – what can be perceived as a reification of a mythical past. In our project team, this depended on the age of the individual looking at the folder: those older than 50 'saw' something more sinister than those under 30 years of age. It at any rate highlighted the need for a conscious moral attitude and historical awareness of how archaeology was, is, and could be presented.

This chapter examines some aspects of the decision-making as to the archaeological importance of the Broekpolder. It also contains a summary of what the monument probably includes, explains how traces are monitored for preservation, and considers alternatives for assessing future areas for possible monument status, national policy on image quality, and the final process of arriving at a certain visual quality and informing the public about the monument.

4.2 Why these five hectares preserved?

The main purpose of the of the monument in its present form is to preserve characteristic remains from the Late Iron Age/Roman Iron Age. Situated on a higher-lying sandy salt-marsh ridge, also typical of the period, it is currently the only example in the province. The sherds initially found were most probably from the RIA. It is a well-known rule of thumb in the region that if you find sherds, you are within 20 m of a habitation site/dwelling from the Roman Iron Age. From the narrow focus of settlement archaeology, it was assumed there was nothing of interest apart from traces on the ridge. The local authority commissioned RAAP, via the ROB, to establish by survey the nature of the archaeology of the Broekpolder in its totality as outlined in Chapter 1. However, the survey simply confirmed more of the same after the initial sherds were recovered by amateurs. The large majority of core-borings were taken from the highest part of the ridge, where trenches were also dug by the ROB. Soonius warned (1993, 21) in the RAAP report of the difficulty of interpreting core-borings if no pottery is found. Core-boring would probably not now be included in a survey or quality assessment at any Holocene site. The method has proven notoriously inexact and, depending on how the assumptive process of interpretation is built up, very often useless. RAAP no longer uses survey by core-borings as the primary method of identifying sites, or as a tool for interpreting layers. Surveying now relies more on trenching than on core-boring.

A number of clearly visible features in the polder were not examined. In the south of the polder, numerous low hills were visible, off to the west of the ridge. These could have been low platforms, of the type known from the Assendelver Polder and Uitgeest Polder, but they were not core-bored. When they were examined during the project they were found to be 'islands', what remained of the natural stratigraphy. The surroundings had been dug away, as mentioned in Chapter 2, possibly for large-scale clay extraction, in connection with the construction of the St. Aagte dyke.

The ridge itself visibly extended past the last core-boring to the south. The stratigraphy was the same as in all other sections of the ridge. De Roo's map does not show the full extent of the ridge. To the north, De Roo's map also proved incorrect, and the later phase ridge had not been differentiated. It actually did show up quite clearly in the field as a marked difference between the higher and lower field level. But the totality of the landscape feature was visually confused with the tertiary roadway and the old A9 motorway. The altimetric contour data *(fig. 1)* of the region which became available during the project is now indispensable for any area and should be used whenever larger-scale palaeogeographical features need to be traced. The Altimetric Contour Map for the entire province is available, and it should be used to check older data against visible features.

An actual warning is in order against using 'soil maps' at all to define anything other than soil types. And, although the designated 'soil type' may be correct, the processes that led to its formation may have been culturally induced. This is the case in the area of the Broekpolder marked as 'peat'. The few trenches dug during the project in the peat area to the south of the polder revealed that accumulation had occurred in laterprehistory, and that peat had been extracted as a resource thereafter. The absence of peat over the depression of the former Oer-IJ channel, to the north, is probably entirely an effect of peat cutting. Checking such traditions of interpretation could be a focus of future research in Holocene areas. Geologists have in the past failed to realise how drastically the landscape was altered by humans, and that more of their data may be less 'natural' than they assume.

More than 90 farmstead sites have long been known to have existed on peat in the Assendelver Polders, across the Oer-IJ channel, and peat areas should not in any case be ignored. Some of the field ditches in the peat area also have the characteristic irregularities established by Bos (1988) in

Waterland as a predictive characteristic of Medieval house terps. These can be found in core-borings.

The core-borings taken in the Broekpolder did not establish the presence of traces of the Bronze-Age or Early Iron-Age landscape. Both were visible in the stratigraphical layering in the borings, but these periods remained unrecognised due to the lack of 'cultural' indicators in the form of sherds, and because the layers were not related to absolute NAP levels. Initial ideas as to where the monument should be did not therefore consider the preservation of any Early Bronze Age landscape, as only one period was focused on, represented by the still visible landscape feature of the Oer-IJ salt-marsh ridge. The ROB did not examine deeper layers in the kilometres of trial trenching, due to the focus on what was already suspected, and the constraints of a policy of not disturbing features. These 'rules' for trial trenching are not compatible with the need to understand Holocene areas which have stacked sediments representing periodically changing landscapes and accompanying period traces. ROB trial trenching afforded an opportunity to look at the deeper stratigraphy beneath the 20 ha scheduled monument and small sections extending to the deeper levels would have revealed the earlier periods. After the excavations, core-borings were taken when dipwells were installed for monitoring purposes (see below), and it was established that the Bronze Age layer did not extend under the present 5 ha monument area.

As briefly discussed in Chapter 2, sites from the Bronze Age to the Iron Age yield very few sherds when excavated. The explosion in pottery manufacturing that typified the Late Iron Age-Roman Iron Age period has undoubtedly led to a skewed representation of the number of sites known from surveys in the province of Noord-Holland. The same applies to recognising Early Medieval traces, which were not stratigraphically discernible in the case of the Broekpolder, and, again, yield little pottery. Theories concerning colonisation and migration in the coastal zone in general are strongly linked to the number of sites established through sherds, without taking into account the fact that the number of pots being made fluctuated greatly over time. Potsherds do not represent in any linear fashion the number of inhabitants, based on the number of 'settlements'.

With more funding, traditional archaeological assumptions can be tested by other means: firstly by budgeting sufficiently for dating, and by developing new criteria for establishing 'periods' at survey level. This applies, as demonstrated, to assumptions (still broadly held) about correlating the manufacture date with the date of deposit of Roman goods; only checks on the actual dating by independent means can begin to clarify past ideas on past goods.

The danger of ignoring low-lying areas was amply demonstrated during the excavations, and it is unfortunate that they could not be researched more extensively during the project. Prehistoric creek depressions had been partially re-dug for some of the Medieval ditches. Depressions over these early creeks were also used, as shown by the Medieval horse deposit found in tr 8. Future research should include damming off, and draining, such modern field ditches so these types of earlier features can be fully examined. Low-lying areas and open water are a well-known context for single (weapon) deposits in the Bronze Age (cf. Fontijn 2003). Such deposits have only been recovered by chance in the province (cf. Kok 2008). The absence of 'offering' sites for the earlier periods in the Broekpolder, the early Roman Iron Age, could well be due to the failure to excavate these early channels originally cutting through the ridge.

The two larger offering sites now known in Noord-Holland – here in the Broekpolder and in the Velserbroek polder – clearly show continued use into the post-Medieval period in terms of re-marking and use for making deposits. This practice in NW Europe is also known from texts, particularly Scandinavian texts, and has been established in the Netherlands (e.g. Van Vilsteren 2000). The duck decoy pool (to the east of tr 24), which was probably a specially dug pool, may have contained indications of deposits similar to the complete pot recovered. It would have been useful to drain and excavate the pool, which still exists, to establish when it was dug and if it was used as a depository for finds from whatever period. Draining the 'star-shaped' ditch pattern in the lowest part of the polder, to the east of tr 48, could have given us a greater understanding of the duration of use of this low-lying area beyond its 10th C use as an offering site.

Landed reparcelling proceeded steadily in the province during the 20th C, and there are presently very few areas where the Medieval field pattern is still intact, as it was in the Broekpolder at the beginning of the project. Even when reparcelling has taken place, older maps will give indications of where generally lower-lying areas were, and possibly something of a much earlier, natural drainage system in the winding trajectories of field ditches, as disguised prehistoric creek systems.

Environmental research in archaeology

An expensive nuisance or an absolute necessity for understanding prehistoric society?

by Willy Groenman-van Waateringe

Environmental research in archaeology has a long history. The classic example is the committee of scientists representing different disciplines, formed in Denmark in the 19th century, to study the køkkenmøddinger – Mesolithic rubbish dumps. In the course of the 20th century, with settlement excavations coming to the fore, it was felt that the many biological remains – animal bones, molluscs, seeds and fruits, wood (carbonised or non-carbonised) – had to be identified, since they could provide more insight into the exploitation of the local environment, and perhaps indications of exchange/trade, and so on.

To evaluate these data and place them in their proper context it seemed necessary also to study the 'natural' environment. This is a contradiction in terms as soon as man is involved, however, since geology, topography, vegetation and fauna are all influenced and altered to some extent by human presence. Thus, it is not enough simply to study the biological remains at a site; they have to be placed in the wider context of the surrounding (and broader) environment. Which disciplines are required depends not only on the complexity of the geological, vegetational and faunal history of the site, but also on the preservation conditions for the various kinds of material which might theoretically be studied.

Environmental archaeology acquired an unfavourable reputation in the 1980s and 1990s. It was accused of being deterministic, since it argued that prehistoric societies depended entirely on the possibilities the landscape offered. Man had no choice; his environment predestined his existence. This negation of the value of ecological research was also partly due to the way in which most environmental data were handled by archaeologists. Often the results of geological, botanical and zoological research were presented in tables and graphs at the end of an excavation report, entirely separate

Though fields are also sometimes levelled during parcelling operations, destroying traces in higher areas, the lower-lying traces will certainly be preserved. The tendency to regard reparcelled polders as archaeologically uninteresting is perhaps warranted when it comes to researching farmhouses, but the possibility of examining still intact lower-lying traces certainly still exists. These areas remain the least understood type of landscape situation.

4.3 Expected traces preserved by the monument

Chapter 2 mentioned the absence of farmstead plans for three of the periods represented by other types of traces found in tr 31 – 33 and tr 45 & 49. Calculations were also performed for the northern segment of the ridge, taking into account the numerous ^{14}C datings, the minimum and maximum durations thus derived and the number of dwellings found, as well as the best estimate of duration of habitation per dwelling. There is no reason to suspect total abandonment of the site in the Roman Iron Age period, and possibly even into the Early Medieval period. The monument encompasses areas belonging to two of the suggested three 'family territories'. About two-thirds of the 5 ha monument is part of the northern 'family territory', while the remaining area belongs to the central segment, the areas separated by a preserved W-E creek bedding. In each of the preserved segments, one can expect to find:

- Early Iron Age strip fields, and possibly dwellings
- farmstead complexes, including pits and house plan(s) dating to the Middle Iron Age
- multiple Late Iron Age/Roman Iron Age farmhouse plans and associated features, particularly pits
- very possibly 4th C feature complexes, including dwellings
- farmhouses and related feature complexes from the 6th/7th C, including fields
- the 125 m trajectory of a creek, cutting W-E across the monument, which formed in the Bronze Age. Levees were visible to either side. Still a depression to the present day, deposits were almost certainly made in this creek, possibly as early as the Bronze Age, and probably intermittently during the Iron Age and Roman Iron Age. While the offering site excavated adjacent to the monument is 6th/7th C, earlier use for deposits during the (later) Roman Iron Age may be represented in the preserved area. Considering the dated deposit of horse bones in another creek to the south (tr 10 etc.) Late Medieval and post-Medieval deposits were probably also made in this depression.
- about 80 m of the low dyke that forms the border between the municipalities of Heemskerk and Beverwijk (Kadijk).
- modern features, including the ditches along the tertiary

from the main publication. Sometimes the environmental data were published in advance of the full excavation report, and the lack of information exchange between environmentalist and archaeologist meant that data were presented in a poor interpretative framework. Discussion of all the data, environmental and non-environmental, and attempts to reconcile apparently contradictory evidence takes time, but is extremely rewarding in the end.
The aim should therefore be discussion from the very beginning of fieldwork, open presentation of data, comparison of results, and attempts to understand each other's data and clear up points that do not fit at first sight. Integration of all the evidence in the final report is the combined task of archaeologists and environmentalists. In fact there is no difference between the two. They are both dealing with all aspects of human activity, from the simple need to feed oneself to social and religious life. Although the archaeological data represent an incomplete picture of the past, all the evidence taken together, with the emphasis on 'together', often allows us to sketch a more or less satisfying image of historic or prehistoric society.

In the Broekpolder project, all facets of environmental research – geological, botanical and zoological – were taken into consideration from the start. The environment was subject to extreme change – not linear from marine to brackish and freshwater, but switching from one to the other and back – with differences in elevation, brackishness and soil type over short distances. Detailed investigation of the changes over the length and breadth of the polder, over the course of time were vital for understanding the Broekpolder's settlement and use history. Working closely together, with regular meetings, clear questions from both sides and an open mind in the search for answers resulted in a detailed history of the site and its surroundings and an integrated report on all the data gathered over three seasons of intensive archaeological research.

roadways, containing illegally dumped waste, from high-heeled shoes to refrigerators; the old A9 motorway foundation trench and, abutting this to the west, tree roots (poplar & hawthorn) from a 10 m wide stand of trees; buried building rubble extending over an unknown area, adjacent to the disturbance found in tr 47.

One of the great advantages of preserving this area is the mass of features likely to be present beneath the monument. If one of the points of preservation is to wait for better methods for understanding the past, developments will certainly help narrow down the range now offered by ^{14}C dates. Trench 49 is a good example of the problems of defining even the sequence of activities within a timeframe. It does make a difference when picturing the past if there was conglomerated settlement followed by settlement abandonment. Or if dwelling sites were shifted along the levee area, having been occupied for about 25 years each, over the period 100 BC – AD 700. It is impossible to say now whether the three Late Iron Age dwellings found were built successively, or inhabited contemporaneously.

The dozens of pits undoubtedly preserved in the monument have the most to offer in terms of range of finds. Pits are features containing rich archives of information on what type of material culture was imported, made and used in settlements in two main periods: around 400 BC and c. 50 BC – AD 300. There is undoubtedly an enormous wealth of information in the monument area, and wooden objects and other organic remains are still considered most important; 3rd – 4th C pits may also be present.

Macroremains analysis has shown the importance of samples derived from pits, and the 'flax factor' in the Broekpolder is currently one of the best-defined in the Netherlands. Sampling and delineation of dung/intestinal remains during excavation yielded a great amount of information, thanks to their excellent preservation. It is possible to gather samples very specifically in these conditions. This applies particularly to cut sods and dung, which contain an enormous amount of information on habitat and exploitation. Compared to what was being done even fifteen years ago in the Netherlands, the methods now being used to determine macro-inclusions are proving decidedly more helpful in narrowing the gap between supposition and reasoned interpretation. A concerted effort, requiring investment, could be made to advance ecological analysis, moving on from generalising about crops and livestock towards formulating new questions based on newer methods and specified goals (see box by Groenman-van Waateringe).

Archaeological landscapes and monuments

by Heleen van Londen

The *archaeological landscape* perspective provides a framework for archaeological heritage management that differs somewhat from the traditional approach. Clearly defined spaces, such as settlements or burial mounds, are not difficult to mark. The list of archaeological heritage monuments in the Netherlands typically includes sites with very clear spatial boundaries. Landscapes are unlimited in time and space. The definition of meaningful ensembles is the key to preserving archaeological landscapes, and these will of course change and develop over time according to prevailing attitudes. Information is needed to preserve landscapes in addition to the main physical aspects and identifiers that are found often enough to build a case for protective measures. Knowledge of habitation models and land use, such as presented in this volume, are the basis for defining ensembles. A meaningful ensemble can consist of a diachronic context or a single time layer context, or a combination of the two. Its contextual aspects or *components* can be located together or spatially separated. The concept of a *component monument* offers a workable tool for heritage management of landscapes.

In the case of the Broekpolder monument, a boundary was defined in a landscape based on palaeomorphology and archaeological indicators assumed to be related. Now, in hindsight, meaning can be given from the archaeological landscape perspective. This monument harbours a diversity of randomly chosen windows into past landscapes from the Bronze Age onwards. The location tells only part of a story, but it has a complete sequence. The monument, together with the information collected around it, offer the opportunity to select other, missing components in the future, in order to protect representative samples of archaeological landscapes.

4.4 Other opportunities not explored

If one persists in the mental construct that higher-lying areas are the most 'interesting' because that is where people lived, one will keep finding where people lived: their houses. Dwelling structures are relatively well understood in the region. Therefore, if a choice has to be made, tracing and preserving other types of features belonging to other types of complexes should be the focus in the future. If reconstructing a representative past is one of the aims of creating archaeological monuments, and there is another opportunity such as that afforded by the Broekpolder landscape, a selection including both high and low areas must be considered. Even broader considerations associated with archaeological and geological features would be an interesting alternative.

The Oer-IJ channel is a very large landscape feature. As suggested, it may very well have functioned as a border between cultural groups, as a route for transportation by water, as a place of ritual deposit and as a repository of information charting geo-ecological change from about 2500 BC to AD 1000. It may also very well have been a focus of cosmological landscape representation, for transporting the dead – all those, from both sides of the channel, perhaps, who are not reflected in the archaeological record in cremations or burials. It could well be a reservoir of well-preserved archaeological remains, including boats, rafts, bodies and 'grave' goods. No portions of the channel have ever been examined under controlled conditions, nor is there a monument preserving any part of this natural, but also exceedingly important, cultural conduit.

The specialist – particularly period specialist – approach to the past can lead to aspects perceived as 'uninteresting' being overlooked, and 'interesting' facets being preserved, creating an often one-sided view of the past. In Holocene areas in many parts of the province a wealth of information is available for most periods. Because of shifting local patterns of use in the diachronic sense, 'interesting' features may be fairly scattered, or it may not be feasible to preserve a contiguous area of landscape zones for one period. 'Component monuments' might be a solution, depending on the circumstances (see box by Van Londen).

In the case of the Broekpolder, many components of the landscape could have been incorporated into the housing estate. They were visible as a fossilised pattern when plans were made for the street plan and the accompanying blocks and layout of the modern dwellings. 'Archaeologists' were too late to advise on this process, but interest is growing, and there were themes taken from surrounding, known landmarks of regional cultural history *(fig. 85)*. Archaeological heritage and the created visual quality of landscape is discussed by Bloemers (see box).

Archaeological heritage management and the Image Quality Plan *(Beeldkwaliteitsplan)*

The case of the Broekpolder development scheme

by Tom Bloemers

Introduction

Environmental planning policy is a major public issue in the Netherlands, a country with both densely populated metropolitan areas and rural areas that has its economic base in intensive agriculture, industry, trade and transport. The fundamental concepts that guide and legitimise such long-term planning are *dynamism and quality*.

Dynamism is a planning concept whereby conditions develop in accordance with the historically important idea of improvement, expressed by evolution and transformation. For example, our present archaeological sites, as landscapes, are the result of a long-term process of human intervention from prehistory onwards. This compels archaeologists to participate in the development of the present landscape by providing information on what it was like in the past and offering help with interventions in the present. This is our responsibility to both past and future generations (Achterberg 1994).

Quality is determined by function and potential for combination with other functions, by meaning given to certain elements of the environment and by the value they hold for future sustainable development. Quality in the environment is achieved by appealing to the identities these elements create, by the diversity of elements and by the coherence of various facets of the environment. Archaeological values can contribute to these aspects of quality, in combination with historical and geographical elements.

The Dutch government launched the Belvedere programme (in its Belvedere Memorandum 1999) on the basis of a joint effort by four government departments – the Ministry of Education, Culture & Science, the Ministry of Housing, Spatial Planning & the Environment, the Ministry of Agriculture, Nature Management & Fisheries, and the Ministry of Transport, Public Works & Water Management. The Belvedere programme is a response, from a cultural heritage perspective, to the aims of environmental planning policy. Three types of cultural heritage resources – archaeological, historical-geographical and historical – are considered from an integrated perspective, in a process known as 'internal integration'. Heritage policy had previously treated these fields as separate entities, so a fundamental step forward has now been taken, linking the long-term past with the present and future use and development of the environment. This is known as 'external integration'. The link is founded on the concept of 'protection by development' of cultural heritage resources in urban and rural areas, based on the fundamental notions of development, sustainability and quality, as they relate to architecture, infrastructure and the natural environment. The notion of cultural heritage values as a resource for experiencing and expressing identity by conservation, innovation and design is fundamental. The combination of cultural heritage value with various other functions should create conditions for protection by development whereby the keyword is *multifunctionality*. The programme encourages national, regional and local governments to create and exploit opportunities inherent in the historic landscape. Pilot projects involving landscape, urban planning and architectural design completed over the last five years anticipated the concept, and they can be used as examples for Belvedere policy (Van Marrewijk *et al*. 1998; Linssen & Strolenberg 2002).

Belvedere policy strongly supports implementation of one of the most important goals of the Valletta Convention (1992), set out in Article 5: the sustainable protection, conservation and enhancement of archaeological resources by integration in planning policies. One of today's tasks for archaeologists is to develop a pragmatic approach towards opportunities created by the Belvedere and Malta policies, and by existing procedures and instruments such as Image Quality Plans (IQP).

The Image Quality Plan and its application in the Broekpolder development scheme

The Image Quality Plans (IQP), first introduced in 1992, has no legal status. The concept of 'image quality' has been defined as 'all aspects that influence the representation and perception of the spatial environment and its objects. … A Quality Plan is a coherent set of intentions, recommendations and/or guidelines to safeguard, create and/or to improve visual quality in a certain area' (Kuiper Compagnons 1992, 12, 20). It can serve three purposes, acting as a policy framework, as a framework for design and construction and as a set of criteria for assessing plans and dimensions. The IQP is an interesting concept, and a useful tool for achieving the goals of Belvedere policy. It has only recently been applied in the context of archaeological heritage management, the Broekpolder development scheme being one example. The process and provisional results will be described insofar as they pertain to the >>

archaeological and historical geographical values in the Broekpolder development scheme.

In 1997 the municipalities of Beverwijk and Heemskerk commissioned Teun Koolhaas Associates to draft a Image Quality Plan. The IQP is a specification of the urban planning programme one condition of which is that the scheduled archaeological monument must be preserved. Special conditions regarding earth removal operations and the water table were stipulated for the archaeological monument. In addition, it was to be integrated into a tourist route connecting various archaeological and historic monuments in the surrounding area *(fig. 85)*: the earthworks of the former castle at Oud Haerlem, Assumburg castle and, between Aagtendijk and Veldhuis forts, parts of the *Stelling van Amsterdam*, a network of late 19th-century forts and inundation works built to defend Amsterdam, which is a World Heritage Site (*Broekpolder Beeldkwaliteitsplan* 1998, 8 – 11). The next step, in 1998, was to conduct a study exploring the spatial development potential in the Broekpolder (*Ruimtelijke Verkenning middengebied Broekpolder*), which sets out a more detailed and coherent development strategy for the various cultural heritage features in the region. It also contains a more detailed design for the scheduled archaeological monument, incorporating parts of the remaining dyke and roads and presenting ideas for accentuating and visualising the occupation history of the site.
Presented in June 1999, the *Groenplan Broekpolder* ('Broekpolder Green Plan') was prepared by Buro Adrichem in cooperation with the two municipalities and Amstelland Vastgoed bv, a developer. The plan attempts to integrate cultural heritage features with ecological values in the broader landscape, and with the geological origins and genesis of this estuarine area. The historical dimensions of the landscape are characterised by four time layers: the pre- and protohistoric period; Medieval castles and strongholds connected with altercations with the Frisians; Medieval reclamation and water management in the region; and the construction of the 19th-century *Stelling van Amsterdam*. Forts and embankments also function as elements of the ecological structure of the development scheme, at the urban programme and regional level. Three parks were planned for the Broekpolder housing estate: Aagtendijkpark, Florispark, and a park over the monument, known as *Vlaskamp* (Flax camp). Cultural heritage and ecological features have together created a basis for a recreational structure with various walking and cycling tours and sports facilities (*Groenplan Broekpolder 1999*, 7 – 18 and 36 – 43).

Evaluation of the Broekpolder IQP
The Broekpolder IQP is an interesting case study that allows us to evaluate the processes, opportunities and problems associated with pursuing the aims of the Belvedere programme in the specific context of a new housing scheme. The critical conditions are the spatial framework – including 'hard' elements like roads and railways – the attitude of the client towards the cultural heritage environment and, finally, the financial constraints.
The shape of the Broekpolder development is to a great extent determined by its situation, bordered by the railway along the west side, and the A9 motorway to the east. On the west side there is an open connection between the housing and the railway station, while on the east side people's homes are separated from the motorway by a high embankment.
The two municipalities – Beverwijk and Heemskerk – clearly stated their intention to add cultural heritage value to the new residential development and the surrounding area. Between 1997 and 1999 they took the first three steps in preparation for this. The provisional results for the housing estate itself were limited to the five hectares of scheduled archaeological monument, but the details of its design had still not been finalised. This could potentially create an unfavourable situation whereby the design of the archaeological area lagged behind that of the residential area.
However, the archaeological monument is located between the central area of the development and the railway station. The complete discontinuity between the remaining east-west parcelling of the former rural landscape and the newly designed north-south orientation is striking. The new orientation follows the ridge on which the archaeological monument is situated.
From a slightly broader perspective encompassing the surrounding area, there is a network of interesting cultural heritage features that served as defences over the last eight centuries. They will be linked by a cycle route that connects historically interesting points. From a visual perspective, however, the landscape of the network is highly compartmentalised. This applies particularly to the embankment along the A9 and A22 motorways, which separates the line of forts from the area they originally protected, and to a lesser degree to the railway track. The same problem arises at the regional level, where present land use still partially reflects the geologically important Oer-IJ estuary, the course of which is in some ways essential to our understanding of landscape development over the past four millennia. The built-up areas of Heemskerk and Uitgeest are mainly located on coastal barriers and

separated from each other by the silted up depression of the former estuary channel. As a landmark, this unbuilt zone should be maintained, but it is gradually being overbuilt.

The Broekpolder IQP is relatively good compared to other plans in the Netherlands (Steenbergen 2000). It reflects clear compromises between different land use functions in a strongly urbanised environment that is most notably illustrated by fragmentation of the historic landscape. Implementation of the design depends to a great extent on the developer and the municipalities. Their involvement, and engagement with future inhabitants, determines what choices are made and what elements contribute to the identity and diversity of the new landscape. Another crucial factor lies in how the archaeological authorities – in this case the State Service for Cultural Heritage – foster this process by presenting information to serve as a source of inspiration and as material for reflection. The Broekpolder IQP nicely reflected the state of Belvedere policy at the time: less then halfway between intention and implementation. Consequently, we still have a long but fascinating way to go, marked by a series of pilot projects like the Broekpolder example.

Application of the IQP in the Netherlands

The Broekpolder case is just one of several similar initiatives in the Netherlands of the late 1990s and early 21st C. Marieke Steenbergen described and analysed six other planning processes involving archaeological values (Steenbergen 2000). Four of them (Utrecht-Leidsche Rijn, Bemmel-Essenpas, Delfzijl-Weiwerd, Leiden-Roomburg) can be compared with the Broekpolder situation, where ensembles of archaeological or more general cultural heritage values had to be integrated into new residential or industrial building schemes. Valkenburg-Plenckertstraat is a somewhat atypical case, as it concerns a point-like feature at the entrance to prehistoric flint mining complexes in an existing urban area. The case of the former island of Schokland, a World Heritage Site set in a rural landscape, is the only example where cultural heritage value is a dominant factor in a planning context characterised by low dynamism.
The cases analysed by Steenbergen show four ways that archaeology or the cultural heritage can be used as a source of inspiration:

- Planning public parks covering (scheduled) archaeological monuments.
- Designing an urban layout based on an existing historic field, road or drainage system.
- Creating an atmosphere perceived as characteristic of past cultures and local identity.
- Organising exhibitions about and creating tourist routes linking local monuments.

Steenbergen's conclusions are informative, and allow a provisional assessment of the application of IQP in situations where archaeological values are integrated in the planning process. The instrumental function of the IQP is defined in different ways by different officials, but most often it is associated with the architecture of the built environment or the appearance of the streets. It can be used as a policy framework, as a framework for implementing and referencing that policy, and as a source of design inspiration. Application of a IQP as a policy framework relevant to archaeology tends to be an exception, rather than the rule. However, the design of the Masterplan – a phase in the planning process before the IQP – for Utrecht's Leidsche Rijn development was strongly influenced by the 'cultural heritage impact assessment report' (*Cultuurhistorische Effectrapportage*, CHER) prepared especially for this major urban development scheme, one of the largest in the Netherlands. By 2000, however, archaeology was no longer included or mentioned in any explicit way in the individual plans for parts of Utrecht-Leidsche Rijn (Vleuterweerd, Veldhuizen, Rijnsche Park).
In the Broekpolder case, the IQP was intended to support the planning process and its coordination, enhance the cohesion of various aspects, and foster communication. The Broekpolder, Bemmel-Essenpas and Leiden-Roomburg are good examples of the use of a IQP as a source of inspiration in an archaeologically relevant context.

Provisional assessment of the IQP

It is evident from Steenbergen's study that the IQP has the potential to become a crucial instrument for the integration of archaeological and cultural heritage values in general and in attempts to enhance the quality of environmental development in a way that is consistent with Malta and Belvedere policy. One absolute precondition is that archaeological institutions and their representatives are open-minded about the aims of these policies. This implies not only a willingness, but also the capacity to make available the archaeological information needed for their implementation, in an adequate way and at the appropriate moment. However, two aspects in the planning process itself are also critical for its success: the formal and informal status of the IQP and its stakeholders during the planning process, and the creativity and quality of urban and landscape architects and planners who transform cultural heritage values in their designs. These two aspects are closely linked to a third aspect: the quality of >>

those – generally local authorities and/or commercial developers – who commission the plan. As stated IQP is an instrument with no legal status and no clear definition, which makes its status and function in the formal planning process somewhat unclear. Successful application depends on the fortunate combination of planning authorities and individuals with an interest in the cultural heritage. Most of the cases described by Steenbergen involved scheduled archaeological monuments of national or regional importance, a circumstance that forced planning authorities to cooperate with the State Service for Cultural Heritage which both represents national authority and serves as an expertise centre supplying specialist information. This association gave rise to a process whereby local authorities confer with the archaeological authorities to develop their own selection of cultural heritage values and an architectural design for integrating them. This process creates public support for protection by development and stimulates the expression of local identity.

The second critical factor is the role of architects and planners and their ability to integrate archaeological values in designs, within the constraints of the political and financial requirements. This is a completely new experience for architects, planners and archaeological heritage managers. Knowledge and understanding across disciplines is very limited at present, but without architects and planners there will be no 'protection by development' in an urbanised environment like the Netherlands.

The results of a 1999 seminar on designing for the archaeological heritage showed how these two worlds might be brought together (Van Marrewijk et al. 1998; *Archeologie en ontwerp* 1999). The creativity and professionalism of architects and planners and their approach to research by design can lead to surprising results. They have to take account of both the past and future depth of time, and long-term trends in the transformation of the historic landscape. From this perspective, archaeologists face interference from other parties carrying out their responsibilities for managing the archaeological past.

My final conclusion is that IQP, a consequence of Malta policy, is a fascinating instrument for the implementation of the Belvedere concept of 'protection by development'. Examples of their implementation in an archaeological context demonstrate at the same time the potential, the weaknesses and the immaturity of the processes involved. There is for example a risk that expert knowledge or architectural design will be abused for the mere 'window dressing' of a conventional design tradition. Or an IQP might amount to nothing more than a compilation of isolated features lacking any meaningful narrative of the past. A great deal of experience needs to be gained in pilot projects, and there is much to learn in terms of training archaeological, planning and architectural professionals. The challenge is to combine and use the knowledge and the innovative potential of three disciplines: archaeology, environmental planning and architecture.

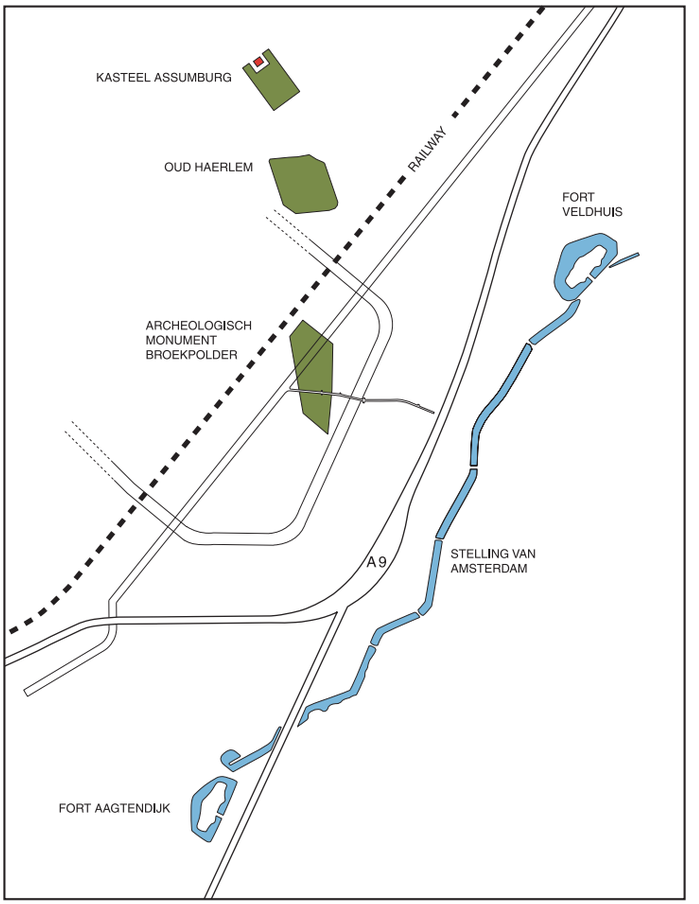


Fig. 85 The Broekpolder housing development and archaeological monument was viewed in relation to nearby cultural-historical monuments: Assumburg castle, Oud-Haerlem castle and the two fortifications Veldhuis and Aagtendijk belonging to the Stelling van Amsterdam (see box Bloemers).

4.5 Monitoring, the public and landscaping

Monitoring

The ROB monitored the condition of the archaeological traces and the burial conditions in 2002, as outlined by Van Heeringen, Smit and Theunissen (see box).

Publishing for the public

During the archaeological project, various methods were used to inform the public about progress and the findings of the excavations. They included open days every two weeks, regular media reports to the local newspaper and radio, exhibitions of finds, photos and drawings, and regular contact with the municipal authorities.

In the final stages of its involvement in the Broekpolder, the University of Amsterdam acted in an advisory capacity in the planning process for the monument, as briefly described below, and commissioned a book, in Dutch, in conjunction

with the province and the ROB. A professional author specialising in publications for the general public, Gertrudis Offenberg (2003), wrote the book based on seven interviews with people who had been associated with the recent history of the Broekpolder. These stakeholders[1] in the history of the polder were a former inhabitant who became a professional Medieval archaeologist and expert on the region, and who as a boy criss-crossed the empty polder on his bicycle carrying his father's produce to customers; a farmer whose family had worked in the polder for generations until relocated for the housing development, and whose land we excavated; an urban planner involved with the Broekpolder housing estate; a representative of the State Service for Cultural Heritage; an expert on Holocene geology and coastal dynamics; an archaeologist who has summed up some of the findings of the conceptual past; and the landscape architect commissioned to create an attractive and engaging park over the monument.

Archaeology in the future

Monitoring the physical quality of the monument in the Broekpolder, 2002

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Why preserve for later?

The excavations covered in this publication clearly show what types of interpretations can be drawn from archaeological features and material culture. However, excavations cannot be repeated, and the subsurface archaeological resource created by human activity over thousands of years is so complex that it is not possible to record all the information it contains by means of excavation. Future generations of archaeologists will reach different insights, create new paradigms and raise new questions requiring new research techniques. These considerations have led to a desire to preserve something of archaeological traces *in situ*. One area of the Broekpolder monument was not excavated and has been preserved beneath a park in the housing estate. The 5 ha area was declared an archaeological monument by the Minister of Health, Welfare and Culture in 1997. The stories of the past are preserved here in successive layers, the condition of which determines the value of the monument.

A vulnerable heritage

In situ protection is meaningful only if the archaeological features and material culture remain present in the ground. They are enfolded in a 1 m thick stratum of habitation layers and dug features, dating from c. 700 BC to AD 1000, located on the remains of the salt-marsh ridge. In the central part of the monument, the most recent Medieval layers have already deteriorated: dozens of sherds were recovered from molehills. The cultural layers from the Roman Iron Age period are only 30 cm beneath the surface. Clearly, this vulnerable situation had to be taken into account in the design of the park.

But there is another form of degradation, not immediately apparent, which is more gradual. Many of the finds consist of organic material such as wood, bone, seeds and fruits that deteriorate rapidly when exposed to air. These find categories, brimful with information, are a very special element of subsurface archaeology in wetland situations, and are often absent at sites on the higher sandy soils of the Netherlands. Perishable materials have been preserved for so long in the soil because the waterlogged soil matrix contains little oxygen. Fluctuations in the groundwater level, any lowering of the water table in the district, or changes in the chemical composition of the groundwater have a negative influence on organic material as the soil becomes more oxygen-rich, prompting the slow decay of the organic component.

Determining present quality: to measure is to know

Knowledge of the present quality of the soil was needed in order to take effective measures for the design and monitoring of the Broekpolder archaeological monument. The research sector of the ROB, working with the firm Paleo Terra (Amsterdam), implemented a programme to measure the present burial environment in April 2002. This type of research is new, and it is developing rapidly (Kars 1997, Van Dockum et al. 2001, Soonius et al. 2001, Van Heeringen & Theunissen 2002).
The archaeological layers are the key focus of any such programme. The layers can be measured by various means. Firstly, soil samples are taken from the layers for analysis to determine the quality of uncharred botanical macroremains and the organic matter content. Secondly, a number of parameters of the soil environment are established. The focus is on the context (embedding and level) of the cultural layers, the redox boundary, the water table in relation to the layers, and the quality of the groundwater. >>

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Methods

To establish these parameters, seventeen samples were taken by core-boring in the monument in March 2002 (and see drawing RAAP, AAC). The work was performed by RAAP (Archaeological Consultancy Amsterdam), in collaboration with the AAC (Amsterdam Archaeological Centre) and the ROB. The quality of the organic remains in the archaeo-samples was analysed by various specialists .
In addition, a long-term monitoring programme was launched using nine dipwells connected to the appropriate input and output devices. Sixteen electrodes were also installed at selected positions and varying depths to measure the oxidising capacity of the soil. A brief explanation of the measuring equipment follows (cf. Smit 2002 for more detailed information):

Water table
The water table was monitored in nine dipwells, which were placed at the borders as well as in the middle of the archaeological monument, to a depth of about 2 m below the present surface level (see photo). The lower meter of the dipwell consists of a filter, which permits the infiltration of groundwater into the dipwell. Above the filter, a 1 m long second sleeve has a bentonite seal to prevent rainwater from entering the tube through the borehole. The dipwells at locations 6 and 9 have integrated dataloggers that automatically record the groundwater level four times a day. In addition, the groundwater level was manually recorded once a month at all monitoring locations. In June 2002, a GSM device was installed to transmit daily measurements to a desk-top computer. Thanks to the involvement of the ROB, it was agreed in the zoning plan for the Broekpolder monument (*Ontwerpbestemmingsplan* 1997) that the polder water level would be raised. A ditch with a high water level was planned around the monument to ensure that the groundwater stabilised at – 1.10 m NAP. At an average surface level of – 0.34 m NAP, stabilised drainage is at 76 cm (the difference in the height of the water table in the ditch and the height of the land surface). In 2002 Waterschap Het Lange Rond, the district water board, formally instated this water level.
Measuring the water table during monitoring should reveal current variations in the water level in the monument. Initial measurements at dipwell locations 6 and 9, taken between April 14th and May 14th 2002 showed a change from – 0.80 m NAP and – 1.50 m NAP. The lowest level, – 1.50 m NAP, is close to the average depth of the redox boundary which was visually established from a core-boring at – 1.60 m NAP. One can therefore tentatively conclude that during certain periods the water table in the monument falls below all cultural layers.



Redo potential (reduction/oxidation)
Redox electrodes were installed at each depth 30 cm away from each of the dipwells. A redox electrode consists of a platinum tip – the actual probe – connected to a copper wire. The platinum wire is placed at the desired depth in the soil. The copper wire extends to the surface and is connected via a calomel reference electrode to a millivolt meter. Once a month, at the same time as the water table is recorded by hand, the redox potential is recorded at each depth. The reference electrode is lowered into the dipwell to groundwater level. The recorded values (between – 400 and + 800 mV) are a measure of the increasing oxidising potential of the soil.

Acidity (pH value)
Soil samples were taken twice, near each measurement location, during the first monitoring year (2002 – 2003). To avoid disturbing the redox electrodes, soil samples were taken about 2 m from the dipwells and redox electrodes. Seven samples were taken at 20 cm intervals from each soil column, starting about 20 cm below surface, and extending to 1.40 m. The pH value was established in a laboratory.

Electrical conductivity of groundwater
Once a month – at the same time as the water table and the redox potential recordings were made – the electrical conductivity of the groundwater was measured in the dipwells. The value indicated whether there was percolation of brackish or salt water. This is an important factor influencing the preservation of metal finds.

Oxygen content of groundwater
Experience from other monitoring projects – at Schokland and Voorne-Putten – and evidence in the literature (Sørenson & Gregory 1998) reveals difficulties associated with taking precise recordings of the oxygen content of groundwater using traditional Clark electrodes. The greatest problem lies in collecting groundwater without introducing oxygen. Moreover, it is technically impossible for Clark electrodes to operate in the soil for any length of time. Recently, a new type of oxygen electrode has been developed, which is now available as a meter with an integrated datalogger. Various experiments with this new electrode were planned for the Broekpolder monitoring project. Initial results will determine what measurements should be taken with this new device.
As has been noted above, methods for monitoring archaeological sites *in situ* are still developing. In the case of the Broekpolder monument, it was assumed that the baseline situation could be established satisfactorily after one year. Subsequently, the monument trustee requested that conditions be set out for a plan of action *(plan van aanpak)* for the monitoring of the physical condition of the monument.

A safe archaeological monument
The Broekpolder monument was dominated by pastures with grazing livestock, in which a Medieval winding ditch pattern was still visible, cut in two by the old motorway. This image was transformed into a green oasis enclosed by the housing estate in 2006. The archaeological monument has been incorporated into a park, managed responsibly on the basis of the quality of what lies underneath. New inhabitants of the old polder can enjoy the park while, safe beneath their feet, lie the accumulated layers of information on a distant past.





Landscaping the monument

Plans for developing the monument were finalised in 2002, and carried out in 2006. Landscape designer Marieke Adrichem of Buro Adrichem was commissioned to design the monument park, which was to be known as Vlaskamp ('Flax Camp'). A supervisory committee was formed consisting of municipal and provincial representatives, infrastructural and landscape advisors, commercial developers, artists, an ROB representative and the director of the archaeological project. In discussions with the ROB as to what would be permitted, and with the senior author about what had been found archaeologically, a final design took shape. It was generally agreed that the monument should retain an open character, and that two aspects of the recovered remains would be emphasised: the ridge and the offering site *(fig. 86)*. The shopping centre had already been planned over the excavated offering site (tr 41 & 48), and was to have a Medieval character in terms of its architectural style. Fortunately, a broad area of water had been planned between the shopping centre and the monument.

The idea of the Early Medieval offering site, quite an exceptional site for the province, was taken up in the planning of the monument itself, in combination with the water channel, more importantly, thus mirroring the idea of the pool where so many finds had been deposited. The present site lends itself to active involvement, in terms of the interpretation of the past seasonal use of the pool and the orientations of the stakes towards the constellation of Great Dog (Canis Major): the seasons and stars are still with us, after all. The orientation and the rising of the constellation in the SSE is something that can be witnessed by anyone who is interested, simply by repeating something that was done in the interpreted past. However, artists and landscape architects implementing the project came up with the idea of highlighting the theme of 'water offerings' by creating new symbols and rituals specific to the Broekpolder's new inhabitants. They combined two elements of deposits at the offering site – the double spiral and the white pebbles – in the gifts given to each new family, which they could choose to 'offer' in the newly created pool. The large new water feature is bound to the idea of the Milky Way (rather than the ridge in the interpretation of the past) and the constellations represented in the floating islands different from those thought to be represented in the traces (cf. Pr. Noord-Holland 2005, 73 – 75). Though there is a thematic connection, there is no direct harkening back to the past.

Another art-landscape project involved designing a 'skating creek'. Adrichem had envisioned active use of the monument park by a certain age group for a certain activity: skating and skateboarding. The area covers a part of the creek which originally fed the offering pool. Not just a slab of cement, the 54 x 8.5 m feature, a labyrinth, is a completely functional piece

Fig. 86 Two views of the 5 ha. archaeological monument, where ideas of use and the design (by Bureau Adrichem, IJmuiden), has since been implemented. Features commemmorated on the monument are:
a The ridge with flax. A hightened area along the west side of the monument;
b The offering pool;
c The remnant creek bedding, now a 'skating creek'.
Also included by the municipalities were contracts for landscape art such as (above) a snake in the watery pool. Below, looking from the south, the most southernly point of the monument.

of landscape art designed by artists and landscape architects (Mauer United Architects, Eindhoven), based on the wishes of professional and local skaters, and in keeping with the archaeological theme (Province of Noord-Holland 2005, 76 – 79).

The park design also includes the most salient landscape element excavated: the salt-marsh ridge. A small-scale ridge on the monument gives the otherwise flat park some contour, thus engaging visitors and users with a visible landscape form. Relatively prominent features of this type, by which attention was drawn to the archaeology of the Broekpolder, are becoming very scarce indeed in the region. Thus, a rare site is being 'commemorated' in the offering site, which was completely excavated, while another, a portion of the ridge, is preserved beneath the monument as a typical example of prehistoric landscape use, as well as being made more noticeable above ground.

The planting in the park draws attention to the past vegetation, from prehistoric times through to the post-Medieval period. Along the edge of the water, low hedges suggest the curves of the ditches found bordering the early Medieval offering site *(cf. fig. 35, fig. 86)*. Rows of trees planted on the newly created ridge are oriented like the ditches (LIA/RIA) recovered around the monument. The botanical analyses of archaeological traces suggested a continuity and the likely importance of flax cultivation from c. 400 BC through all periods up to the bundle of flax in the post-Medieval retting pit. Fields of flax lend colour and texture to the monument, and they are the only direct reference, in material terms, to what was recovered.

The ROB had placed constraints on all of the landscape design elements in the park, in view of the possible damage that might be done to the traces, which lie only 30 – 60 cm beneath the surface. Blanket heightening took place, and areas to be raised further – the artificial salt-marsh ridge – were subject to constraints associated with the danger of subsidence. Trees with shallow root systems were also chosen. All the advisory committee members were enthusiastic about the outcome; hopefully the new inhabitants will be too.

This is the first time an archaeological monument has been incorporated into a new residential 'VINEX' development, and although creation of the park was not subsidised by Belvedere, the monument is regarded as a model Belvedere project. The public-private developer (GEM) advertised the archaeological background of the polder to prospective homebuyers from the outset. There is no romanticism involved; the past was used as a source of inspiration, not as some sort of continuing theme prodding new inhabitants to identify with the past, but instead urging them to discover in the past something 'interesting' that can inspire modern landscape design.

The Broekpolder is an example of what many viewed as the burden of the past, during an interim phase of Dutch developments in archaeology between the Treaty of Malta, signed by EU ministers of culture in 1992, and the new Dutch legislation on archaeological heritage management, which was finally adopted in 2006. 'Archaeology' is now considered as a matter of course in the destruction of all types of landscapes, but with perhaps a growing threat to 'quality' research thanks to the market economy and commercial archaeological enterprises, where the least expensive bid often wins the contract. The threat might now in fact be seen as coming from archaeologists, rather than developers, especially in the lack of new research perspectives.
Offered here have been a number of aspects for developing research and more work will need to be done in comparison with other regions. Certainly, much work needs to be done, for example, in comparing pits, finding more offering sites and addressing features such as buried animals, or in regarding common finds such as stones and nails. These facets have to do with the actual lived landscape and they can be conjoined with mythical landscapes.



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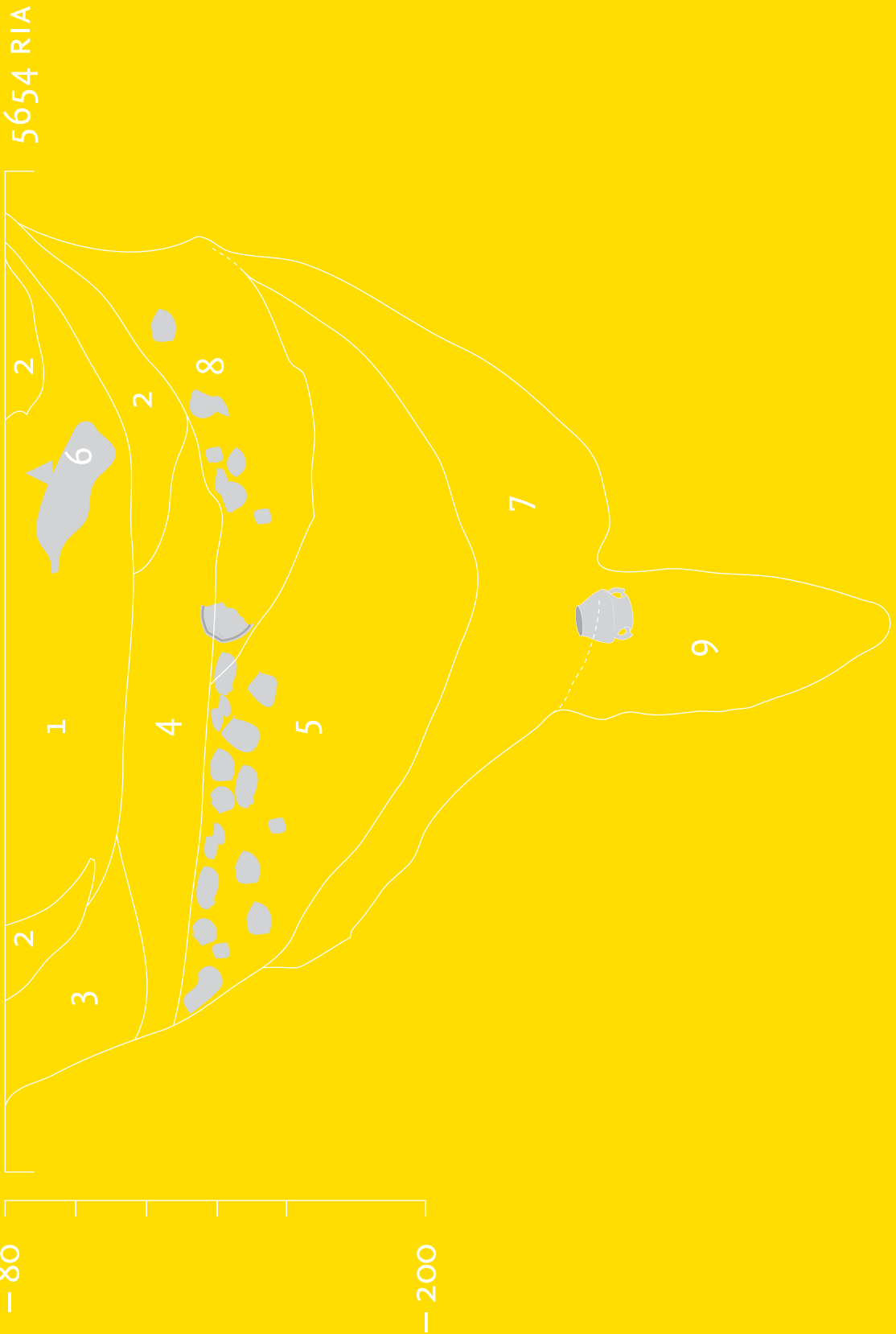
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Landscapes in the Broekpolder



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