LOCAL COMMUNITIES IN THE BIG WORLD OF PREHISTORIC NORTHWEST EUROPE

49

ANALECTA PRAEHISTORICA LEIDENSIA

edited by
C.C. BAKELS, Q.P.J. BOURGEOIS,
D.R. FONTIJN AND R. JANSEN


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To Harry Fokkens

Harry Fokkens in 1986 during one of his many excavations in Oss (photo Faculty of Archaeology)

Harry Fokkens in 2013 during the study-tour visit to the Danube delta (photo W. Roessingh)

Preface

How small worlds can be big – local communities in prehistory in the work of Harry Fokkens

One of the things that triggers our interest in communities from the deep past lies in the confrontation with the details of local life. The fascination of how societies with a relatively simple technology managed to make a living in landscapes we tend to see as peripheral and inconvenient; how hardships of life were overcome and how, in the face of practical adversities and with simple tools, complex and elaborate buildings and monuments were created.

Not least, a lot of the fascination lies in how local communities, by shaping their landscape, carved out a place for themselves in a big social world that stretched out far beyond the landscape they lived and worked in.

The work to which Harry Fokkens devoted his career as an archaeologist has been situated precisely at the intersection of these small and big worlds. Throughout decades of research, Harry investigated how prehistoric communities shaped and transformed their environment and dealt with their own (pre)history, with a keen eye for the entanglement of practical, social and ritual aspects. Truly pioneering landscape-scale approaches in fieldwork (notably in his decades of research in Oss), Harry added empirical flesh to the theoretical bones of concepts like 'local identities', always with a keen eye to linking these to supra-regional, and even Pan-European studies. His recent participation in the discussion about mobility of the beaker people is an example of the latter.

The present volume focuses on the kind of questions that have been central to Harry's work – how did local communities define themselves in relation to bigger social world? The contributions are written by colleagues and friends with whom Harry worked intensively throughout his career, and who have, like himself, been leading in research of prehistoric society of Northwest Europe. The topics discussed cover those that are central in his work (like megaliths, seafaring and issues of mobility, the farmer's life, the creation of ancestral presence in the landscape and, of course, the creation, occupation and maintenance of entire cultural landscapes). Likewise the time range covered captures his own field of study of the Bronze Age as well from Neolithic to later Iron Age.

This book, made in honour of Harry Fokkens for the occasion of his official retirement from work, shows how intriguing and challenging the topic to which he devoted his work, the archaeology of local communities, was and how promising it still is. It is our hope that the contributions in this volume underscore how small worlds can be big at the same time.

The editors

Corrie Bakels, Quentin Bourgeois, David Fontijn and Richard Jansen

C.C. Bakels, Q.P.J. Bourgeois, D.R. Fontijn and R. Jansen 2018. *Local communities in the Big World of prehistoric Northwest Europe*, Leiden: Sidestone Press, pp. 9-17.

Social memories and site biographies: construction and perception in non-literate societies

Johannes Müller

Institutional knowledge in non-literate societies is transferred via different avenues from generation to generation. One of the most important media for memory transformation is their materialisation at focal places of these societies. Biographies of European Neolithic sites offer diverse rhythms in the creation of such ancestral and social memories. Examples from enclosures and megaliths display this materialisation and the active roles that these monuments play in such transformation processes. This can happen independently at different places in different times.

1 Introduction

For modern, historic and prehistoric societies and their ideologies, the transition of institutional rules, world views and norms of daily practices to next generations play a crucial role in the construction of environmental, social and cultural identities. In recent and post-medieval societies, a manifold of transformational media are known. Knowledge production and distribution, and their restriction according to certain norms, take place and are institutionalized not only in schools, universities, religious institutions, military organisations, and prisons but also in factories and other places of production, as well as on the internet, just to mention some significant avenues. Diverse media exist to transfer knowledge and rules within societies and between the generations. Written sources, pictures, IT clouds, architecture etc., which are handed over from one generation to the next, are often embedded in certain linear learning processes.

Compared in anthropological and archaeological studies, different institutional frames of knowledge transfer and associated rules have been described for non-literate societies (cp. Amborn 2016; Whittle *et al.* 2011; Megerassa and Kassam 2005; Forty and Küchler 1999; Bloch 1998). Events and personal experience, personal memory and active memory, social memory and myths are bound to different timelines (fig. 1). If so, especially the creation of social memories is a step, with which a kind of 'biological memory' is transferred into societal memorisation. This crucial change was described as a transformation from conjunctures to *longues durées* (Whittle *et al.* 2011, 911-913 fig. 15.28).

As we postulate, the creation, control and development of these "memories" constitute the institutionalized practice for the transfer of norms of communities as well as their receptions by individuals. Due to ethnographic observations (Bradley 2002; Clark 1992; Bohannan 1952; Bloch 1998), social practice of memory construction within non-literate sedentary societies includes a renewal and/or refinement of social memories after ca. 150-200 years (5-8 generations).

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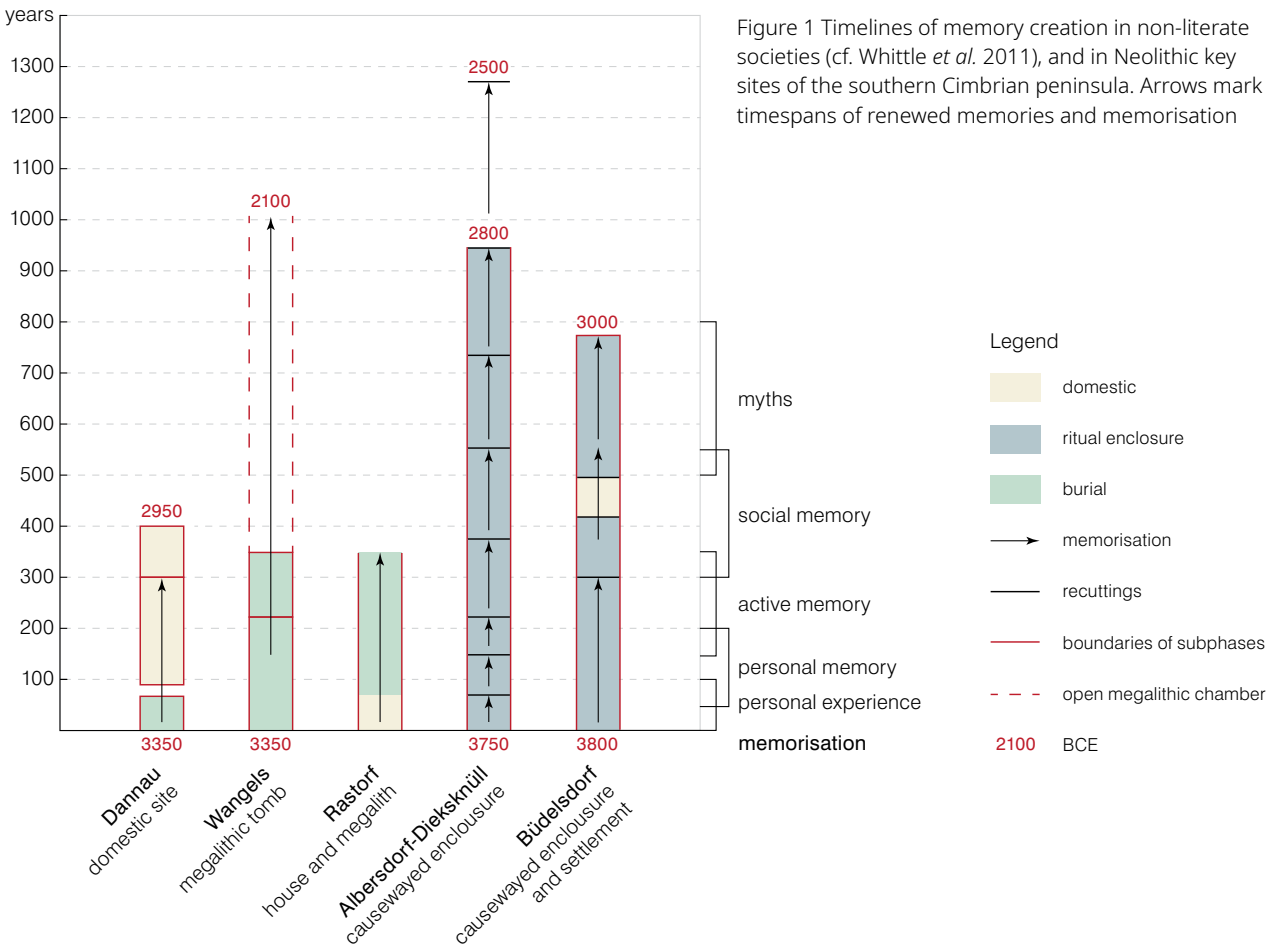

Figure 1 Timelines of memory creation in non-literate societies (cf. Whittle *et al.* 2011), and in Neolithic key sites of the southern Cimbrian peninsula. Arrows mark timespans of renewed memories and memorisation

If we enter the arena of archaeological archives, the identification of memory construction (including the transmission of knowledge and rules from one generation to the next) is one important aspect in order to understand social practices of prehistoric societies. If so, the task is to identify processes of memorisation and the specific rhythms within our archives, which are most likely associated. From a methodological point of view, artefact, site and landscape biographies are key issues for such inquiries.

Ritualized knowledge is embodied in non-functional aspects of objects that are distributed in short and long distance exchange. Rules of conspicuous consumption, e.g., regulate the distribution of symbolic items within societies, to mention some aspects of movable material culture. Household institutions are detectable in house architectures and their alteration over time. Institutionalized memories of communities are practiced in *rite de passage*, e.g., at burial places, and communal memories are produced and reproduced at focal monuments like megaliths, Bronze Age mounds or enclosures.

2 Site biographies of Funnel Beaker Communities

Recent research on the North German Neolithic enabled the reconstruction of site histories especially through advances of new excavation and dating techniques, and new perspectives in material culture analyses (cf. Furholt *et al.* 2011; Furholt *et al.* 2014; Hinz and Müller 2012). At some key sites, the spectrum of memorisation, especially from ancestral to social memories, became demonstrable (fig. 2). In the following description, the focus is placed on a primarily domestic site, a burial site, and two causewayed enclosures, of which one also involves a phase of domestic activities.

At the TRB domestic site Oldenburg-Dannau LA 77, Schleswig-Holstein (Brozio 2016), the most ancient context is the burial of a 40-50 year-old woman,

Figure 2 Key sites that are mentioned in the article: 1 Büdelsdorf; 2 Borgstedt; 3 Rastorf; 4 Oldenburg-Dannau; 5 Wangels; 6 Albersdorf-Dieksnöll

who was positioned as an extended supine burial (*Rückenstrecker*) within a shallow pit (fig. 3). The burial is dated by 14C to ca. 3350 BC, her nutrition to have been quite agrarian, despite the location of the inhumation in a Neolithic lagoon fjord-like environment. Shortly after or contemporaneous with the burial, the construction of houses and huts commenced and Dannau LA 77 developed into a village with about 150 inhabitants in the 31st century BC. During this whole occupation time, the burial was respected and not disturbed for at least ca. 150-200 years. In the first half of the 31st century BC, the situation changed. Probably both wells of the village were refilled in a very similar deposition pattern: congruent infillings of charred apples and cereals at the lowest level, then parts of used querns and TRB-pottery, and on top white shining shells (Brozio *et al.* 2013). During this event, a small pit had been dug into the female's burial at the location of her right femur, the femur taken out of the grave and placed in the deepest layer of the well infilling (fig. 4). Even if all circumstances of these depositional processes are much more complicated, in my view the Dannau case is significant for the development of an ancestral memory: there is a high probability that the woman was seen by the inhabitants as the founder of the village, then respected for about 5-10 generations, before during the thirty-first century BC a deliberate integration of one of her bones in the described ritual infilling took place. Similar to the querns, of which a *pars par toto* deposition in the well took place, the femur represents a *pars par toto* involvement of the perhaps already mystical burial. After the event (the burial recutting and the well infilling) that might be linked to regional changes of economy and general burial rights (no further megalithic constructions), the site occupation continued for about 5 further generations. It seems that we are able to identify a conscious routine of materiality in a political perspective. This takes place at a time when the renovation of social memories of the village was necessary.

Less than one hour's walking distance from Oldenburg-Dannau LA 77, a burial place mirrors

Figure 3 Flat burial of an adult woman in Oldenburg-Dannau. The individual and her flat grave represent the eldest context at the domestic site (around 3350 BC). A dark brownish pit marks the area, where around 3070 BC the right femur was extracted

Figure 4 The re-filling of a well in Oldenburg-Dannau (Brozio 2016, 38 fig. 25). The femur of the adult woman (Fig. 3) was deposited within the ritual deposition

institutionalized ancestor worship through the active construction of memories and deliberate changes in the creation of memories. Around 3360 BC, the passage grave Wangels LA 69 was erected in a circular mound on a natural ridge probably near a track in an open, ploughed landscape (Brozio 2016). During ca. 10-15 generations, burials and depositions took place in the chamber that never was emptied (as other megalithic tombs). 85 radiometric datings verified that the chamber was kept open until 2100 BC at the latest, when a last giant beaker (*Riesenbecher*) was deposited.

For our interpretation two aspects of the development are important. Firstly in the 31st century BC, the round mound was changed into a long mound by the construction of an extra mound elongation, with a single stone heap burial. Secondly, the deposition of vessel assemblages (partly deposited in an upside down position), were respected and never destroyed even in the 500-600 years after their deposition in the still open chamber of the 'Holsteiner Kammer' (fig. 5). Thus, respect of social and mystical memories in the still open chamber was practiced, on the one

Figure 5 Wangels LA 69. Within the open chamber of the megalith an assemblage of different vessels was respected for centuries. Three of the undestroyed vessels are displayed (Brozio 2016, 503 Table 213)

hand, while the construction of an individual burial at the elongated monument also describes intentional changes on the other. They incorporate the individualisation that already can be observed within the society, an ideology that becomes dominant in the third millennium BC. In spite of these changes, the *longue durée* of memorisation becomes visible: Wangels LA 69 was created around 3350 BC and remained in use until 2100 BC. It was never destroyed and exhibits an open chamber that was only altered by the integration of new ideologies into the institutionalized rhythm of memorisation. In fact, social memories seem to have been recreated here again and again by adaptations of new ancestral memories.

A similar, but slightly different case is known from the site of Rastorf located about 4 hours walking distance from Dannau and Wangels (cf. Steffens 2009). At Rastorf LA 6a, a single farmstead including ploughed fields and a single flat grave existed around 3650 BC (fig. 6). During an event, which we cannot reconstruct, the house was obviously burned and ploughed. Shortly after this, a dolmen with a round mound was constructed above the centre of the house and this was pronounced again shortly after its construction by additional graves within an extended mound. Interestingly, not earlier than around 3300 BC, the still round mound was elongated by a megalithic long mound placed exactly on the axis and exhibiting a kind of trapezoidal shape. The latter refers to the shape and the orientation of the Early Neolithic TRB house. In this case, a memorisation of the ancient household and its house took place for at least 5-15 generations, in which the formerly domestic space was changed into a collective grave monument and later again changed into a funeral space for single individuals. According to my interpretation, the house/dolmen relation represents an ancestral memorisation similar to the round mound/long mound change. Both conjunctures were

Figure 6 Rastorf LA 6a (Müller 2017, 38). After ca. 3 generations the domestic house from the 37th century BC is changed into a burial monument (dolmen). The memorisation is visisble, as a later long elongation of the round mound followed the axes of the long devastated house

linked within the social and mythical memory of the originally existing household.

One of our hypotheses suggests that the creation of social memories took place in cycles of memorisation, whereby the temporality of the rhythm is influenced by the stability or instability of the communities. While at the three discussed sites (Dannau LA77, Wangels LA 69 and Rastorf LA6a), the identification of the materialisation of ancestral and social memories was possible, no rhythm was yet detectable. On another site – the causewayed enclosure of Albersdorf-Dieksknöll – this is possible in our view. At Albersdorf-Dieksknöll, a Neolithic causewayed enclosure was surveyed and partly excavated (Dibbern 2016). In addition to the "usual" characteristics of an EN TRB enclosure with activities within the frame of the enclosing elongated pit system and a palisade in contrast to the archaeologically nearly empty inner central space, the site history could be reconstructed as one of recurring infilling, recutting, and fire events.

During the early stages of the enclosure, these infillings and recuttings took place every 1-3 generations, while during the Middle Neolithic the time intervals between these events became longer (fig. 7). We are talking about a change from a 30 to a 60 and then to a 220 year time interval of activities at the site. Obviously, performed gatherings were reduced after the new middle TRB subsistence and cultural system was established and probably a kind of social stability ascended at least in the perception of the socio-environmental conditions. In principle, we discover a change from ancestral memorisation to social and perhaps mystical memories. It is of interest that also at a late point in time, around 2500 BC, the ditch system was re-cut and re-filled during the Younger Neolithic. In summary, the enclosure was advanced and memorized from ca. 3750 BC until 2500 BC (ca. 1250 years; ca. 45 generations).

Until now, we have discussed local site biographies. In contrast, at Büdelsdorf and Borgstedt within the central Eider region (Hage 2016) a whole landscape was involved in the creation of memories (fig. 8). Here the erection of non-megalithic long mounds and perhaps also of first simple megaliths started around ca. 3800 BC, followed by the development of a nearby causewayed enclosure. Recutting and infilling activities – even with dramatic fire events – took place also near the entrances, which were marked with huge wooden posts. Visibility existed between the Büdelsdorf enclosure and the Borgstedt burial ground, where further long mounds and dolmens were continuously erected. At the Borgstedt cemetery, fire was also involved in different ritual depositions at the outer wooden demarcations of the grave mounds. Obviously, these and further megaliths were constructed along a trackway that connected different domestic areas on the well-known north-south route of the Cimbrian Peninsula, the so-called 'Ochsenweg'.

After about 10-15 generations of activities at the enclosure and the cemetery, the sacral character of the Büdelsdorf enclosure came to an end. A village with quite large houses was erected. These houses belong to the longest houses of the TRB and describe the extraordinary character of the site. Nevertheless, artefacts and 'ecofacts' identify domestic activities, which led to an overexploitation of the local environment in the form of overexploited soils. After about 4 generations, the domestic site was abandoned and ritual activities at the former enclosure were resumed, lasting until ca. 2800 BC. Clearly, the memory of the

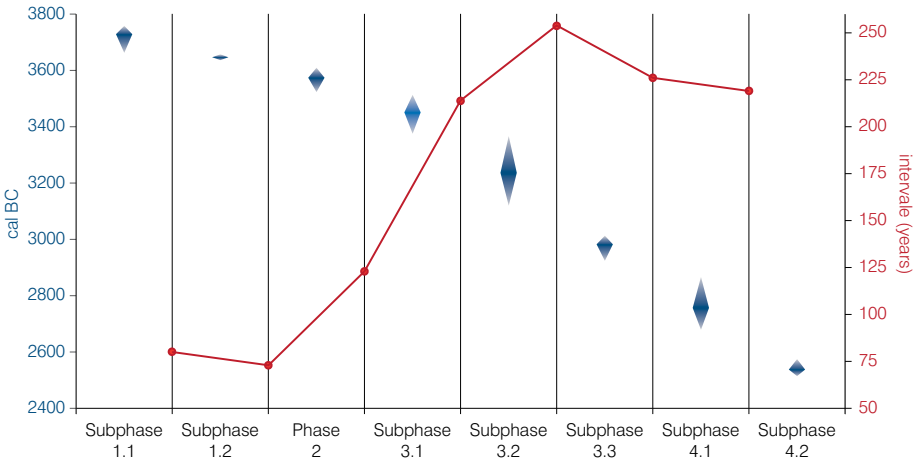

Figure 7 Albersdorf-Dieksknöll, time intervals of recuttings and infillings (Dibbern 2016, 50 fig. 261). The radiometric dates from the subphases of the ditch indicate the slow-down of depositional practices and gatherings at the causewayed enclosure

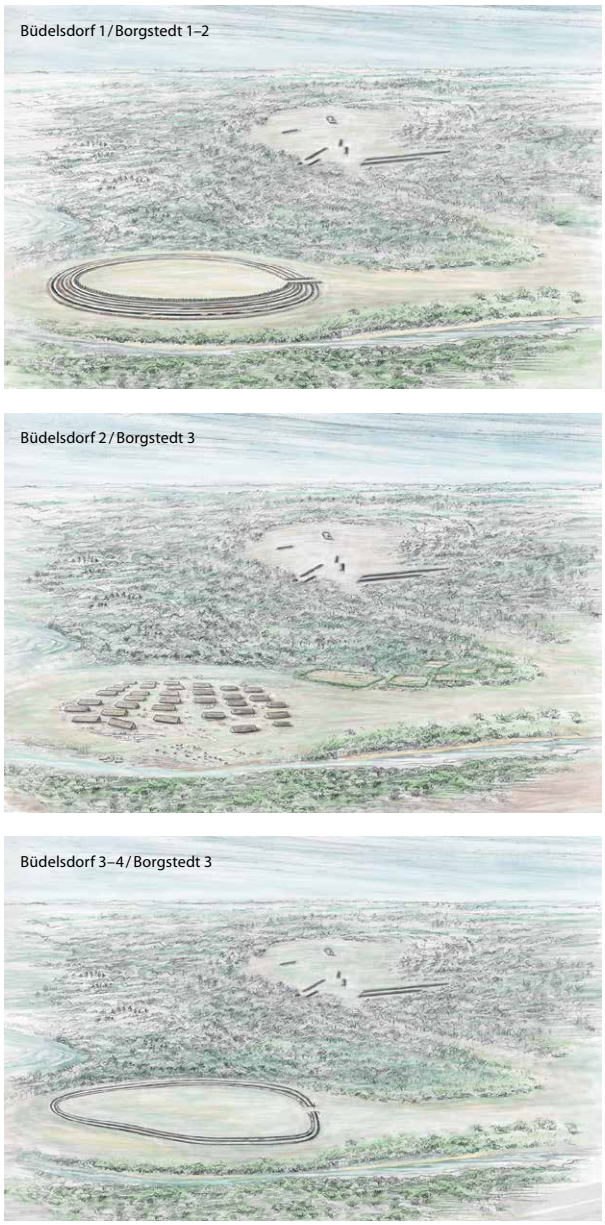

Figure 8 Büdelsdorf-Borgstedt (Hage 2016, 275 fig. 316). A causewayed enclosure and a non-megalithic and megalithic cemetery indicate a use of local landscape for memory construction. For about three generations the enclosure was changed into a domestic site, but after that restored as a ritual place again

site and the renaissance of the ritual practices verify the validity of social practices that were stored in 'invisible' memories. Even the Borgstedt cemetery was in continual use until the 29th or even the 27th century BC. In summary, the regional focus of ritual activities describes how ancestral and social memories were produced and used. Even if the time span in Büdelsdorf/Borgstedt is shorter than in Albersdorf-Dieksknöll, the dialectic relationship of the causewayed enclosure and the monumental cemetery signifies the integration of memory construction in different parts of the created landscape.

3 Memory construction and transformation

Within our examples, the dead were transformed through burial practices into ancestors and the ancestors were used to transform places into constructions of memory. These places could have been former settlement sites or ploughed fields, whereas the memorial landmarks at these places remain visible in the landscape and are repeatedly used for the commemoration of new burials. Furthermore, transformations of enclosures into settlements or periodical gatherings at causewayed enclosures signify memorial institutions with different time patterns.

Our observations are also confirmed at other places of European Neolithic history, for example, the destruction and re-use of the Grand Menhir in the Table des Marchands already describes the significance and reordering of monuments within at least a 700 year time span (Cassen 2009). Also the *longue durée* of non-megalithic long mounds of the Passy type with the burial of individuals for over more than 400 years introduces us to the narrative of a society (Chambon and Thomas 2010). Site histories of settlement mounds, such as Cösalhom, indicate similar social practices and their realisation over hundreds of years (Raczky *et al.* 2011). In conclusion, the creation of ancestral, social and mystical memories is mapped at many places of the cultural Neolithic landscape. Do these narratives also cross the temporal borders of economic and social changes? This might be the main question for future narratives about human agencies in social processes.

Acknowledgments

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The Dutch Abroad? Interpreting the distribution of the 'beaker culture'

John C. Barrett

The similarity in the form and decoration of Beaker ceramics, and the comparability of many of their associations, distributed, albeit intermittently, across Europe and into northern Africa, has long held out the promise that a common origin and a single process of distribution, such as diffusion or human migration, might be identified that would explain the emergence and spread of this 'cultural' pattern. This expectation is now further enhanced, in some regions at least, by the recent analysis of the ancient DNA (aDNA) recovered from human skeletal remains. This contribution offers an alternative approach to this material, one that treats human activity as the local construction of a form of life which, in some areas of Europe in the third millennium BC, converged upon a commonly expressed set of expectations about how some aspects of the world might operate.

1 The problem with Culture

Benjamin Roberts and Marc Vander Linden have noted that whilst the concept of an archaeological culture is widely regarded as being 'theoretically moribund' it nevertheless continues to enjoy widespread application as a means to 'enable patterns of similarities and differences in the archaeological record to be identified and discussed' (Roberts and Vander Linden 2011, 5). This contribution is an attempt to think again about one such pattern of similarity observable amongst archaeological finds, namely that represented by the third millennium BC distribution of the so called 'Beaker Culture' or 'Beaker Package' across Europe, and the ways that archaeologists might use the distribution of Beakers, their associations, and their depositional patterns, to understand that period (cf. Nicolis 2001). I offer these comments to Harry Fokkens out of my respect for the significant contributions that he has made, not only to our understanding of the mechanisms resulting in the distribution and deposition of Beaker assemblages, but also to our understanding of northern European prehistory in general.

The complexity of European Beaker deposits illustrates many of the problems that have been associated with the archaeological analysis of cultural regularities, not least the weakness of the archaeological concept of 'culture' itself to provide an adequate gateway through which to approach the past. Case described the Beaker Culture as comprising 'pots of generally similar form with variously similar detailed traits, associated with variously similar artefacts of materials other than pottery, distributed within a limited span of time over large and well-defined regions of the continent' (Case 1977, 71). Here, then, is a single European wide distribution of 'generally similar' finds as seen from the perspective of the twentieth century CE. The formal similarities are therefore those that are identified by archaeologists who treat them as if they were produced as the result of, and thus represented, a single historical process. This pattern of material seems to demand that we should identify

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its origin, trace its subsequent history, and explain how it had achieved its overall distribution. But 'theoretically moribund' data categories lack, by their very definition, strong and critically informed arguments as to what such categories might represent. What are we to assume that Beakers, their distribution, depositional patterns and their associations represent in terms of a historical process?

Roberts and Vander Linden tell us that the definition of a culture remains that of Childe's 'iconic formulation' before they quote Childe, but without telling us what he thought that a culture represented (Roberts and Vander Linden 2011, 2). What Childe actually wrote in his introduction to *The Danube in Prehistory* was:

> *'We find certain types of remains – pots, implements, ornaments, burial rites, house forms – constantly recurring together. Such a complex of regularly associated traits we shall term a 'cultural group' or just a 'culture'. We assume that such a complex is the material expression of what today would be called a people.'* (Childe 1929, v-vi my emphasis)

Childe had every right to group together archaeological finds upon whatever reasoned basis he so wished, and to recover whatever pattern might result: what matters for us is the assumption that he then used to link the resulting pattern with an understanding of historical conditions. Thirty years later his account of what cultures might represent states that the archaeological patterns of regularity occurred because societies 'are represented…by the durable results of their behaviour … repeatedly found together at different sites within a limited region, they are grouped together to represent what we term *cultures*' (Childe 1958, 10 emphasis original). Childe appears to be adopting the concept of a *mechanical solidarity* that he had derived from the work of Émile Durkheim, and it was this that enabled him to define what the archaeological patterns of culture might represent (Childe 1956). Durkheim had envisaged a mechanical solidarity to be where *all* the individual members of a community establish the cohesion of that community by sharing commonly held beliefs about the world, a cohesion that is therefore enacted through common patterns of behaviour (Lukes 1975, 147-178). If this was indeed the position adopted by Childe then mechanical solidarity is a strange concept to apply to the third millennium BC, given that Childe had himself proposed that the origins of metallurgy, a craft commonly found in association with Beaker ceramics, required specialist producers who were supported by some kind of an administered economic surplus (Childe 1957). Such an arrangement, involving the internal differentiation of roles within a social organisation, would be characteristic of what Durkheim had referred to as an *organic solidarity* and mark what many have taken to be a step on the road to systems of social differentiation and complexity (Chapman 2003).

By equating regularity in the design of material products with the shared behaviour of a people, Childe had little option other than to equate the European wide distribution of Beaker ceramics with the existence of a migratory people that he referred to as the 'Beaker Folk' (Childe 1958, 144-149). I find it difficult to accept, on the basis of Childe's definition of a culture, along with the widespread distribution, inconsistent associations, and varied depositional practices of Beakers and their associated material along-side other contemporary assemblages, that the Beaker complex can continue to be treated as a culture.

2 From Culture to Causal Process

If we were to adopt the commonly held archaeological, and indeed uniformitarian, assumption that regularity in a pattern of residues implies regularity in the processes of its formation, then we would presumably accept that regularities (however these might be defined) in the deposits that are recorded archaeologically had resulted from regularities in human behaviour and in the processes of taphonomy. Whilst the first recognition that certain patterns of material were indicative of an earlier presence of humanity marks the moment at which an archaeological study of human history became possible (Trigger 2006), by simply recognising the historical depth of human existence, and that those earlier humans had done certain things in a variety of different ways that had changed over time, is not in itself the basis upon which to claim an adequate understanding of human history. The 'New Archaeology' (hereafter 'processual archaeology') of the 1960s and '70s made two very significant contributions to resolving the challenge of writing archaeological histories. The first was to recognise that human behaviour had to be understood systemically: human-beings have always operated in relationship with other humans, other forms of life and a wide range of other material conditions. The second contribution was to claim that understanding the past involved offering explanations that identified the processes that had resulted in systemic change. These

two contributions to the development of archaeological thinking were linked by the belief that the systemic behaviour of humanity was necessarily adaptive. At the risk of over-simplification, we might note that, as a consequence of these ideas, human histories were constructed as if they had operated within systems of social organisation, and with a range of material equipment, where both were designed relative to the adaptive needs that were driven by the wider environment. Given the often-stated desire that archaeology should not be concerned with the unique status of any single historical system, but should instead aim to establish high level generalisations that might explain similar kinds of changes occurring within similar kinds of systemic conditions, it is not surprising that processual archaeology expressed a commitment to the idea that the explanation for particular historical developments should be subsumed under certain law-like principles (Hempel and Oppenheim 1948; Watson *et al.* 1971).

The thinking that was marked by the development of processual archaeology had the consequence of distinguishing between questions of *why* behaviour and things were employed in the various processes of adaptation (in other words, explanations in terms of the function of patterns of behaviour and the use of artefacts and the ways those functional roles were represented by various surviving material signatures), and *how* those functional requirements were met within a particular historical context (*i.e.* the way that things were done). This reinforced what Dunnell referred to as the 'fundamental dichotomy' in archaeology between the function of things and the style of their execution (Dunnell 1978). The patterns of variability described by archaeological cultures then appeared to be dominated by matters of stylistic choice, such that Beaker vessels might be treated as one stylistic way in which the late Neolithic social function of serving drink and food was achieved (Sherratt 1997, 376-402), or in the way that the functional requirement for 'prestige objects' was satisfied (Shennan 1986). As Robin Boast has explained, this division between function and style makes no sense, rendering as it does the stylistic way of doing something as a mere embellishment of the action of actually 'doing'. How, Boast asks, would it ever be possible to do something without doing it stylistically (Boast 1997)? This would be like trying to say something without using a particular language with which to say it. Verbal expressions cannot exist outside ways of saying, any more than behaviour can exist outside the ways of behaving.

Notice that the archaeological emphasis in general, and the emphasis of processual archaeology in particular, has been upon explaining why humans made certain things and lived together in certain ways, and that these explanations have been achieved by reference to the systemic conditions to which those 'ways of being' needed to adapt. The emphasis in reasoning has therefore come down to identifying the causes that are assumed to have resulted in the creation of archaeological data (things). The processual archaeology that developed in the 1960s and '70s, rejected claims that systemic change could be explained as the result of the influence of one set of stylistic rules upon another. Given that processual archaeology had set itself the task of explaining systemic change (Plog 1974; Renfrew 1973), the rejection of vague notions of 'cultural influences' (as exemplified by claims to be able to recognise processes of 'cultural diffusion') seemed to imply that the rules of stylistic expression were themselves of secondary importance to such underlying processes as those that had operated at the level of social and economic organisation. It was the latter that were assumed to have resulted in systemic change, an argument that might be taken to reinforce the view that the processes driving historical change had occurred 'behind the backs' of those whose agency was merely expressed through their production of a stylistic veneer. However, we have already accepted Boast's rejection of the assumption that behaviour (normally characterised in terms of what that behaviour did) can be distinguished analytically from ways of behaving (expressed as the style of behaving).

Two significant problems now attend upon any attempt to explain systemic change by reference to causal conditions. The first concerns the enormous complexity of causal factors that are likely to have been at work in any process of systemic change, and the consequent impossibility of accounting for all such factors (Botterill 2010). Processual archaeology dealt with this objection simply by claiming that only certain causal factors, such as social dynamics (Renfrew 1984) or mechanisms of economic adaptation (Higgs and Jarman 1975), were causally relevant to each case. The second problem associated with systemic explanations is that they present us with an infinite regress, simply because each causal condition must itself have been caused by some prior causal condition *ad infinitum*.

Causal explanations look back prior to the condition that is to be explained and seek the underlying processes that brought that condition into being. For Childe the widespread distribution of Beaker ceramics had arisen as the result of the migration of a 'Beaker Folk', whilst processual archaeology downplayed human migration as a possible explanation and placed the emphasis instead upon exchange processes between otherwise autonomous and geographically stable socio-economic systems (cf. Shennan 1986). As befits the claims made by causal explanations, however, none of these propositions was able to actually explain why it was *Beaker ceramics*, rather than some other type of artefact, that had emerged either as the cultural marker of a 'people', or as the centre-piece of an exchange and consumption network, let alone explain why it was a 'Beaker People' who were necessarily migratory, or why the autonomous polities of the third millennium had evolved towards participating in a particular kind of exchange network (but see Friedman and Rowlands 1977). We might conclude that archaeology has never actually provided explanations for material change but has created instead a number of narratives that are composed with the aim of rendering the observed changes in the material comprehensible.

It seems as if the search for a causal explanation for the distribution of the Beaker assemblage has now taken another turn. Kristian Kristiansen has written of the way that the link between 'fundamental changes in archaeological, science-based knowledge and the increasing application of Big Data to necessary changes in archaeological methods, interpretations and theory' (Kristiansen 2014, 12) have heralded the start of a third scientific revolution in archaeology. This revolution, Kristiansen suggests, has three main components. The first is the development of biochemical analysis of human skeletal material (although its application to ancient plant and animal populations should also be noted). This is providing the genomic data that enable the migration of haplogroups through human populations to be mapped, and the isotopic data that provide information relating to an individual's diet and life-time mobility. These major analytical advances are occurring within the context of Kristiansen's second component: a funding environment that, alongside the development of digital capabilities, can support international research into the 'big data' sets accumulated by archaeology (cf. Kintigh *et al.* 2014). The third component is the collapse of the dialogue between processual and post-processual archaeology that has dominated archaeological theory for the last thirty or more years, and with it a return to the long dismissed grand narratives of human mobility, migration, warfare, comparative analysis and evolution (Kristiansen 2014, 13-14; Kristiansen *et al.* 2017). It is the return to the themes of human mobility and migratory populations that have once again begun to characterise the archaeology of the third millennium in Eurasia (Vander Linden 2016; Heyd 2017).

Volker Heyd has heralded the publication of two papers in 2015 (Allentoft *et al.* 2015; Haak *et al.* 2015), in addition to earlier and more recent studies, that have provided evidence for the inheritance within the genomic history of northern and central European populations of haplogroups the origins of which are placed amongst the populations of the Eurasian Steppe. This genomic inheritance of haplogroups that are not represented in sampled European hunter-gatherer and Neolithic populations (cf. Vander Linden 2016) seems to have been established in Europe by the end of the third millennium, and Heyd accepts that these data mean that 'something came out of the Eurasian steppes' and that the Yamnaya burial traditions of the steppe were somehow linked to the development of the single grave mortuary rituals of northern Europe (Heyd 2017, 348-349 and 351; cf. Anthony 2007). Heyd also allows, and this is now supported by further sampling of aDNA (Olalde *et al.* 2017), that a westerly population expansion was linked with the spread of Beakers along with the single grave mortuary traditions from northern Europe into the British Isles. The dispersal of Indo-European languages is arguably connected with this third millennium population dispersal (Haak *et al.* 2015) and, as the result of all this work, Heyd has asserted that 'everyone will … have to accept the existence of large scale prehistoric migrations … that … were a driving force of cultural change' (Heyd 2017, 349; cf. Kristiansen *et al.* 2017). We should note however that the data do not imply population *displacement* (Haak *et al.* 2015; Vander Linden 2016, 719) and Heyd also sounds words of caution by warning against the easy extrapolation of the analytical results obtained from a small number of individuals to the characterisation of an entire population (cf. Vander Linden 2016, 720-721).

3 From explanation to understanding

Let us start from the commonly held assumption that archaeological materials inform us, among other things, about the history of human behaviour. Archaeology has long claimed to be able to describe

the ways earlier human behaviour was organised, and to identify the form of its material products. From this perspective the challenge for archaeology has appeared to be to establish what could have motivated or structured the kinds of behaviours that it had identified. Thus, Childe seems to have accepted that the form of human behaviour was determined by the social environment within which people had found themselves living, a context which Kossinna (1911) had previously reduced to one that mapped a person's ethnic and racial affiliation. Processual archaeology recognised that the aspect of the various systems of human behaviour that were of archaeological interest was not so much the ability of those systems to maintain a cultural consensus (that much was accepted), but rather by their capacity for change. Consequently, explanations for organisational change were sought in the ways that feedback between different institutional patterns of behaviour structured the overall system's ability to adapt to its changing environment. The structural determinism which empowered processual archaeology's ability to explain organisational change, was criticised by the emergence of a post-processual archaeology which reasoned that the structural determinism pursued by processual archaeology failed to recognise the capacity of human agents to act strategically according to their own understandings of the conditions within which they had existed (Hodder 1982). Common to the arguments of both processual and post-processual archaeology however was the assumption that the patterns of human behaviour, attested by their archaeologically recovered residues, could be explained as if they had been determined either by the various social, economic and material conditions within which those people had once lived, or by actions that had derived from that people's own cognitive understanding of those same conditions.

An alternative approach towards our understanding of the histories of human behaviour is to consider the goals towards which that behaviour was directed, rather than by speculative attempts to establish the forces that drove that behaviour forward. As Artur Ribeiro has shown, this is not by a matter of attempting what Binford once dismissed as a kind of 'palaeopsychology' for the simple reason that intentional actions are not the expressions of some prior mental condition. Drawing on the work of Descombes (2001 and 2014), Ribeiro argues that intentional actions are those that are executed within the particular contexts towards which they are directed and within which they must be intelligible. By this means Ribeiro draws Descombes' principle of 'narrative intelligibility' into an archaeological understanding of human action, not in terms of what was intended *per se*, but in terms of the context that ensured that those intentions were possible and could be comprehended by others (Ribeiro 2018, 9-11). It is for this reason that expressions of intentionality become understandable in teleological rather than in causal terms: they are goal directed in 'the context in which the intention [was] intelligible' (Ribeiro 2018, 9), rather than being determined by some prior condition or force. For the archaeologist the context is the material architecture and the technology by which an environment of intelligibility was maintained, and the archaeological method turns upon the identification of such contexts.

If we accept Ribeiro's argument then it follows that the objective of archaeology must shift away from explaining the historicity of certain patterns of behaviour by reference to their causes, and towards an understanding of the goals to which those actions were directed. This need not involve us in any unnecessary speculation as to the mental state of those whom we seek to understand, simply because their actions, as we have already noted, were directed towards, and were understandable with reference to, the material conditions that are now accounted for archaeologically. We can now distinguish between a traditional archaeology that sets itself the task of explaining why certain material patterns arose, such as the attempt to explain the widespread distribution of Beaker pottery, and the alternative that seeks to understand how the occupancy of a world that produced, utilised and maintained such a ceramic tradition facilitated the effective execution of certain goals. But what were those goals?

If the production of a Beaker was goal directed, then such a vessel needed to be recognised as appropriate for a particular use. In the case of some vessels, that use was to be employed in a mortuary ritual. It was this goal that informed the choices that were made regarding the materials used and techniques employed in the production of these vessels, and these choices resulted in the differences that are noted today in our analysis of the fabric, firing and the surface treatment of mortuary vessels, as compared with those that are recovered from the context that we identify as 'domestic' (Boast 1995, 71-72; Salanova 2000, 174; Needham 2005, 174-175). The perspective that is provided by understanding that the production of the Beaker was directed towards the goal of its use, implies that mortuary rituals did not simply demand the selection of a vessel from a pre-existing assemblage,

but instead demanded a particular genealogy of production. This implies that mortuary rites would have involved a range of technological and productive activities that extended further across time and space than has previously been allowed, and this has additional implications for other elements of the mortuary assemblage. It requires, for example, that we should distinguish more carefully those objects that occasionally adorned the corpse and that might include personal decoration such as hair ornaments (Sherratt 1986) 'bracers' (Fokkens *et al.* 2008; Woodward and Hunter 2011) and belt fittings, from those that were placed next to the corpse by the mourners, such as beakers, knife daggers and arrows, and those artefacts that were excluded from deposition in the grave altogether that, in Britain and Ireland included axes and lunulae. These different assemblages traced different object biographies by being carried forward towards goals that were lived out as the projects of human life and which converged, for at least some, upon mortuary rites.

In his essay on 'understanding a primitive society' Peter Winch noted that humans 'do not merely live but also have a conception of life' and that it is this conception of life that has enabled such questions to be addressed as: 'what is the right way to live, what things are most important in life, whether life has any significance, and if so what?' (Winch 1964, 322) The answers to these questions were implicit in the goals towards which earlier lives were lived, and whilst archaeology has always studied the material conditions within which those lives became intelligible, it has not sought to understand how the questions posed by Winch might once have been addressed. Perhaps this has been because archaeology has failed to recognise that the evidence necessary for such an understanding has always been available to it.

A number of different observations on the distribution of Beaker ceramics, their dating, and their associations, have all contributed to the difficulty in explaining these phenomena as if they were the products generated by some yet to be discovered cultural, social or economic process. These observations might now be accommodated from the perspective that has been outlined above. Indeed, this recalls the observation of David L. Clarke who dared archaeologists to 'suspect, perhaps, that the beaker "problem" is a philosophical artefact of our own manufacture' (Clarke 1976, 460). We would concur the "problem" has indeed been the product of our own manufacture, and that this has been due to the significance that we have given to the data as if it were the representation of a process rather than as the contexts within which a form of life had become possible. It is from this change in perspective that we can begin to understand the ways that the members of a number of the different communities, dispersed across Europe in the latter half of the third millennium, sought to establish a shared intelligibility for some of the goals towards which their lives were lived, including the means by which they came to define their dead. This shared intelligibility would have resulted in a degree, albeit limited, of trust that not only required, but also fostered the possibility of individual movement between one community and another, and will have confronted the occasional movement of populations. What was therefore being built was, perhaps at a quite limited level, a common understanding in the ways life might be conducted and this would, among other things, have underpinned the exchange of raw materials between communities, including those materials that were required by the early practice of metallurgy (Brodie 1997). The convergence towards this shared intelligibility was locally constructed, and this is registered today in the form of the Beaker vessels that were used in the service of food and drink (a practice crucial in building trust between individuals), as well as by the personal appearance in the dress and adornment of some. It would, however, always have been an intelligibility that was understood in the context of local practices and local material conditions. Consequently, the localised contexts of the use and deposition of these materials are to be expected (Harrison and Heyd 2007), as is the emergence of these new beaker ceramics by the modification of established traditions (Lanting and Van der Waals 1976), along with the development of indigenous traditions of ceramic production (Lanting and Van der Waals 1972). It is therefore unnecessary to abandon the so called 'Dutch Model' for beaker origins, although as Fokkens warns, we need a more careful handling of the regional variability of all cotemporary ceramic traditions in future analysis (Fokkens 2012, 16). The Dutch model need not be abandoned on the basis of faulty typological reasoning (Salanova 2000), nor in the face of early radiocarbon dates for Bell Beaker material in Iberia or southern France (Needham 2005, 176), but rather accommodated instead by understanding the process by which divergent origins might converge upon a common goal. The approach outlined here also accommodates the collapse of the various taxonomic systems that have been proposed as mapping Beaker development in Britain, where that collapse was heralded by the first programme of radiocarbon dating

(Kinnes *et al.* 1991). Indeed, that dating can be read as confirming the approach that Boast (1998) developed towards the stochastic variability in the form and decoration of beaker vessels: they do not follow a sequence of typological development because each vessel was produced as if it were the restatement of what constituted a Beaker vessel, with the potter operating within the broad regional parameters of what had rendered that tradition recognisable. This argument also supports Harry Fokkens' doubts that comparisons between some Dutch and some Scottish beakers must imply the migration of the potters involved from the northern Rhineland to the west of Scotland (Fokkens 2012). People certainly moved in their lifetimes, but the chance comparability in the form of artefacts is testimony more to the inventiveness of potters who were constrained by the need to act intelligibly, rather than by the need to replicate a common prototype. It is therefore upon the basis of the dispersed re-invention of the 'Beaker' as a single category that a convergence towards the formal similarity of products becomes a statistical likelihood.

The path that I have attempted to follow in this contribution treats archaeology as providing the possibility for our understanding of the material conditions that once contributed to the making of different forms of life. Those forms of life were built by means of the goals towards which participants were able to direct their actions, and where those goals were intelligible to others in virtue of their having a commonly understood relevance. Simply put: forms of life and material conditions brought each other into being (Barrett 2014). The results that are currently being obtained from aDNA now need to be read against this understanding of how lives have been constructed. The distribution of haplogroups over time indicate the spread of certain dominant regions of DNA across a population, they do not explain the strategic development of particular forms of life. Alexandra Ion has recently noted that the ways individual burials are selected for sampling according to their assumed cultural affiliation tends to reinforce the idea that the aDNA analysis is addressing the archaeological 'problem' of how cultural origins might be established, and thus of explaining the distribution of cultural signatures (Ion 2018). She also notes the strength that these results achieve is based upon the foundations of the scientific objectivity of their methodology. We can accept that the aDNA results, along with the work of isotopic analysis, means that archaeology now recognises that individuals might have moved quite extensively in their lifetimes, and that this movement may have been along lines of marital affiliation, as enslaved labour, or as part of larger and possibly contested human migrations. Clearly, the fixed borders and controls operated by state systems are rather more anachronistic than we might have been led to believe. But these results do not explain the histories of the ways human identities have been constructed and of how people found some security in the worlds in which they lived. Thus, and from a British perspective, the aDNA results indicative of a Steppe derived ancestry entering the populations of southern Britain in the third millennium BC via the population of northern Holland (Olalde *et al.* 2017) are certainly important, but they do not allow us to understand how those populations proceeded to construct their various identities into the Bronze Age.

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Early Bronze Age boat graves in the British Isles

Richard Bradley

This paper draws attention to the presence of Early Bronze Age burials containing boats, and other graves whose forms were modelled on those of water craft. Both have been found close to the coast of Northern Britain. Larger vessels of similar kinds have been recorded around the Severn Estuary, but there is little evidence from Ireland. The vessels represented would not have been suitable for making long journeys, and the remains of plank-built boats identified during recent years were not associated with mortuary ritual.

1 Introduction

During the Bronze Age the British Isles were closely integrated with European exchange networks, especially those involved in the movement of raw materials and their products. In some cases there is scientific evidence of migrants, but in others there are indications that particular symbols, from pottery decoration to metalwork, were widely shared. A good illustration of such a network is the study by Harry and his colleagues of Bell Beaker bracers or 'wrist guards' (Fokkens *et al.* 2008). It showed that purely functional interpretations of these objects were unsatisfactory. Nonetheless the wide distribution of these objects illustrates the importance of a martial ideology.

Such networks reached over an enormous area and must have involved travel by sea as well as land, but less attention has been paid to the boat as a distinctive symbol. This has two distinct aspects. Coffins that resemble log boats were widely distributed in Britain but there was only a limited overlap between these separate types (Parker Pearson *et al.* 2013). Tree trunk coffins are dated between the 22nd and 17th centuries BC and, unlike the water craft, they rarely distinguished between a prow and a stern. They were less carefully finished than the vessels which survive intact, and some were found in graves well away from the coast or any navigable river. The authors of the recent study suggested that few log boats had been reused as coffins, although it may have happened with two burials in Scotland. It was no accident that both were near the sea (Parker Pearson *et al.* 2013, 47).

On the other hand, it seems possible that other kinds of boat were employed in Early Bronze Age funerals (this period label is used to refer to the entire period between 2400 and 1500 BC as some examples are poorly dated). The idea has seldom been discussed and provides the starting point for this paper. Again there is a danger of taking this evidence literally – of supposing that the vessels occasionally found in graves must have played a practical role. That is not suggested here. People may have believed that the dead travelled by water, but in Chris Tilley's term the vessels evoked in the mortuary ritual were 'solid metaphors' (Tilley 1999, chapter 2). When more substantial boats moved between Britain and Continental Europe their remains did not feature in the funeral rite (Van de Noort 2011, 179-87).

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2 A ship setting on the Clyde Estuary

The results of a recent excavation on the west coast of Scotland help to set the agenda (Duffy 2007). At Dunore Road in Ayrshire an Early Bronze Age flat cemetery was investigated. It was located by the shoreline and commanded a clear view out to sea. The first group of graves – both inhumations and cremations – were set in a natural dune. During a subsequent phase dated between 2200 and 1900 BC the existing graves were capped by an oval mound, although their positions were respected. This earthwork was not a large one compared with the barrows of the same period, but it was associated with burials and other features. Among them was a small setting in the shape of a boat which came to a point at both the prow and the stern. The vessel was 86 cm long and 54 cm wide and had been covered by a slab. It provided a radiocarbon date of 2140 – 1920 BC. Next to it was a sub-oval feature with an Early Bronze Age Food Vessel. The excavator observed that some of the material used to construct the cists and other features were obtained on a nearby beach. The same applied to their capstones which showed the rippled effect that typified stones taken from the same source.

The excavator commented on the placing of this distinctive structure. As he observed, it pointed towards Arran 30 km to the northwest. During the Neolithic period it had been the source of a widely distributed lithic raw material. Although this kind of stone was no longer employed in the Early Bronze Age,

Figure 1 Distribution of the sites considered in the text

older monuments on the island were reused at that time.

3 Other small ship settings

During the nineteenth century a similar structure was found at Elgin in the north of Scotland (its basic form is illustrated in fig. 2, A). In this case a bronze dagger was discovered together with the remains of its scabbard inside a 'boat-shaped cist' (Gerloff 1975, 75). The original description is revealing. The cist was '6' [1.8 m] long, 3' [[90 cm] wide in the middle, tapering to 1' [30 cm] at either end' (Stuart 1867, vol. 2, xciv). No human remains survived but the dagger was one of a small group found in Northern Britain which can be dated to the earlier second millennium BC (Gerloff 1975). There was nothing to show whether the grave was associated with a mound or even whether it had a capstone. Today Elgin is some distance inland, but before the surrounding area was drained it was connected to the sea by a system of lakes (Ross 1992, 32-65).

The Elgin cist was significantly larger than the stone setting at Dunore Road, but can be compared with a series of features currently under excavation at Newbarns in south-west Scotland (Penman and Penman 2016). Again they were near the sea. They were discovered during work on an Early Bronze Age cemetery which included a number of cremations. According to interim accounts of this research there were several 'boat-burials'. They shared some striking characteristics (fig 2, B). They were up to 2. 2 m long and 1.1 m wide. No trace was found of the vessels themselves but these features were unlike the other graves because they came to a point at one end – perhaps the position of the prow. They were approximately square at the opposite end which may have represented the stern. The cemetery was only a kilometre from Sandyhill Bay on the shore of the Solway Firth and was also close to a lake. These features were directed towards the sea. A further link with the coast was the use of beach pebbles to line a burial pit in the cemetery which is dated by finds of barbed and tanged arrowheads.

The new discoveries at Newbarns resemble those from another cemetery in Scotland, at Dalgety on the northern shore of the Firth of Forth (Watkins 1982). In this case it was on the site of the destroyed round mound and included a series of cists as well as three

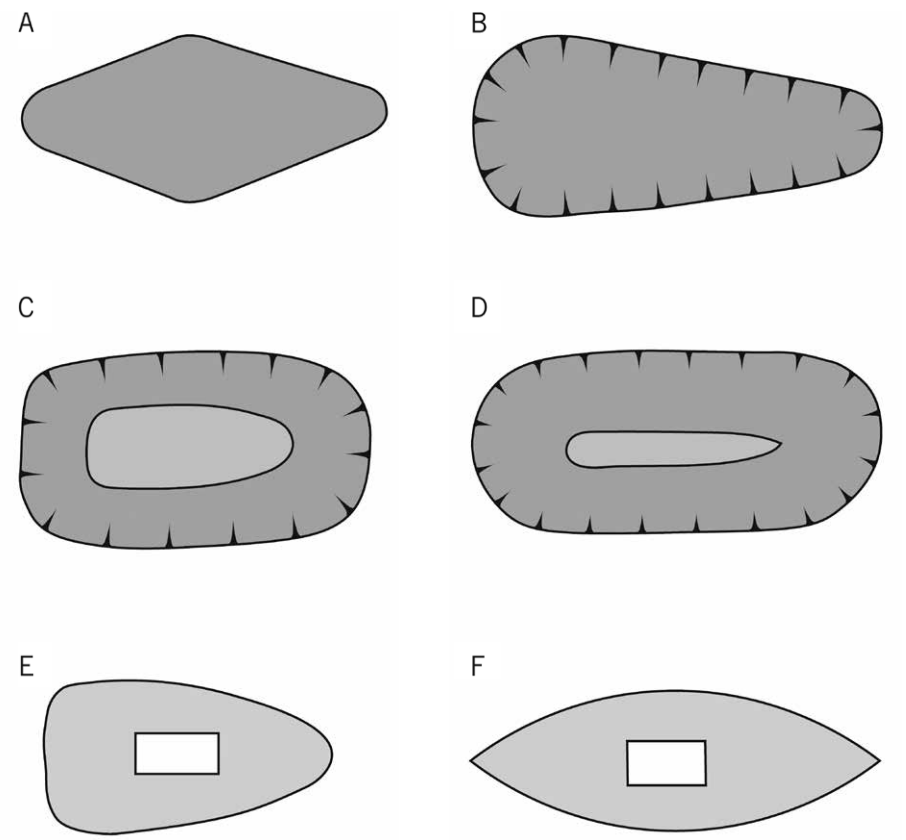

Figure 2 Outline plans of the main types of boat grave represented in the British Isles. They are not drawn to scale but are approximately the same sizes as one another; the dimensions of individual examples are given in the text. A: ship setting with pointed prow and pointed stern; B: boat grave with pointed prow and a stern approximately at right angles; C: grave containing a small vessel similar in form to a coracle; D: grave containing a possible log boat with a pointed prow and its stern at right angles; E: cist grave covered by a massive capstone, pointed at one end; F: cist grave covered by a massive capstone pointed at both ends

graves which shared a different axis. The excavator recognised an organic lining in the filling of one of these features. Careful recording showed that the body was inside a container that had been pointed at one end and roughly square at the other (fig. 2, C). It was 2 m long and 95 cm wide: a similar size to the putative boat-graves at Newbarns. Laboratory analysis suggested that this lining consisted of leather or hide, leading Watkins to compare its form with that of the skin boats or coracles whose use in Britain and Ireland has continued to the present day. A more recent study suggests that all three graves at Dalgety contained vessels of this type (Parker Pearson *et al.* 2013, 47). It seems possible that they were represented as travelling towards the coast which was under a kilometre away. Another link with the sea was a deposit of fish vertebrae deposited with the coracle burial. Again the cemetery is well dated and the vessel identified at the time of the original excavation was associated with an Early Bronze Age pot.

The distinctive siting of the levelled mound at Dalgety resembles the position of a cemetery at Seafield West which was located on the shore of the Moray Firth in northern Scotland (Cressey and Sheridan 2003). Its position also recalls that of the ship setting at Dunore Road. Two distinctive graves were identified during the excavation of a ploughed out barrow. They were found side by side, one with a plank coffin and other with a reused log boat 2 m long: a rare example whose credentials were accepted by the authors of the recent study (Parker Pearson *et al.* 2013; its form is illustrated in fig. 2, D)). Again one end narrowed to a point while the other was roughly square, 'giving the appearance of a boat' (Cressey and Sheridan 2003, 52). This feature included a Food Vessel and a bronze dagger whose scabbard is dated to 1872 -1533 BC. This find recalls the grave at Elgin 50 km away. Like the coffin in the neighbouring grave, the orientation of this vessel followed the shoreline. Seafield West was near the opening of the Great Glen which provided the principal overland route to the west coast and Ireland. That connection was important as the dagger was made from Irish metal, and the pot was an Irish form (Cressey and Sheridan 2003, 80).

The evidence from Ireland itself is very limited. Here there is no convincing evidence of ship settings. On the other hand, the excavation of three cemeteries has identified a feature they shared with burials in Scotland; that is particularly true of Newbarns where several pits were covered by massive capstones. At the Irish sites square or rectangular cists were covered by slabs of similar size (they were between 1.1 and 1.7 m long), but in these cases they were the same shapes as the boat graves found in Britain. They were either pointed at one end and came to a right angle at the other (fig. 2, E), or they narrowed to a point at both extremities (fig. 2, F). The first arrangement is recorded at Ballynaboola in Co. Cork and Lug in Co. Offaly (Cahill and Sikora eds. 2011, 93 and 296). The latter site included a second grave with a capstone of the other type. Another was found at Culleens in Co. Sligo which is not far from Kilala Bay (Cahill and Sikora eds. 2011, 296 and 455). The cists at Lug and Culleens were associated with inhumation burials and Early Bronze Age pottery.

4 Larger ship settings

There were larger stone settings at three sites not far from the Severn Estuary in western Britain, but in two cases it is difficult to establish their original plans. In a third, the dating evidence is ambiguous. Even so, they share the same basic forms as those shown in figure 2.

The first was at Sutton in South Wales where Cyril Fox excavated a remarkable grave (Fox 1943). On the bottom of a deep oval pit there was a distinctive stone setting in the form of a boat travelling inland from the coast 5 km away. The stern of the vessel was square: a feature it shared with the burials already considered. The point was not lost on Fox who observed that 'the resemblance to the gunwale plate of a stern-based canoe was noted at the time [of the excavation] (Fox 1959, 67, note 1)'. The length of the vessel was about 3.75 m – a higher figure than any of the examples considered so far – and the grave was sealed by a mound enclosed by a ditch. The stone setting contained an inhumation associated with a Bell Beaker and barbed and tanged arrowheads. The monument was subsequently rebuilt and used for other burials.

A second project, at Twyn Bryn Glas in south Wales was nowhere near the coast but identified a similar structure (Webley 1960). According to the excavator, its form was that of a small boat. It was the same shape as the grave at Sutton, but in this case the position of the grave 'was surrounded by a megalithic wall' (Webley 1960, 60). The vessel was 3.1 long, and had an empty pit in its prow. In a subsequent phase a second wall was built, outlining a larger boat of the same kind, and a cist burial associated with a Bell Beaker was inserted into the original chamber. Like Sutton, the monument was still used for burials in a subsequent phase. It is difficult to say more than this as the excavation report is difficult to understand

The same configuration is found at a better documented site in western England: Soldier's Grave (Clifford 1938). In this case another circular mound or cairn covered a feature excavated over a metre into the subsoil. It had parallel sides, and one end was square while the other was pointed like the prow of a vessel. It was lined by a drystone wall and contained the disarticulated remains of at least 28 people. The structure was 3.3m long and resembled those at Sutton and Twyn Bryn Glas. The site was on top of a prominent escarpment which commands a view extending to the Severn Estuary 8 km away, although the grave itself was directed along the axis of the ridge. The few sherds identified in the excavation are undiagnostic, but Stuart Piggott attributed them to the Early Bronze Age (Clifford 1938, 214); on the other hand, the burials resemble those of the Middle Neolithic period in the same region (Darvill 2004, 219 and 265). At present the human remains cannot be traced and it is impossible to resolve the competing arguments.

All three structures were considerably larger than the others considered in this article. Their dimensions were similar, with overall lengths between 3.1 m and 3.75 m. By contrast, cists of the same date were rarely more than 2 m long. All the vessels had a pointed prow and an approximately square stern and in at least two cases they were associated with Early Bronze Age burials. The positioning of two of the structures may have referenced the coast, but they lack the close relationship to the sea documented at Scottish sites.

5 Summary and conclusions

This paper began by summarising recent work on Early Bronze Age coffins in Britain. Only two examples have been reused vessels. On the other hand, the smallest log boats recorded in McGrail's corpus had similar proportions to the features described in this paper McGrail 1978). The prow of the vessel was pointed, and its stern was often square. Few of the wooden vessels have been dated, but they were about the same size and shape as the boat graves described here. The evidence is enough to show that their distinctive forms were not restricted to coracles. Perhaps what really mattered was the *idea* of a boat.

Like the reused log boats, most of these cemeteries were located near the sea. The Irish evidence is too slight to have much bearing on this question, but five of the examples discussed in detail seem to be related to the shoreline. In another two instances – Sutton and Soldier's Grave – the same relationship seems possible, but the distances involved were greater. Only the poorly recorded monument at Twyn Bryn Glas was a long way from the water. With the exception of the large structures in western Britain, all the sites were within the region that experienced isostatic uplift, meaning that the prehistoric coastline still survives. Had similar sites existed in lowland England, they could have been submerged.

In Northern Britain it may have been important to make an explicit connection between the dead and the sea. Individual features at Dunore Road and Newbarns employed raw materials collected from a beach, and the coracle burial at Dalgety contained a deposit of fish bones. Metaphorical journeys may have been important too and could have been emphasised by the orientations of the graves. Thus the small ship setting at Dunore Road was directed towards a conspicuous island with a series of funerary monuments, and at Newbarns the alignments of the putative boat graves suggested that the vessels were journeying towards the sea. The same seems to have happened at Dalgety, while the reused log boat at Seafield West was displayed as if it was travelling along the Moray Firth.

Again it is important to emphasise that the presence of boats in these graves cannot be taken literally. Such small vessels would have been used on inland waters, but instead they are represented by graves at the coast. In fact it is the log boats that are more common in the hinterland (McGrail 1978). The coracles and similar craft may not have ventured far out to sea. In any case the smallest examples could not have accommodated more than one or two people. Larger plank-built boats, on the other hand, might have been suitable for long journeys, and fortunately a few traces of such vessels have been identified (Van de Noort 2011, 179-87). The earliest examples were built in the early second millennium BC, meaning that they were available at a time when boat graves were established near the water's edge. These were more sophisticated craft, but the burials identified in this article took no account of their existence.

In 1995 Crumlin-Pedersen and Thye edited an influential collection of papers with the title *The Ship as Symbol in Prehistoric and Medieval Scandinavia*. The new evidence from the British Isles suggests that their approach might extend to a wider area. Boat burials dating from the first millennium AD have long been known in Britain and Ireland, and now it seems as if they were also a feature of the Early Bronze Age. As was the case with the 'wrist guards' studied by Harry and his co-authors ten years ago, the harder we look at the evidence the more surprising it becomes.

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The nature of a Bronze Age World

Anthony Harding

The progress of research in recent years has shed new light on how often and how far individual people moved in Bronze Age Europe. This information complements and in some cases confirms what the study of artefacts had suggested. These approaches can be compared with the detailed study of particular landscapes where full information is available on complete "living systems". As a result, it is possible to think in terms of both small worlds and big worlds in the Bronze Age, without it being necessary or appropriate to see this in terms of World Systems Theory.

1 Introduction

What constituted the "Bronze Age world"? This is a topic that both Harry Fokkens and I, in different ways, have considered in recent years, not least in our jointly edited Oxford Handbook (Fokkens and Harding 2013). Did people – most people – live in a small area and rarely venture out of it? Did they know their neighbours in adjacent social groups? And – most pertinently in view of the progress of research – did they travel more widely across the continent of Europe? If so, how many, and over what distances? And what happened to everyone else – the majority, one assumes – who stayed behind and tilled the fields, built the houses, made the pottery and cast the bronzes?

2 Mobility and movement of people and artefacts

These matters have become more urgent to decipher in the light of recent work which shows that some Copper and Bronze Age people travelled, over short and long distances. The recent demonstration that in the Beaker period a more or less complete genomic change occurred in Britain (Olalde *et al.* 2018) not only confirms long-hold views about what lies behind the extraordinary similarity in pottery over the areas where Bell Beakers are found (something that Harry has also worked on), but also indicates the power of modern DNA techniques to trace the movement of people in ancient times. While these genomic transformations mainly affect the Neolithic and Copper Age, for the Bronze Age recent studies have concentrated on DNA recovered from relatively small buried populations, in some cases individuals, such as the women from Egtved and Skrydstrup (Frei *et al.* 2015; Frei *et al.* 2017). The fact that both these women died in a different place from where they were born is just one of the recent discoveries that indicates how people were on the move in the Bronze Age. But these young women special, or do they represent a common facet of life in the Bronze Age world? How frequently did this occur, and what does it tell us about how people viewed the environment, physical and mental, in which they lived?

The answer to the first question will depend on the progress of research in the coming years, but there are already some indications of how common movement was, or was not. At the cemetery of Neckarsulm in Baden-Württemberg (Wahl and Price 2013), of 38 young male individuals, 12 had isotopic signatures which were

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non-local – which means that the remaining 26 were locally born and bred. Analysis of origins is now such a common practice in archaeology that great variation can be expected in any reconstruction of Bronze Age society in terms of the geographical origin of individuals (the ERC-funded project "Travels, transmissions and transformations in the 3rd and 2nd millennium BC in northern Europe: the rise of Bronze Age societies", led by Kristian Kristiansen, reports "a good deal of mobility among the people of the late Neolithic and Bronze Age".[1] But I, for one, would expect that movement was the exception rather than the norm, though I recognise that this is a reaction based on personal supposition rather than any objective analysis.

Of course, if *any* people were moving over significant distances, their knowledge of the world was more than purely local. It is already nearly 30 years since Albrecht Jockenhövel pointed to interesting artefactual depositions best interpreted as evidence for the movement of females in marriage (Jockenhövel 1991); although several writers have followed this type of interpretation, none has bettered it. I myself considered razors, which are personal objects *par excellence*, and likely to belong to the individual with whom they are buried (Harding 1997; 2000, 190-192 Fig. 5.13; 2008); others have looked at other types of personal object or weapon. Swords, for instance, have often been assumed to be items for personal use, and their deposition with a burial an indication that the person in question was a warrior of some kind. The antenna swords found in Britain, notably that recovered from the River Witham in Lincolnshire, are a striking case in point (Burgess and Colquhoun 1988, 122 Plate 111). Such swords are entirely of continental origin; it is perhaps striking that all the British finds occur on the eastern side of the country, nearest the probable area of production. The same is probably true of the 'Mycenaean' swords found north of Greece, notably the magnificent piece from Tetovo in Macedonia (Harding 1995, 21 Taf. 4); other swords of Mycenaean type in Albania, Kosovo and Bulgaria are in my opinion mostly of local production, not imports, though this remains to be demonstrated analytically.

If a sword was found a long way from its place of manufacture, then (so the story goes) either it was a prestige object carried along exchange or travel routes to the society and individual who came to possess it; or it was taken as part of a warrior's accoutrements to foreign lands where the person fought with it in a foreign conflict, in other words as a mercenary. Such notions go back many years, for instance to the work of Hector Catling on swords of Naue II type in Greece (Catling 1956; 1961); the idea has been revived at various times, most recently by Kristiansen and Suchowska-Ducke (Kristiansen and Suchowska-Ducke 2015, 371). In the meantime, the wider question of metalwork relationships between Italy and Greece in the Late Bronze Age, such as those affecting swords of Naue II type, have taken step changes forward, notably through the work of Reinhard Jung and Mathias Mehofer (Jung and Mehofer 2005-6 (2008); Jung 2009; Jung and Mehofer 2013). It is clear through their work, from the presence of Italian and Sardinian objects in the East Mediterranean, and of course from the large number of imported Aegean pots in the central Mediterranean, that the world of the Mediterranean was a highly connected one. In this, the sea obviously played the major role; something that was not the case for the world of the European continent more generally.

That is not to say that connections across wide reaches of the European continent were not possible: of course they were. We need only remember the so-called drum from Balkåkra in Scania, which is patently a product of the Carpathian Basin, its only close analogue in Hungary (Knape and Nordström 1994). Such an object can only have travelled as part of a special, not a regular, journey or journeys, perhaps part of a ceremonial gift exchange or diplomatic mission. With a diameter between 41 and 45 cm, and a height of 27.5 cm, the object is too large to have been carried by one person unaided over a long distance (unlike beads of amber or other materials). Journeys involving several people and an animal or boat (if transported by riverine routes) are most likely. The same would be true for the transport of metals in ingot form, a matter under intensive investigation at present.

What sort of world, then, do these pieces of evidence indicate? Clearly a connected world, at least for some people. The progress of research in recent years has brought about a situation where one might think every person and every object was involved in long-distance movement, though (as mentioned above) this cannot actually have been the case. Certainly metals and metal objects moved, apparently over significant distances (especially in the case of tin, though the details of this too remain unclear; the project 'Bronze Age Tin', which aims to unravel the relationship between potential sources and finished objects has not yet succeeded in a definitive resolution

of these matters.[2] But pottery is likely to have moved only in special cases, perhaps more for the contents of the pot than for the vessel itself (for instance liquids or perfumes in Mycenaean stirrup jars and alabastra). And only rather specific foodstuffs would have moved: not common cereals or meat, but special foods such as herbs and spices, or fermented and alcoholic products.

All these forms of evidence indicate that different people probably saw the world on different scales and levels. While some travelled significant distances in their lifetimes, others were more or less confined to the areas where they were involved in the continuous process of the production of food, clothing, shelter and the tools necessary for these activities. Most people lived on the land, and the land has things to tell us.

3 Land and ownership

The extent to which people could claim "ownership" of land in the Bronze Age is a controversial matter, but one which is crucial to any decision on the size and scale of people's "world". In a pre-literate period no one can truly know about ownership; we can only make informed guesses based on the best archaeological evidence.

One such example may be provided where exceptional survival, and diligent reconnaissance (usually, though not always, from the air), have enabled investigators to view landscapes over large distances (up to tens of kilometres). In some areas of Britain, long-term aerial survey coupled with particularly receptive soil and crop conditions, as well as an absence of modern destructive features, have allowed archaeologists to see where ancient activity was taking place and where it was not. In parts of central southern England (especially the counties that make up "Wessex"), there are exceptional landscapes dating predominantly to the Bronze Age, for instance on the Marlborough Downs (Gingell 1992). Here, extensive stretches of field boundaries covering many hectares are separated by land with no evidence for any activity; and there is no indication that these blank areas ever did contain agricultural or any other features. In all likelihood, these were areas of common land or forest, land not belonging with the blocks of fields that surround it on all sides. In addition, many of the blocks of fields are attached to small enclosures containing round huts, which one may imagine are the houses or hamlets in which those who tilled the fields lived. We can speculate that the inhabitants had exclusive access to those blocks of fields; whether this counts as ownership is probably more of a semantic question than one that affects our understanding of the ancient economy. Comparable attempts at understanding a complete living system have been made by several authors, though without widespread knowledge on the part of the archaeological community (Spratt 1981; Carlie 1994, Chapter 6). In an ideal situation, we would know about the location of all aspects of people's lives; only in such a way will we be able to build up a fully contextualised picture of ancient life and death.

Dartmoor represents another example of a close relationship between an agricultural landscape and settlements (Fleming 2008), as do parts of Bodmin Moor, some 35 km west of Dartmoor. The well-known field boundaries (locally called "reaves") cover many square kilometres of land, and are frequently in direct association with settlement features and ritual sites, or close to major enclosures containing houses (locally "pounds"). Here too one may imagine that groups of people were able to claim particular fields or areas as their exclusive preserve, maybe lying close to their place of residence or possibly a little further distant. One of the best such "living systems" can be seen on Bodmin Moor, in east Cornwall, on the moor around the tumulus from which the famous Rillaton gold cup came: here there are the stone circles called the Hurlers (such sites usually date to the Neolithic-Bronze Age transition), extensive signs of tin extraction, an enclosure (Stowe's Pound), and field systems on nearby Craddock Moor (Johnson and Rose 1994, 45; Needham *et al.* 2006, 72-3 Fig. 36). Many other areas in the south-west peninsula have comparable groups of sites. Some caution is necessary given that it is impossible to prove that all the elements of the landscape were contemporary, and the potential timescale covers several hundred years; but overall the picture is highly suggestive.

Dutch scholars, including very notably Harry Fokkens, have shown very clearly that it is possible to recover and reconstruct total living systems in the Netherlands and adjacent areas (Fokkens and Roymans 1991; Arnoldussen and Fokkens 2008). In recent years, French scholars have also show how extensively Bronze Age occupation survives (many authors in Carozza *et al.* 2017, with full references), especially in the north of the country where large occupation sites lie close to field systems, as at Bernières-sur-Mer or on the small island of Tatihou off the north coast of the Cotentin peninsula (Marcigny and Ghesquière 2003a; 2003b). The progress of research in other countries shows that these are not isolated phenomena; we can expect comparable developments elsewhere.

4 Discussion and conclusions

So did Dartmoor or Bodmin Moor constitute a "world" in itself for their residents, or merely part of a much larger world? The Rillaton cup shows that there were technological connections between different parts of Atlantic Europe during the Early Bronze Age; the burial of the cup in the landscape described above relates to potential social connections over wide areas. Both suggest that what appears to be no more than an extended Bronze Age living area was in fact part of a much more connected world. The presence of tin here, and in many other parts of the peninsula, can also be taken to suggest the potential for wide-ranging contacts around Channel coasts, even if – for the Early Bronze Age – these are not yet supported by finds comparable to those of later date, for instance the apparent ship cargo with tin ingots from the sea off Salcombe, Devon (Wang *et al.* 2016).

One approach to the question might involve viewing these matters through the lens of World Systems Theory, an approach that became fashionable in the 1980s and has persisted in some quarters as an explanatory mechanism until quite recently. I and several other authors have given the matter full treatment in previous articles and books (in recent years, from a critical standpoint: Harding 2013; Kienlin 2015), so there is no need to repeat what has already been said. Obviously such an approach would operate on the macro scale, whereas here I have been considering the micro scale. The two are not incompatible; people could have been part of both small worlds and big worlds, and some no doubt were.

The issue boils down to a question of scale. In some circumstances (cross-continent movement of people and goods) a big world approach will be appropriate; in others (understanding the nature of a local landscape) the small world is the best way to view matters. Forcing a "system" onto the often scattered and always incomplete archaeological evidence is unlikely to be a sensible way to proceed. The work of Harry Fokkens and his colleagues shows, in my opinion, how fruitful it is to work from the detailed landscape upwards into wider spheres of understanding and knowledge.

Notes

1. https://cordis.europa.eu/result/rcn/179942_en.html, accessed 24 April 2018
2. https://cordis.europa.eu/project/rcn/109308_en.html, with link to project pdf, accessed 28 April 2018.

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A triangular Middle Bronze Age trade system of amber, copper and tin 1500-1300 BC

Kristian Kristiansen and Johan Ling

Harry has worked extensively on Bronze Age settlement systems in the Netherlands, from his thesis onwards to the present (Arnoldussen and Fokkens 2008). The extraordinary results presented in the book Harry edited with Stijn Arnoldussen were in part due to excellent conditions of preservation in tandem with large scale rescue excavations, and have become a benchmark for other regions to compare with. Thus in the Thy archaeological project (Bech et al. 2018) we found inspiration in the Dutch results, as it turned out that a number of settlement features connected the two regions. However, what were the driving forces behind these similarities, which also included the tradition of barrow construction, as well as similarities in metalwork?

Harry, in his contribution to my Festschrift, provided an inspiring model for at coastal maritime trade system (Fokkens 2013: Figure 6) that connects Jutland with the coastal communities in the Netherlands, France and southern England. In the following we expand on this model, and propose that it formed one leg in a more complex, triangular trade system that also included the south German Tumulus Culture and southern England. The model (fig. 1) is based on the following observations:

Firstly, from the coastal communities of Jutland and northwest Germany (Bergerbrant 2007) the Weser river leads directly down to one of the centers of the Tumulus Culture with rich Middle Bronze Age burials, often containing complex necklaces made from Baltic amber (Kristiansen and Suchowska-Ducke 2015: Figure 1; Woltermann 2016). This was collected along the coast of Jutland bordering the North Sea, and in the Thy project we found a small amber hoard deposited under the floor of a house from around 1350 BC, close to the coast (Earle 2018).

Secondly, it has been demonstrates in a recent work on the origin of copper in Danish bronzes (Melheim *et al.* 2018), that from around 1500 BC the new dominant source of copper is the Italian Alps (Artioli *et al.* 2016), which provided most of the copper employed in swords from south Germany to Denmark (Ling 2014; Ling *et al.* forthcoming), followed by Slovakian and east Alpine ore deposits. Traders from the Italian Alps would have traded copper north to the South German Tumulus Culture (Mordant *et al.* 2007). Northern Italy with the Terramare Culture was also a hub linking the European trade networks to the west Mediterranean/Mycenaean trade network that provided among other things glass beads in exchange for amber (Kaul and Varberg 2017; Czebreszuk 2013).

Thirdly, tin sources were located in Cornwall in south England (Pernicka 2010), and therefore we should expect an exchange of tin for copper. The Rhine could therefore have been an important route for the metal traders in the Bronze Age leading more or less from the Alpine copper sources in the south to the tin sources

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in England. Further support for the use of the Rhine route comes from the isotopic evidence showing that England also obtained some of its copper from the Italian Alps after 1500 BC, even if copper from Great Orme (Wales) was still being used (Rohl and Needham 1998; OXALID).

Based on these observations we suggest a triangular trade system in which amber was traded south by Nordic traders/warriors using octogonally hilted and flange hilted swords of international type. In south Germany they traded amber for copper, which they brought to the British Isles along the Rhine route, where they exchanged copper for tin, before returning home across the channel. A key question is how far did the traders travel, whether from Denmark, south Germany or the British Isles? We get a glimpse of the high mobility of people from the two long-distance travelers: the young girls/women from Egtved and Skrydstrup (Frei *et al.* 2015a; 2017). There is much to suggest that similar patterns will emerge from male burials with foreign swords, as we have to envisage well organized caravans protected by warriors moving on a regular basis between the hubs in local chiefdoms (Kristiansen and Larsson 2005: Figure 107). Some would settle in the north or south, others would return home, which goes some way to explain the distribution of international sword types.

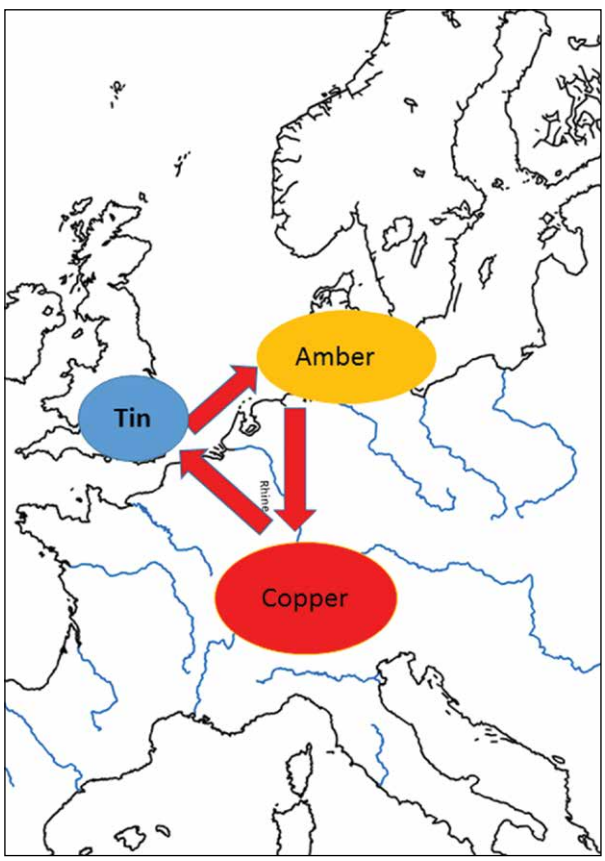

Figure 1 A local triangular trading circuit using the river systems Weser and the Rhine. Amber from Jutland is exchanged for copper in south Germany, which is then exchanged for tin in Cornwall

In such a scenario traders/warriors and accompanying persons, *e.g.* young teenage girls such as Egtved and Skrydstrup intended for marriage with distant trading partners in the north, would have travelled counter-clockwise in a triangle movement of the maritime groups from different locations in Scandinavia, after passing Denmark, either through the Limfjord area or the Hedeby passage in the south setting out on the North Sea moving down the Weser, travelling a short distance overland at the end of Weser to the River Main, following this westward to the Rhine, and from the Rhine to the North Sea over to England, and then from England over the North Sea back to Scandinavia. In such a case they might have traded Baltic Amber with the southern Tumulus groups against copper from the Italian Alps and used this copper to trade tin and perhaps even gold with groups from England. Or was the Rhine route only used by traders from the Tumulus culture and traders from England? Perhaps the Scandinavians primarily traveled along the North Sea coast, meeting up with Tumulus middle men at the mouth of the Weser, and with traders from England at Islands such as Thanet by the North Sea in order to get the precious metals?

In any case, our conclusion is that the Scandinavian travelers were highly mobile and active during this phase (1500-1300 BC) and that they probably used both the Weser and the Rhine or the North Sea route to England in order to obtain the copper from the Italian Alps and the tin from England. Once established these highly organized trade systems would also channel other products, among them woolen cloth, which could not yet be produced in south Scandinavia (Frei *et al.* 2015b). We are thus dealing with the formation of a highly organized form of early commodity trade, that channeled large quantities of goods as well as people. In this the Middle Bronze Age in Europe has many parallels in the Viking Age, which in much the same way connected distant regions, and in the process also would lead to colonization and conquest. Perhaps, future research will enable us to provide evidence of similar processes in the Bronze Age.

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Wetland Knowledges: Resource Specialisation (and Denial) in the East Anglia Fenlands

Christopher Evans

This contribution provides an impression of a study-tour visit to the Danube Delta before exploring issues of prehistoric wetland resource procurement in the East Anglian Fenlands. Reviewing facets of Haddenham and Barleycroft/Over's fieldwork – plus other recent excavations and local marshland settlement densities – it is argued that specialist exploitation skills were rare. Much of the evidence rather suggests either resource-denial or, at least, severe under-utilisation. In short, the now-amassed data is not fulfilling our expectations and long-rehearsed wetland 'projections'.

Coalescing around the theme of 'wetland knowledges', this is a contribution of two parts. Focusing on the Lower Great River Ouse environs, its latter portions review the evidence of the later prehistoric Fenlands of England's East Anglia concerning the nature of wetland exploitation based on archaeozoological evidence. The first part, though, is something quite different. While at risk of verging into a travelogue, it chronicles a week spent in Romania's Danube Delta region with Harry Fokkens and his West-Frisia Project team in 2013, which amounted to a thoroughly splendid wetland-environs experience.

There is also another resonance, one of 'mucking about in boats'. Along with Marie Louise Stig Sørensen (also participating in the delta trip), I first got to know Harry in the 1980s. The early years of the Theoretical Archaeological Group conferences (TAG) and, for me, the Haddenham Project, yet far more 'bonding' was that he then lived on a barge in Amsterdam, while we – I then was also working for the Museum of London – lived on a dilapidated Thames sailing barge moored on the Thames at Battersea.

The other, Fenland-half of this contribution is equally appropriate, as Harry has been, over the last almost 40 years, a mainstay of 'connective-ness' between Dutch and British archaeology. He has played a major role on this side of the North Sea, regularly attending conferences – usually with students in train – and even flying site visits (the last time when the West-Frisia 'gang' made a day-trip visit to our Must Farm excavations). Recently, Cambridge's connections with Leiden have become more formalised, but it is only something largely founded on the many friendship linkages that Harry forged here over the decades, and that is a tremendously important thing.

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1 On the Danube with Harry

We leave from Tulcea, from where we're three days afloat going down through the delta (fig. 1). It's on a coastal life-boat, which only just holds the eight of us in her bows (fig. 2). Aside from Harry and our local nature-conservationist guide, the

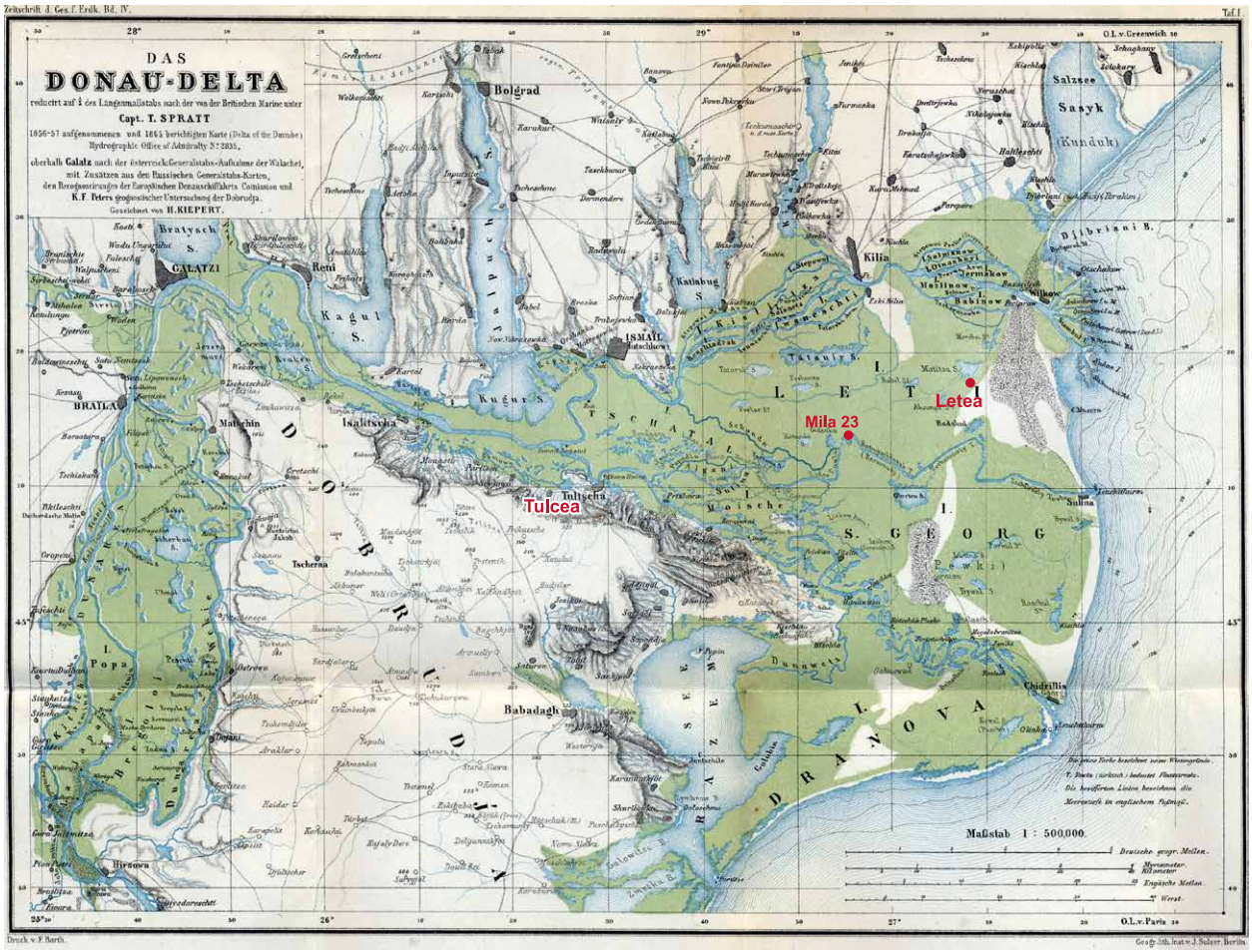


Figure 1 Danube Delta (annotated; 1867 map)

company includes Corrie Bakels, Yvonne van Amerongen and Wilko van Zijverden. We have a lot environmental expertise on board *and, together, they can well read and nuance this extraordinary landscape.*

This kind of thing is always difficult to write about without lapsing into clichés of the 'great-birds-lazily-flying-up-before-us' variety, but that's exactly what there is. What immediately strikes you is the sheer frequency of big birds and, at times, we chase one up every hundred metres or so. With Great White Egrets, cormorants, and many species of heron, occasionally there are raptors, high and at a distance. Twice there were Ospreys, and a few times White-tailed Eagle. Forget well-honed lines about it being an amazing sight, they're simply astonishing. Perhaps most remarkable are the pelicans (fig. 3). At one point we're overflown with flocks of 20 to 100 and, in a matter of minutes, we must have seen upwards of 400. I had no idea of their grace when flying en masse: *they wheel in unison and closely mimic each other. Best is their single-file snake-dance formations, when they rise and fall in lines, almost like notes on a musical stave. (Some of the party are avid bird-watchers and photograph like mad; neither Harry or I are quite so dedicated and conversation often turns to entirely different matters … .)*

The main thing about the landscape – if that's the right term for somewhere that is so much water – is the sense of the wall of green and how jungle-like it all is. Off the main channels, generally 150-300m wide, the waterways vary from 20 to 50m across. Their narrow bordering levees are lined with willow and poplar, and you only rarely glimpse the backswamp's reedbeds behind. Foremost, though, there's the impact of the channels' flanking 'walls'; finding your way amid this myriad is strictly a matter of the pilot's familiarity – fine-honed local knowledge is a must. This is highlighted

Figure 2 The vessel and its intrepid travellers; below, in the bows, bottom right, Wilko van Zijverden, behind him Patrick Valentijn and, then clockwise, Yvonne van Amerongen, Evans, Marie Louise Stig Sørensen, Corrie Bakels, our local guide, and Harry Fokkens (missing is the group's photographer, Wouter Roessingh)

Figure 3 Pelican flight-lines (top) and, below, boats at Mila 23 (photographs, Wouter Roessingh)

when sailing up to the Greek Orthodox village of Letea, with its 'primordial' oak and lime dune-top forest just to the north. There, at points, the channel is dotted with small floating reedbed islands. Through a build up of methane, the reeds jettison their root-base and idly float on the current. Apparently they can present a risk to fishermen; on laying nets in channel-connecting lakes, they can later find their exits blocked by wandering reed isles.

On the return-route we stopped at the village of Mila 23 (fig. 3). Of Russian descent, it's a Lipovan religious sect community who arrived during the nineteenth century. They are, indeed, physically distinct, the men being larger, with a number having full beards and long hair. The village is strung out along a 75-100m wide riverside levee, with reedswamp and pasture behind (en route there we've spotted both free-range cattle and pigs). It would have to count as the first truly 'living' wetland settlement I've ever really been in. It abounds in reed-construction – as roofing, wall-lathes and property fencing – and drying stacks of them are everywhere. Nets are stored in yards and the place is dotted with decaying, small traditional-design boats: they moulder in front of houses, lie beached on the riverbank and there's even one in the cemetery. A sign of the times, fibreglass hulls are now replacing wood. But apparently its very bad luck to break up a boat and they must be left to 'die' on their own accord (even fibreglass vessels are left to rot in this manner). For me this could have implications for our recently excavated Must Farm Bronze

Age logboats. Particularly, why so many should be found in such a short stretch of its waterlogged palaeochannel, with some partially decayed. There, we also recovered an enormous number of fish/eel traps and, again, Mila 23 provides a lesson. Upstream there are arrays of the wooden pole net-settings and these impinge upon the channel. For a number not in immediate use, their nets proper are stacked in either the reeds beside or in overhanging branches above. Obviously, if left in this manner in the past, they would have eventually fallen into the river and, effectively, entered the archaeological record.[1]

Getting out from the delta, we're two days touring the Dobrogea's hill-dotted steppe lands to the south. Variously passing through Tartar-, Turk-, Ukrainian- and Russian-origin villages – with each supposedly having their own subtle house-architecture hallmarks – our first day ends at the ancient Greco-Roman settlement at Capul Dolosman (Arganum*). Perched atop a cliff fronting onto the Razim Lagoon, and with four successive defensive earthwork-lines (plus two exposed basilicas), it's a tremendous site. Yet, it pales in comparison to* Histria *(now Cetateau Istria) where we start the second day. With its walled portion extending over more than 6ha, Histria is located on an island-rise on the edge of the lagoon, and silhouetted in the distance is the settlement's great barrow-strewn necropolis on the next peninsula north. Upwards of a third of the Roman town has been dug and conserved, with only the sacred precinct of the earlier, seventh century BC-origin Greek colony exposed. Its an incongruous thing, here at the side of the Black Sea and the then-barbaric world, to have such an intense experience of a classical world town. Leaving aside thoughts of far-from-Athens dislocation, more moving is when, waiting for the bus, a solitary Dalmatian pelican flies slowly right overhead. Nearly majestic – pelicans never seem to quite make that mark as there is always something inherently comical about them – its an iconic moment as I've always wanted to see one in its habitant, having dug them now on a number of Fenland sites (they being extinct in Britain from the Middle Ages).*[2]

Another 'framing moment' came shortly thereafter as we drove down the shore, reaching our maximum point south and where the lagoon's coastal, shell-packed sand barrier hits the mainland. Here there's the ramshackle ruin of a huge latter-day processing plant for rare minerals. Rollercoaster-paths of the conveyors link decaying tower blocks, whose plastic panes have blown off and are left flapping. The whole thing is like a stage-set waiting for something to happen. Built in the later '80s, but never operational, stuck in the countryside (with ranges of workforce-intended concrete apartments off to one side), it's a testimony to all the draconian madness of Ceausescu's regime. But here, just along the sand spit itself, at a distance you can see the towers and cranes of Constanta. Now a major resort town – another Greek Ponic colony and later, in Roman times, where Ovid was exiled – it has another classical world resonance. Its name, Tomis*, means 'to cut' and it is a candidate for where, in the Argonauts' travels, Medea dismembered her brother.*[3]

This ancient world-margin setting had already been brought home by the Roman forts that were passed en route upon the escarpment flanking the delta's southern side. Here the Danube marks the Limes, including Noviodunum *just west of Tulcea and where London's Institute of Archaeology recently excavated over many seasons. This sense of area being on the once-edge of the ancient world was repeated when, on leaving through Bucharest, we visited the National Archaeological Museum. Most of it was closed except for the rotunda galleries, where there's the massive presence of a full-sized nineteenth century replica of Trajan's column, the basal portion towering up some 10m high and with its upper sculpted panels arranged on the walls around its sides. Its final reminder of the area's borderland status as it, of course, documents Rome's campaign against the Iron Age Dacians.*

Its salient to realise that the delta's 'wetland wilderness' has for so long been both a gateway and frontier. Seeing the ebb-and-flow of the 'barbaric' and 'civilised', the cultural landscape's complexity is only furthered by the attributed ethnic 'signboarding' of so many of its villages. Largely of nineteenth century origin, they tell of the liberalism of the region's then Ottoman Empire rule, as well as of the delta-lands as a place of refuge. Yes, the trip provided significant wetland experience, but the delta's environs did not seem 'timeless'. Even amid Mila 23's reed architecture, there is outside impact and its low-key central 'plaza' has a series of noticeboards celebrating its many champion rowers, including an Olympic medal-winner.

2 Tracking the Wild (Amassed Negatives) – Fenland Resourcing

Prompted by the later nineteenth century's excavations at Glastonbury Lake Village – and Forestiers' superb *Illustrated London News* reconstruction figures showing its Iron Age warriors returning from marshes with caught swans and pelicans (Coles and Minnitt 1995, 13-15; Phillips 2005) – the 'bounty of prehistoric wetlands' has long been celebrated in British archae-

ology. It was promoted with the 1930's 'flesh-on-the-dry-bones-of-the-past' approaches of, for example, Clark's *Archaeology and Society* (*e.g.* 1939) and, later, his *Economic Prehistory* (1952; see Evans 1989), and further encouraged during the latter decades of that century with English Heritage's various wetland-scape initiatives (in part propelled by Somerset Levels results; *e.g.* Coles and Coles 1987). Certainly, there has been an impetus to champion 'wet' economies and their lifeways. This is an ethos that, for example, permeates Fengate's interpretations (*e.g.* Pryor 1984). Its espousal of 'open resources' was deeply influenced by descriptions of the region's Medieval and later economy (*e.g.* Darby 1940), but whose validity – at least at a level of domestic subsistence – appears limited (*e.g.* Hill 1992). Equally, with very few instances aside, the now-amassed Fenland prehistoric data-set has not fulfilled its marsh-resourcing expectations. All this tells of that, in their vast flat expanses, wetlands have clearly been prone to value-laden *projections*. This has been a matter of both great 'planners-dream' enterprises and, of what lies beneath their surfaces, 'wild otherness' (see Evans 1997); it is the latter that concerns us here.

Apart from the sheer abundance of its bird-life – and the distinct character of the Mila 23's village – where for me the Danube trip struck most firmly home was in relationship to our Barleycroft/Over's results (Evans *et al.* 2016). With that vast quarry's working straddling both sides of the River Great Ouse (fig. 4), from the outset its research objectives were straightforward. With the same strict sampling methodologies consistently applied throughout, the main aim was to chart the changing status of a major river in prehistory: when a communication corridor and, otherwise, a territorial divide? Yet, like all best intentions, we were quickly thwarted in this. Instead of one river, there was a myriad of channels and mid-stream islands.[4] Indeed, having started our investigations on the far west bank-side there almost 25 years ago, it has only been in the last few years that the work has finally progressed off the mid-stream islands and onto the river's east side. In its labyrinthine qualities, we've long thought of the Ouse at this point as a delta-like landscape and, in this, the Danube trip was deeply instructive for just how such a complex landscape would be 'known' and navigated. At the same time, though, there was a significant difference, which was also something missing from the quarry programme's original corridor-*vs*.-divide caricature of rivers. The area's major barrow cemeteries were actually located on river's islands (fig. 4) and, therefore, we equally need to consider *rivers as places of 'coming together'*.

With more than 75 Neolithic and Early Bronze Age pit cluster settings now excavated, and with Middle Bronze Age fieldsystems and settlement investigated on both of the rivers' banks and its islands – plus excavating eight upstanding barrows – there clearly is not the scope here to outline the uniquely detailed

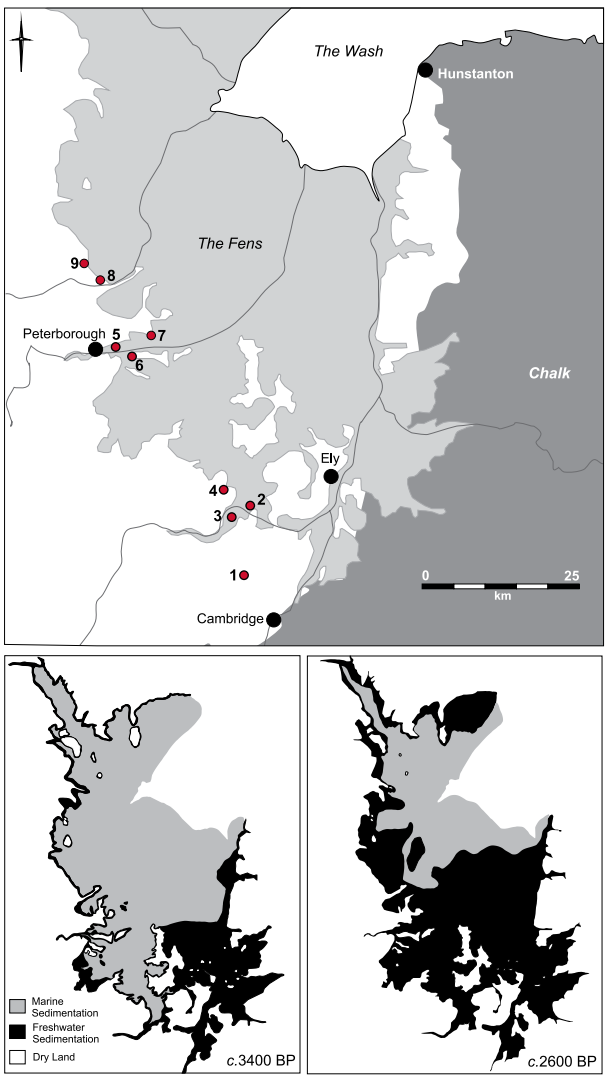


Figure 4 The East Anglian Fenlands, showing location of main sites: 1) Striplands Farm, Longstanton; 2) Upper Delphs, Haddenham; 3) Barleycroft/Over; 4) Colne Fen, Earith; 5) Fengate/Flag Fen; 6) Must Farm; 7) Briggs Farm, Thorney; 8) Welland Bank; 9) Langtoft; below, the sea's progression and retreat during the earlier/Middle Bronze Age and Iron Age (after Waller 1994)

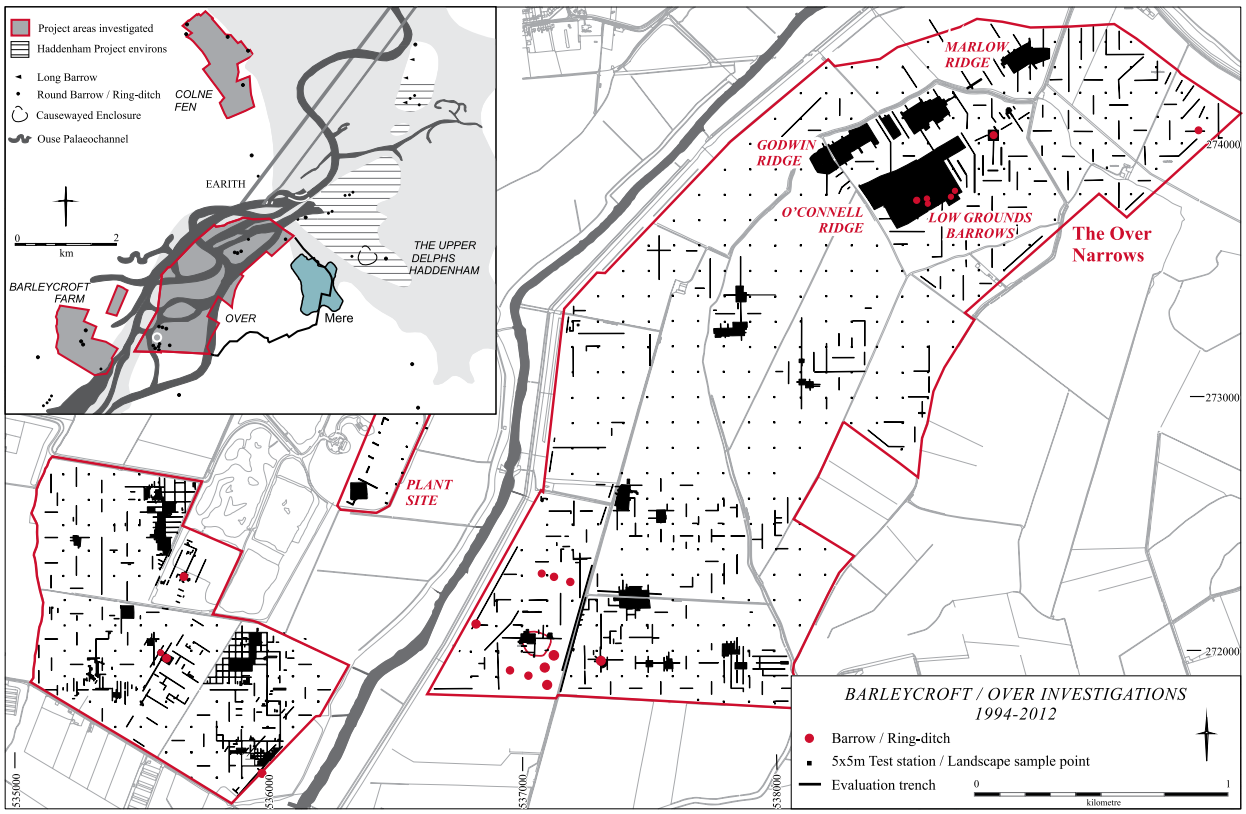


Figure 5 Barleycroft Farm/Over map

picture of long-term low-/wetland-usage that is now emerging from the project. Instead, the remainder of this contribution will focus on the evidence of the Fenland's later prehistoric wetland-specific exploitation and adaption. This largely comes down to the Iron Age. With the immediate area's marshes forming – due to the maximum extent of marine inundation – in the second millennium BC, the Bronze Age economy was essentially almost exclusively focused on domesticates and was very much cattle-dominated (*pace* Pryor 1996; see also Bartosiewicz 2013, 329-41). This goes hand-in-hand with what was then arguably the intentional killing off of aurochs, effectively turning that period's fieldsystem landscapes into 'wild-cleansed reserves' (Evans 2015b).[5]

It was really only in the latter half of the first millennium BC that we see any significant exploitation of local wetland wildlife (*e.g.* Huisman 2018) and, even then, only substantively in very few instances. This goes against the grain of how, 'sentimentally', the Fenland past and, indeed, prehistory generally, is widely envisaged (Evans 1997). We want to see its inhabitants as sensitively attuned to their environment, fully aware of its rhythms and possibilities. Specifically, wetland resources are usually considered to be held in common and, effectively, open to all. Yet, remarkably, the evidence actually would suggest that, far from maximising marshland resources, in most cases later prehistoric Fenland communities seem to have ignored them.[6]

While affected by recovery issues, such as small assemblage sizes and low levels of sieving (particularly relevant for bird bone), this negative evidence is common to the vast majority of excavated Fenland prehistoric settlements. In those instances where wetland species were present, their numbers are usually very low (*e.g.* one or two beaver or otter bones and the occasional bird). Their negligible recovery-values suggest no more than that their inhabitants might have brought home the carcass of a beaver or crane if they stumbled upon one when out on a trail and not any kind of specialist exploitation.

Among those few sites demonstrating any substantive degree of wetland exploitation would be Welland

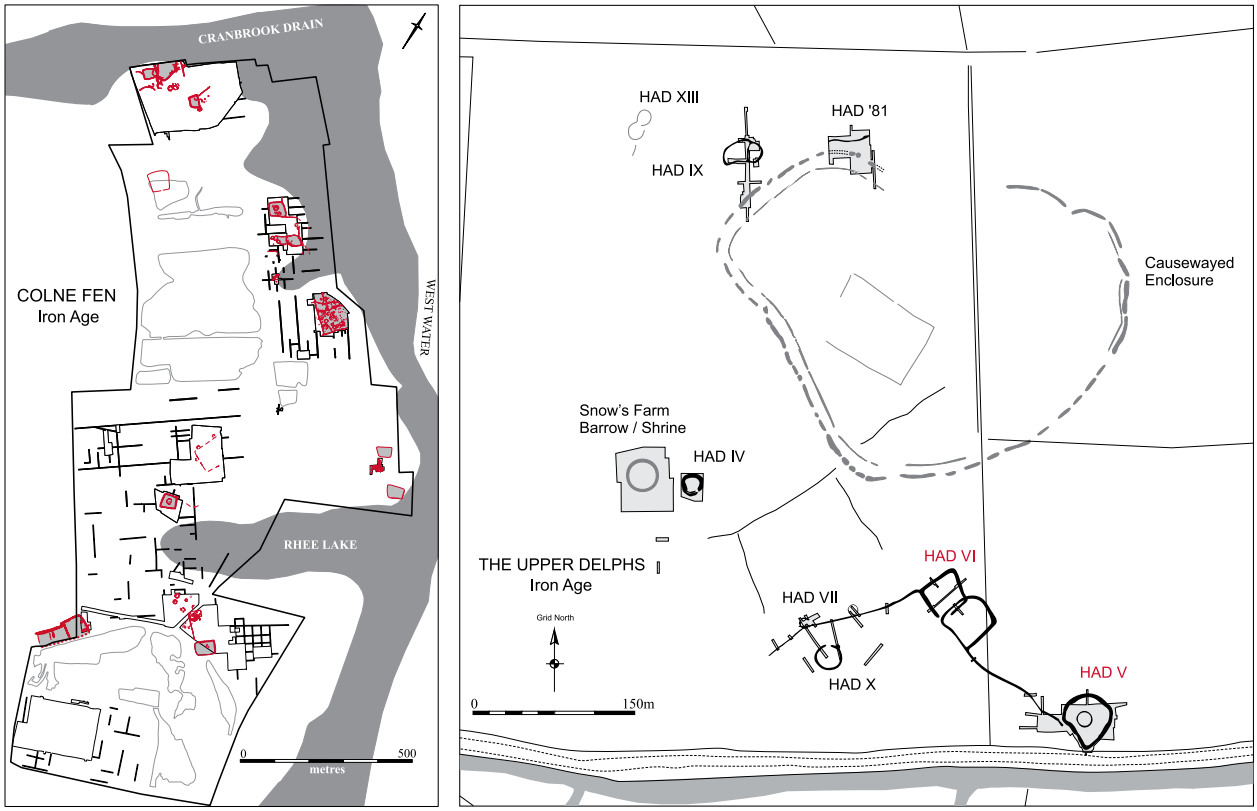


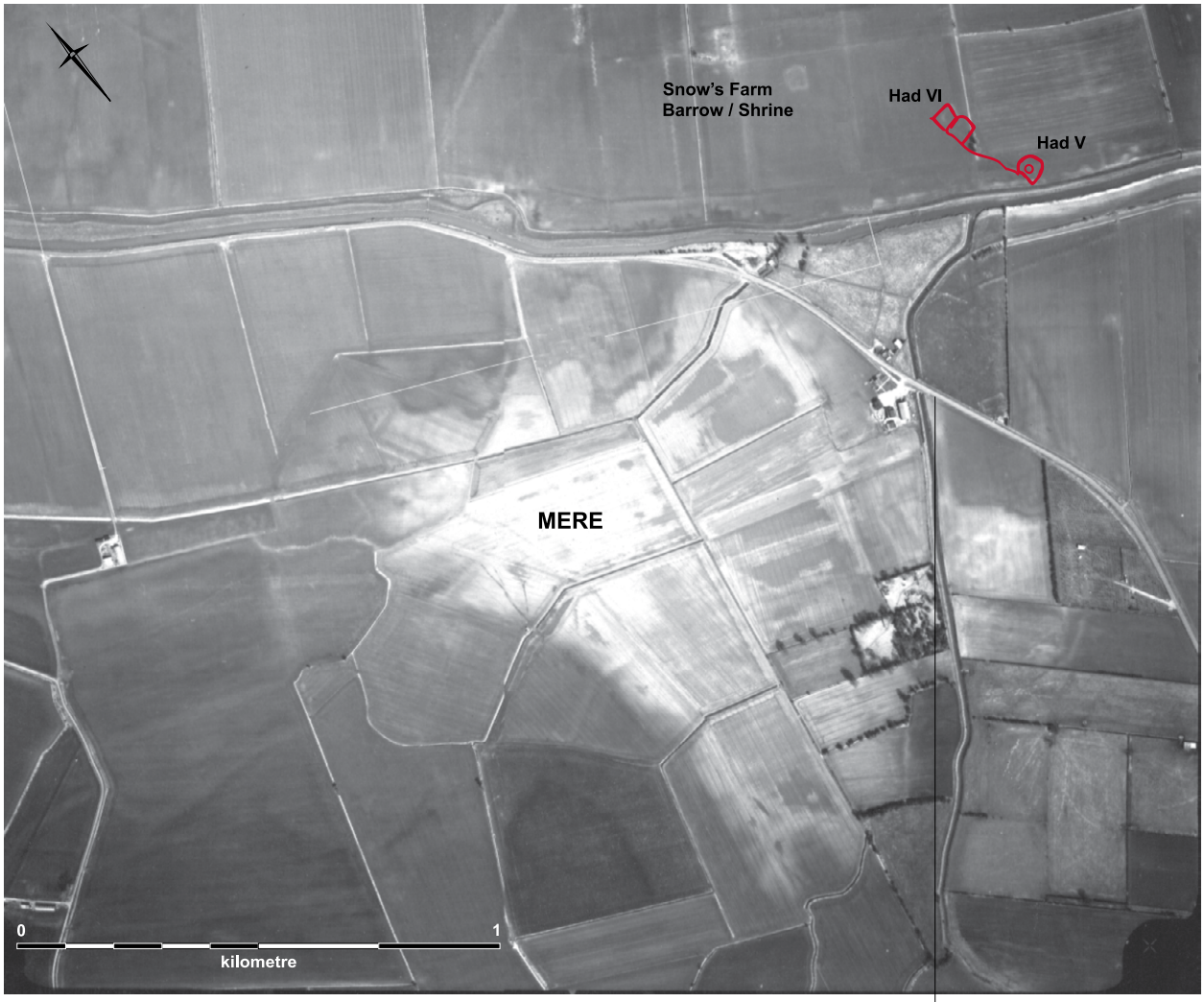
Figure 6 Fen-edge Iron Age settlements: left, Colne Fen (with Iron Age sites red-highlighted); right, Upper Delphs, Haddenham (see fig. 5 inset map for location)

Bank (fig. 4; Pryor 2002). With its layout primarily of Middle Bronze Age date, this apparently also saw Late Bronze Age occupation. Amongst its more than 1400 identified animal bones were, aside from a single seal item, just over a hundred beaver specimens. Intriguingly, fish and bird were almost entirely absent, with just two heron bones present (Albarella and Viner nd.; Albarella pers comm.).

Fengate's Cat's Water Iron Age settlement should also be mentioned in this capacity (fig. 4; Pryor 1984). With its faunal assemblage amounting to 5759 species-identified fragments, while there were just 33 wild animal specimens – including eight otter bones (but no beaver) – there were also 70 wild birds (see Biddick, Appendix 6 in Pryor 1984; see also Biddick 1989). Of the 20 bird species present, with pelican, goshawk and heron notable inclusions, only swan, duck, crane and crow occurred in numbers of five or more.[7] Both Welland Bank and Cat's Water's 'wild take' seems to be of an order beyond just incidental or haphazard use. As we will see, though, they still fall well short of the levels encountered on one of Haddenham's Iron Age compounds (HAD V), which clearly evinced a degree of specialised exploitation (Figs 4 and 6).

It is fitting that the scale of negative wetland-recovery in the region's other contemporary sites is appreciated. This will be restricted to two areas: Colne Fen, just north of Earith and the River Great Ouse's Fenland basin-entry and, also, the Isle of Ely's Iron Age settlements. Of the first, seven Iron Age settlements have, to varying degrees, been investigated (Figs 4 and 6; Evans *et al.* 2013, chap. 5). Collectively their identifiable animal bone count would amount to 1425 specimens. Of these, the total 'wild' would be less than 2%, with just 11 bird bones (including two of mute swan and one crane) and only single occurrences of otter and beaver.

The Isle of Ely sites reflect a similar pattern. In recent years there have been six large-/medium-scale excavations of Iron Age settlements on this marsh-fast island (see Evans *et al.* 2007 for overview; Patten 2015; Wright 2018), which has two major, former marsh em-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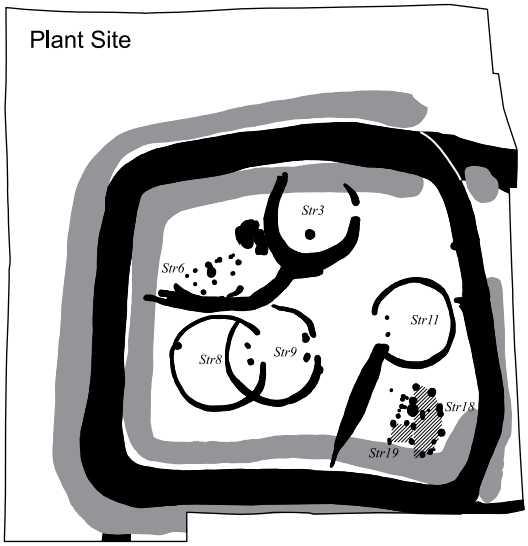
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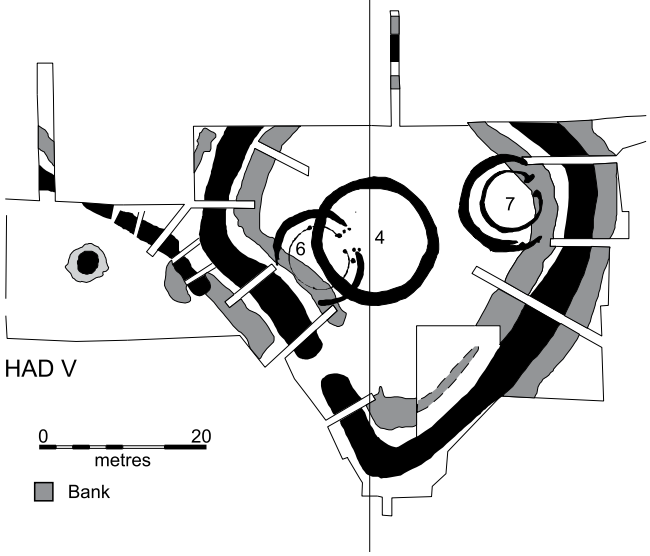
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bayments within its interior: The Cove and Grunty Fen. Again, however, the now amassed faunal remains from these sites – amounting to more than 3,000 identifiable specimens – shows remarkably low 'wild' recovery; just at a level of occasional 'one-off presences', but really no more. This includes, for example, those from the excavation of the marsh-side Wardy Hill enclosure, and its arising *c.* 17,225-piece faunal assemblage had just five otter, four fox and two badger bones (plus just 24 non-domestic birds, amongst which are single swan and ?crane specimens; Davis in Evans 2003, 126-7).[8] One could go on in this vein, but there is little point in further reiterating of just how widespread is this negative recovery within most recent 'modern-standard' wetland excavations.

3 Backwater Economies – Haddenham Revisited

Located on the southern flanks of the Upper Delphs gravel peninsula and just east of the River Great Ouse/Fenland junction, the layout of the sub-square HAD V compound's roundhouse settlement was entirely typical of western fen-edge Middle/later Iron Age domestic enclosures (figs 4, 6 and 7; Evans and Hodder 2006: hereafter *HAD*; see also Evans 2011 for project overview). Sealed by alluvial deposits, not only were its deep cut-features waterlogged, but this also permitted a high degree of stratigraphic preservation, with upcast banks, house floors and enclosure-interior deposits all surviving. Its painstaking excavation (involving a high sieved component), occurred over the better part of two years in the mid 1980s and resulted in major artefact assemblages: some 15,000 sherds and more than 24,000 animal bones. Of the latter, among the 3823 identifiable to species – the assemblage and economy as a whole being dominated by sheep (*c.* 75% NISP/MNI) – in addition to occasional otter remains (plus also deer, hare, fox and badger), beaver constituted between 5-10% of the site's mammalian assemblages Indeed, they were actually the third-most common species (16 MNI) and even more numerous than pigs.

Beyond this was also the compound's bird bone, with more than 600 identifiable to species: a far greater number than from any other prehistoric site in southern Britain.[9] The main species were swan, mallards and coots, but with crane, sea eagle and Dalmatian pelican also occurring in some numbers (33 species in total; see *ibid.*, 227-33, table 5.45). The site's 'wild' evinced both gnawing and cut marks, and there can be no doubt that they were utilised. While just 14 fish bones were recovered (apart from one cyprinid, all pike), upwards of 10,000 eggshell fragments were retrieved, much attributable to mute swan (Siddell in *HAD*, 233-5).

It was the recovery of so much big bird eggshell from HAD V that, in some respects, most clearly tells of the nature of its households, as well as later prehistoric wetland attitudes and exploitation generally. The pieces were often large, not easily missed (*HAD*, fig. 5.103) and, therefore, should be readily recognised and recovered on other sites. That it has not been surely reflects of, not just a denial of a ready resource – their 'capture' not demanding particular skill, apart from basic landscape familiarity – but could perhaps suggest that, in later prehistory, there may even have been a widespread fear of marshes. Again, this is not how the 'wetland past' is usually envisaged. Yet now, with the amounting regional data-set, it is a possibility that has to be seriously entertained.

Despite the wealth of the site's resources, these 'wild extras' occurred against a background of a fairly typical, mixed economy of the period (*i.e.* they also had herds/flocks and grew crops). Certainly, the settlement was well-placed in its landscape. Marshes then surrounded the Upper Delphs; the community's arable fields would have lain on the terrace above/behind the HAD V's compound, with water meadows below and reed beds flanking Willingham Mere's then open waters (figs 5 and 7). The latter was a large freshwater lake that had started to form from, at least, the Late Bronze Age and, in Domesday times (the eleventh century AD), was recorded as supporting a number of fishing boats, it was only drained in the nineteenth century (Hinde 1977; Waller 1994).

Having such a range of wetland species, HAD V allowed us, in effect, to 'clock' something of the settlement's annual rhythms: beaver pelts likely taken, when at their thickest, in winter months; big bird eggs collected in the spring, with the late summer/autumn given to crop-harvesting and young animal slaughter. In its time, this demonstration of the settlement's year-round occupation was itself significant. It is difficult to appreciate today just how abiding was the 'pastoral-mania' and recourse to transhumant modelling in British prehistory during the 1970s (Evans 1987) and, certainly, permanent settlement was not then presumed. The Haddenham sites did, though, evince 'movement' and off-settlement tasking. Admittedly

Figure 7 (previous page) Aerial photograph, with Willingham Mere showing white from its shell beds; below, Iron Age settlements: Barleycroft Farm, Plant Site (left) and, right, HAD V

only demonstrated across distances of just over a kilometre, this involved 'procurement stations' and, in effect, camping out upon what then would have been marsh-fast, earlier Bronze Age round barrows.

With the barrows' crowns having later been plough-damaged, the evidence of this usage was slight; generally, just a handful of Late Bronze and Iron Age sherds, but from the hand-digging of the topsoil of one, bones of beaver and swan were also recovered (*HAD*, 54, 58-9). Similarly, during the recent excavation of a multi-phased barrow nearby at Over (Neolithic with Early Bronze Age reworking), its crown was riddled with an 'old' badger sett. Aside from disarticulated human bone, bird bones were recovered from their tunnels, with some definitely juvenile crane. While these await absolute dating, also dragged into them was a small, coarsely made perforated clay weight, probably either a fishing or fowling net (Tabor *et al.* 2016).

Of the 'wild extras', what most distinguishes HAD V's location and its potential resource exploitation, is that it lay beside Willingham Mere (fig. 7). If, as seems likely, this was the source of much of the compound's 'wild' (plus more distant, in-marsh barrow-top camping), what seems telling is that the terrace's other such enclosures of the period were not also situated close to the lake.

A striking demonstration that such 'wild procurement' skills may have been restricted derives from when we investigated a near-matching compound (HAD VI) only some 150m to the northwest of HAD V (fig. 6). Clearly contemporary and actually conjoined by a ditch boundary, the two compounds were 'paired' and likely shared kinship relations. We could only test-investigate HAD VI, but this involved a metre-wide sieved transect taken right the way across its interior. Some 1200 bone fragments were thus recovered (380 identifiable). No beaver at all was present and there were just six bird bones (*HAD*, table 6.6); aside from a single pike vertebra, the remainder were all domestic species. This seems extraordinary given the compounds proximity, HAD V's findings and what must have been the two household-enclosures' interrelationship.

To take beaver to the extent that HAD V's inhabitants evidently did, could itself reflect that only limited portions of the local inhabitants regularly ventured into the marshes. Beaver are sensitive to sustained human interference (B. Coles 2006, 7-9, 57). As such, it is unlikely that they would have remained and continued to breed in the area had the marshes been widely visited and intensively exploited. Given this, there would be two ways of interpreting the evidence of 'the wild's' limited exploitation: careful management of resources or restricted harbouring of its knowledge. One can only imagine the latter to have been more likely.

With the vast majority of the local populace evidently practicing a 'standard' mixed domestic economy, trapping and fowling might well have been specialist pursuits. Those by whatever means acquired the necessary skills – plus also the relevant knowledge of the local landscape – may have had little desire to share them.[10] Another factor may well have been trade in such species. While their meat may well have been consumed by the settlement's dogs, the underlying reason for taking big birds and beavers may have been for their feathers and pelts: provisioning conspicuous dress-display amongst the period's elite.[11] If extra-regional trade was the prime motivator for this specialised exploitation, the settlement's material culture would not attest what they received in return. This, though, is often the case with postulated trade/exchange relations and, as discussed in the next section, is also true of the region's prehistoric salt production.

Issues relating to settlement densities underpin these discussions. With just three substantive Iron Age compounds known on what would then have been the roughly 67ha of the Upper Delphs' marsh-proud peninsula, if just one of its households focused on wetland wildlife procurement then sustained trapping may well have been viable. This is not the case, though, of either Colne Fen's fen-edge terrace or around Ely's The Cove embayment. With broadly contemporary settlements generally lying at an interval of just 200-800m from each other (fig. 6), local population levels are likely to have been far too high to allow such activities to have maintained to any significant extent. Given the marsh-/terrace-edge location of these sites, their inhabitants were clearly drawn to live close to wet/dry 'edges'. This presumably was due to the ready availability of water supplies, seasonal pasture and plant/reed collection. Yet, at what were evidently their high residential levels, it is unlikely that trapping or hunting could have been a major concern.

It is significant that at HAD V there was no evidence that the wetland species played any obvious role in their ritual life. Certainly, they were not deployed in any kind of totemic manner ('people of the beaver' or '… the crane/pelican', *etc.*).[12] Instead, it was sheep remains that marked their house thresholds. With

equivalent doorway deposits found elsewhere in the region (Colne Fen: Evans *et al.* 2013, 210-11; Bradley Fen: Knight and Brudenell forthcoming), this was thought to reflect no more than that ritual behaviours exist within wider social networks and, to be meaningful, are unlikely to have been single settlement-specific.

This argument had, in part, been formulated in contrast to the Snow's Farm Romano-Celtic shrine, that we had previously excavated on Haddenham's Upper Delphs (fig. 6; *HAD*, chap. 7). Constructed on top of an Early Bronze Age barrow and, albeit modest in its architectural/structural traces, it had distinctly votive sheep head-and-hooves deposits set within its building's floor. There were also extensive midden spreads and, obviously, the shrine's ritual calendar included large-group feasting and much animal sacrifice. In contrast to just over 2600 pottery sherds, its enormous faunal assemblage (33,000 pieces; 8748 diagnostic) included a substantial bird assemblage (2593 items). While most were domestic fowl, duck and goose, there was also grebe, cormorant, heron, mallard and teal (plus sea eagle and coot; see Beech in *HAD*, 383, table 72.3 and Evans 2013, table 1 for complete listing). Interpreting this material, emphasis was given to augury and the reading of entrails, for which full carcasses are necessary. It was argued that big wetland birds may, by virtue of their size, have been considered the equivalent of sacrificed sheep (fig. 8); though, bird sacrifice might well also have involved soul-flight and/or winged messenger connotations. Whatever the rite's intent, it was then considered a distinctly Roman-influenced ritual practice. This interpretation largely went unchallenged until, 25 years later, we excavated an Iron Age ritual complex at the southwestern end of the Godwin Ridge (fig. 5).

Running like a great raised corridor mid-stream within the River Great Ouse, the long use-sequence of this *c*. 6ha sandy gravel ridge has been fully outlined elsewhere (Evans *et al.* 2016). By the late first millennium BC it is estimated that only a hectare of its land-mass lay above water level: too small an area to allow any kind of 'normative' permanent occupation. Its southwestern end did, though, see some manner of settlement, having a small roundhouse set within an 'L'-shaped ditch configuration (fig. 9). With only few finds associated, this proved difficult to interpret. One possibility is that it was some manner of guardian's abode, relating to the ridge-end's undeniable ritual focus.

The ridge-end's ritual component would seem to have been initiated during the Middle Iron Age and had quantities of loose human bone deposited along its lower riverside flanks. Some definitely had cut marks, with one of its many skulls having four holes neatly

Figure 8 Providing a sense of 'wetland exotica', birds featured highly in Glastonbury's portrayal, as here in a figure from Rutley's *Children of the Lake Village* of 1924; to convey a sense of species/'sacrifice' size, inserted right are (from top to bottom) a Dalmatian pelican, sheep and coot. These are shown at correct relative scale; there are, however, discrepancies regarding the portrayal of species within the Rutley illustration, as the pelican is shown much too small when compared to the herons (D. Serjeantson pers com)

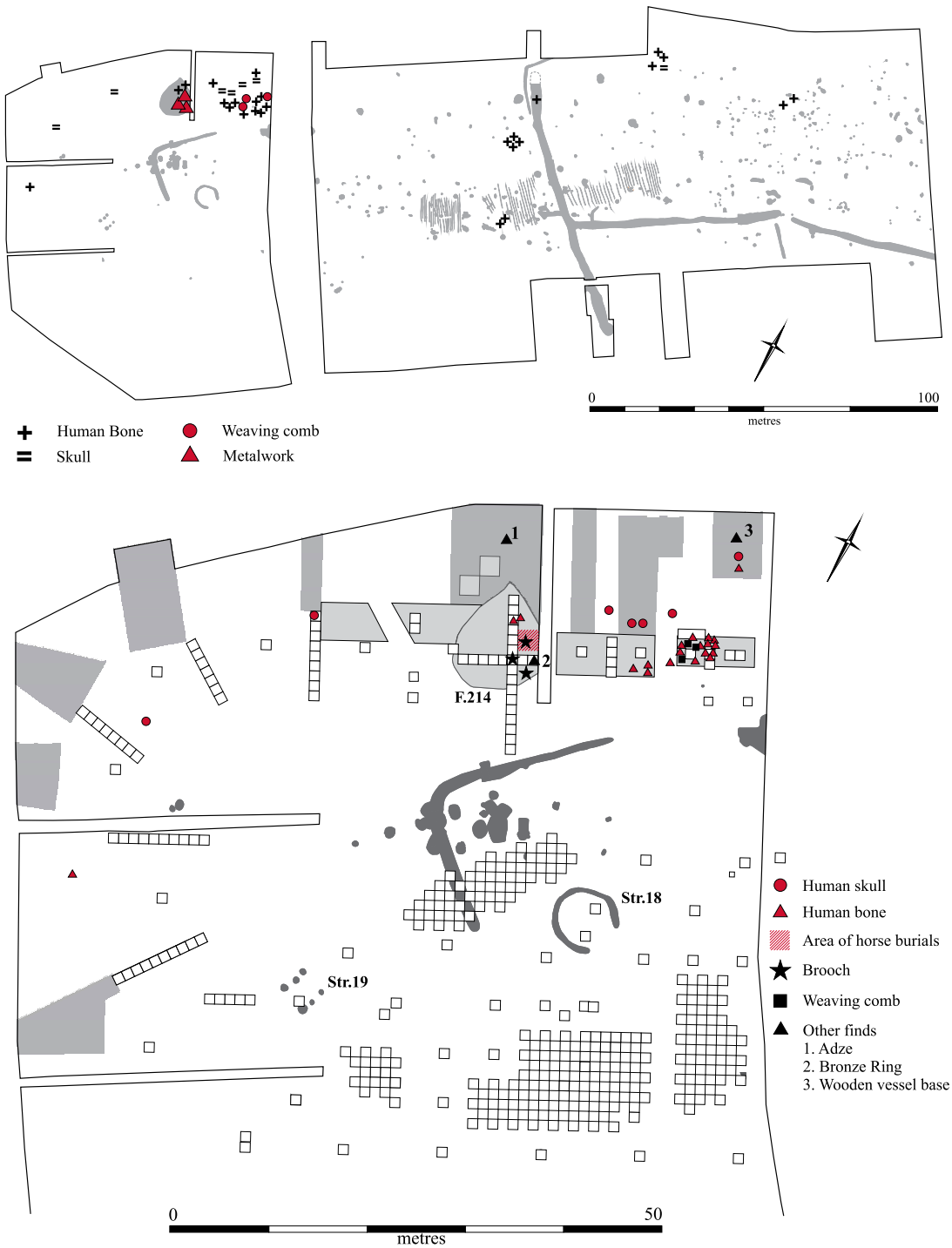

Figure 9 Godwin Ridge, western end, showing the distribution of 'special finds', Iron Age features and the F.214 'platform'

bored into it, and there can be little doubt that bodies were there being 'delivered unto waters' (Evans 2013). Also found at that point were a series of modest ritual 'packages': a clutch of three weaving combs found together and, separately, a 'trio' of brooches. The latter occurred within the matrix of a heaped river-edge platform (F.214), in whose base were the remains of four slaughtered horses (these clearly having to be ferried into the spot; fig. 10). While the quantity of fish bone within the platform's deposits could suggest that it might have been used for more pragmatic purposes at certain times of the year (*i.e.* a fishing stand), the same may not be true of the some one hundred bird bones recovered from it. Among the 14 species present (some having signs of modification) – mostly coot, mallard and other ducks, plus great-crested grebe – were swan, heron, bittern, crow and marsh harrier, as well as a Dalmatian pelican (fig. 10). With wheelmade Iron Age pottery forthcoming from the platform, as well as 'Romanising wares' (but no Roman metalwork, *etc.*), its usage likely dated from the first century BC and is thought to have continued into the later first century AD. This, therefore, suggests that the type of bird-related ritual attested in the Snow's Farm shrine actually dated back to the later Iron Age.[13] There is, though, a degree of ambiguity in this attribution. Given the nature of the platform's bird bone assemblage, there can be no absolute certainty of their specifically ritual purpose. Like its fish bone, their remains might also reflect the platform's sometime more prosaic, 'procurement station'-usage.

There is no way of currently knowing whom were the communities that undertook the ridge-end's practices. While Haddenham's households might well have participated, there is no basis to establish a direct

Figure 10 Godwin Ridge, the riverside platform (F.214), showing the animal bone foundation layer (top left; photograph, Marc Vander Linden) and top right: 1) the near-complete left scapula of a bittern (*Botaurus stellaris*), 2) a fragment of a right distal tarsometatarsus of a marsh harrier (*Circus aeruginosus*), 3) the proximal articulation of a right scapula of a Dalmatian pelican (*Pelecanus crispus*) and 4) the complete right femur of a raven (*Corvus corax*) with a cut mark on the shaft near the proximal articulation (photograph, Chris Stimpson); below, Dalmatian pelican radius and ulna (HAD V; photograph, Dave Webb)

linkage and other 'wetland specialist' settlements may have hosted its activities.

Due to flooding and subsequent marsh inundation, there have been few contemporary Middle/Late Iron Age sites within the immediate Barleycroft/Over environs and much of the immediate Ouse-side area would then have simply been too wet for permanent occupation. The main settlement of that period excavated to date there – the Barleycroft Plant Site – involved a sub-square compound, which all but matched HAD V and VI's (Figs 5 and 7; Evans *et al.* 2014). Although located just 2.2km away from the Godwin Ridge-end, amongst the Plant Site's more than 1300 identified animal bones were only a single swan and two crane specimens (in addition to a possible corvid, there were two unidentifiable bird bones).

4 Hunting Farmers? – Local Knowledge

As summarised in a recent paper (Evans 2015a), there arguably was a comparable denial, or least severe under-utilisation, of potential resources in the Fens relating to the maximal extent of the marine transgression during the second millennium BC. Over the last two decades, vast tracts of the Middle Bronze Age fen-edge fieldsystem landscapes have now been excavated, both around Thorney, east of Fengate, and in South Lincolnshire.[14] While evidence of salt production is widely recovered (*e.g.* Lane and Morris 2001), only at Langtoft in South Lincolnshire has there been any significant evidence for the exploitation of marine resources. There, substantial deposits of marine shellfish have been recovered (but not marine fish themselves). Also forthcoming there were perforated cockle shells. Occurring together, they evidently were part of a necklace, and a similar perforated seashell setting has been found on another fen-edge site of the time. These resonate in comparison to a freshwater mussel shell necklace in a later Bronze Age 'inland' settlement context at Striplands Farm, Longstanton (Evans and Patten 2011). Despite this 'wearing' of the immediate environment, the evidence from Langtoft aside (and salt production generally), the widespread denial of marine resources seems remarkable. Could it simply be that some local communities could more readily appreciate environmental-resource potential than others? Here, we could also think of the distinct ethnic attributions of the Danube Delta's villages, who surely must have a variety of food prohibitions and preferences: for a variety of reasons, are/were varied communities drawn to 'marginal' (wet-)lands?

Behind these arguments sits, of course, Glastonbury Lake Village, Britain's preeminent wetland settlement. Including a variety of fish dishes – plus fillet of heron and roasted beaver tails – 'the wild' featured in the fantastic menu that, in their reappraisal of Bulleid and Gray's findings (1911 and 1917), Coles and Minnitt concocted in reference to the site's food remains (1995, 197). The site's excavators were only 'casual' in their recording of its faunal material and, while clearly including a wide range of non-domesticated mammals and birds, of the some 3500 bones examined in total, 'the wild' apparently accounts for less than 2% (*ibid*., 194-5).[15]

Remarking that 'Fish, fur and fowl were the traditional fenland staples', 'the wild' featured in Clarke's highly influential 'Glastonbury Model' paper of 1972 (see, though, Coles and Minnitt 1995, 181-90 and Barrett 1987 concerning its use of data). Aside from the Coles' small-scale excavations at Meare in the 1980s (Coles 1987, 233; Coles and Coles 1987), there have been no major excavations of Iron Age sites in the Somerset Levels proper by which to seriously gauge Bulleid and Gray's findings (Brunning 2007; see also B. Coles 2006, 58-71). In his '72 model Clarke situated Glastonbury within a dynamic trade/exchange system and, from more recent excavations of adjacent hillforts posited to have been participants in its network – Cadbury and Ham Hill – there has been no evidence of wetland resource exchange (Hamilton-Dyer and Maltby in Barrett *et al.* 2000, 283-4; Randall in Brittain *et al.* 2015, 67-9). A crucial point is that while fur and feathers will almost invariably amount to archaeologically 'invisible commodities', if the 'wetland wild' was intensively exploited on any kind of uniform regional basis then its faunal remains should by now be much more apparent.[16]

In contrast to Louwe-Kooijman's assertion that, from the Late Neolithic, communities in the Netherlands increasingly focused on farming alone and 'started … to live with their backs to nature' (1993, 80, see 78-83), Van Amerongen's 2016 detailed analysis of the economic basis of West-Frisia's Bronze Age 'hunting farmers' emphasises the range and diversity of their 'wild' exploitation (see also Fokkens *et al.* 2016, 294-7). In it a distinction is made between *passive* and *active* modes of hunting (Van Amerongen 2016, 61 -104). This largely coming down to the degree of seasonal planning and whether 'takes' were net-based (*i.e.* passive) or involved other techniques (*e.g.* archery; *i.e.* active). While admitting that the sites' economic basis would still largely have been rooted in domes-

ticated subsistence, the contribution of 'the wild' is held to have been substantial.[17] The approach to 'wild resourcing' is, essentially, holistic, *qualitative* and draws upon ethnographic and ecological 'proxies'. Yet, at least in relationship to the Fenland data, to the study's criteria should perhaps be added that many households evidently practised no more than *incidental* 'takes', which probably did not amount to any kind of strategy as such. Accordingly, if wishing to understand the various means by which wild resources were achieved, it is crucial that *quantitative* data-sets are obtained. If there was a spectrum in which individual communities/households exploited 'the wild', then absolute species-frequency numbers are necessary.

Like HAD V or, in West-Frisia, the Keinsmerbrug Site with its over 26,000 duck bones (Fokkens *et al.* 2016, 87-90),[18] the degree to which settlements had these specialist skills seems to have been far from uniform. Certainly, 'they' – the Fenland's later prehistoric marshland inhabitants – do not appear to have utilized their environment in any kind of readily predictable manner. Given its settlements' assemblages, with the exception of a few 'niche-specialists', to categorise their inhabitants as 'hunting farmers' would be inappropriate.[19] Although at risk of stereotypic caricature, drawing upon the work of, for example, Brody (2001), at their root hunters and farmers pursue contradictory lifeways. The necessary mobility of successful small-group hunters sits ill with the permanent-base, large family units of farming communities. The latter's inherently *expansive* population-basis finds expression in the Iron Age settlement densities at Cat's Water, Colne Fen or Ely's The Cove; *intensive local trapping and hunting would simply not have been feasible with such high residential levels*.

Within a context of prehistoric Fenland archaeology what has largely been outlined here are a series of 'one-offs'. One can only wish for more such truly wetland-specific sites – that may still await recovery further out/down in the former marshlands – but, as yet, these have not been forthcoming. All this tells of the sustained commitment it takes to landscapes to move beyond 'quick-fix', environmentally uniform interpretations. In other words, detailed *local knowledge* and exactly the kind of dedication that Harry has consistently shown in his lowland researches. In our Lower Ouse environs investigations we have yet to achieve an 'easy' wetland story, and it will still require further work to generate convincing patterning. These things are complicated, they take time and perseverance, and that is perfectly reasonable and only a worthwhile pursuit.

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Notes

1 Due variously to the effects of erosion, alluviation and coastal submersion, there have been relative few early site findings in the delta and, as emphasized by Carozza (2012; see also Simion 2008), we should be wary of the archaeological 'false voids of deltaic spaces'; that said, what little is known certainly contrasts with the adjacent mainland remains.

2 See, for example, Serjeantson 2010, and Yallen and Albarella 2009; a sign of current changing climatic conditions, on its own volition a Dalmatian pelican arrived in Cornwall in 2016.

3 Classical myth again loomed knowing that, lying some 45km east of delta, out in the Black Sea, Snake Island is dotted with the ruins of temples. Mentioned by Ptolemy, Strabo and Pliny, apparently Arctinus of Miletus related that Achilles and Patroclus' remains were brought there following the Trojan War by Thetus.

4 As the decades have gone by, Barleycroft/Over's palaeo-environmental directive has increasingly come to the fore and there have been specific 'digging environment' public initiatives (Evans *et al.* 2016, 596-99, fig. 7.24; see also Irvine and Evans 2012). This, in part, has been motivated as the restored quarried lands are being transformed into Europe's largest constructed bird reserve. Managed by the Royal Society for the Protection of Birds (RSPB) and with its main goal is to encourage declining bittern numbers (there are also plans afoot to reintroduce the Dalmatian pelican), there was serendipity in our recovery of Iron Age bittern remains in the Godwin

Ridge-end's ritual platform (see below).

5 The sequence of radiocarbon dates obtained by Bryony Coles from earlier '*ad hoc* collected' Fenland beaver specimens, held by Cambridge's Sedgwick Museum and the University Museum of Zoology, attests to their widespread presence during the third and second millennium BC. With most deriving from peat-digging in Burwell Fen, only three of the 19 dated showed signs of human modification (B. Coles 2006, 97-99, fig. 7.7).

6 The idea that Roman-period inhabitants would have been insensitive to their environment would seem more explicable, whereas fowling and fishing would then actually seem to have been more widely practised.

7 In addition, at Cat's Water there were 52 bones of greylag/domestic goose and mallard/domestic duck of uncertain wild *vs*. domestic attribution. Also noteworthy are the settlement's 75 fish bones; these included four freshwater species, with pike and bream dominant (Pryor 1984, 224). Given the site's lack of beaver, it is telling of non-resource utilisation that, on abandonment, some of Must Farm's pile-dwelling's timbers (*i.e.* post-Late Bronze Age) had been beaver-gnawed.
In contrast to the low representation of the 'the wild' amongst the Flag Fen post alignment's assemblage (Halstead *et al.* in Pryor 2001, 330-50), birds – including heron, swan and mallard – featured at Fiskerton's Iron Age causeway in Lincolnshire (20 specimens out of 166 in total; Mulville *et al.* in Field and Parker Pearson 2003, 127-31).

8 Viewed as a whole, on these settlements the number of wild mammal specimens is, in fact, so low that they could be compared to their frequency of 'loose' human remains (Evans 2013).

9 While the site's sieved contexts (5mm mesh) extended to approximately 5% of its deposits, they yielded some 20% of its bird bones, with *c*. 35% of the beaver bone recovered through sieving.

10 As regards 'indigenous' or 'traditional ecological knowledge' and procurement rights – and contrasting with the egalitarian altruism characteristic of much hunter-gatherer anthropology – there is a substantial literature concerning, for example, the secretive knowledge and competitive practices of fishermen (*e.g.* Andersen 1973; Vestergaard 1997); just as trap-line routes also widely involve individual/familial propriety (Brody 1981). While not amounting to 'ownership', common rights and group-held resources does not preclude specific expertise and access (see *e.g.* Wilk 1989; see, also, Speck and Eiseley 1939, Ingold 1980, 152-62 and Pulla 2006 on the 'Family Hunting Territory/Allotment' issue). In hindsight, one can only wish that, while in the Danube Delta, we had talked more within its inhabitants concerning how they actually organised and managed their resource-access.

11 See Harding concerning the evidence of furs within Late Iron Age cremation burials (2016, 151). In some contrast to classical-source references concerning the export of hunting dogs from Britain – and as opposed to other areas of Continental Europe (*e.g.* Taylor 1987, 130) – there seems no direct evidence of rarefied elite-pastime hunting in the British Iron Age (see *e.g.* Hill 1995, 102-5; Giles 2012 and Harding 2016, chap. 9). Concerning 'plume hunting' for bird feathers, see Mackenzie 1988, 89-90 and Van Amerongen 2016, 61.

12 When undertaking ethno-archaeological investigations with the Tamu-mai/Gurung in Central Nepal's Himalayas, although in the many high-altitude forest-flanked farming villages we worked with there was widespread wild plant collection, there was only one recognised 'hunter' as such (Evans *et al.* 2009, 155-6). While hunting activities had been officially curtailed due to the imposition of conservation zones, 'hunting magic' is still an essential component of their shamanic ritual practise (see also, e.g., Tanner 1979 and MacKenzie 1988, 72-5).

13 As expressed by Urnfield iconography (Becker forthcoming), bird symbolism – and arguably ritual – had a long pedigree in European prehistory. More immediately, bird remains have been shown to have had a distinct votive association within, at least, the Cambridge Region's earlier/Middle Iron Age inhumation burials (Evans *et al.* 2018, chap. 4).

14 Of landscape-environmental attitudes generally, it can be hard to think of more wanton land-use than that during the Bronze Age. While, admittedly, they appear to have well understood woodland coppicing cycles, there seems almost something reckless in the mass-deturfing of landscapes in 'Early-period' barrow construction, just as in the Middle Bronze Age there seems a 'blanket' approach to its over-extensive fieldsystems (Yates 2007). Indeed, by the same token, think of the vast tracks of timber that went into the construction of Flag Fen's platform (Pryor 2001).
If adding to this is the evidence of what seems the intentional eradication of aurochs then (Evans 2015b), none of this presents a picture of environmental sensitivity; rather, if anything, it seems to express almost 'live today', highly expansive land-use attitudes.

15 Glastonbury's low 'wild' frequency-level would receive further confirmation through an isotopic study demonstrating that the contribution of aquatic

resources to the diet of its inhabitants was negligible (Mandy 2008).

16 See, for example, Dobney and Ervynck 2007 (also, Evans 2013, note 30) concerning the minimal recovery of fish on the vast majority of settlements. Based on Must Farm's palaeochannel's fishing weirs and traps, the paucity of fish and eel remains must now be accredited as a genuine 'invisible factor' and it is likely that they were either processed (*e.g.* filleted) and/or largely consumed on the spot (*i.e.* 'off-site'). Furthermore, while in the case of HAD V its birds and beavers were clearly processed within the settlement itself, it is possible that otherwise this occurred out in 'the wilds'. A shortcoming of the region's recent commercially-funded fieldwork, especially in quarries, is that it is usually entirely restricted to the development's footprint. To better understand, for example, the fen-edge's Bronze Age fieldsystem landscapes will require 'off-site' investigations of potential procurement/production 'station'-locales within their adjacent marshlands.

17 Drawing upon Murdoch and Kent's studies (1981 and 1989 respectively), the contribution of 'the wild' – including food gathering, hunting and fishing (plus the procurement of raw materials; *e.g.* antler) – to their subsistence is estimated to have been more than a third (Van Amerongen 2016, 308-9, fig. 8.60 and Appendix A1.16). This figure, though, seems very high. The potential environmental resource-basis of the variously sedentary hunting-farmer groups that feature, for example, in Kent's volume (1989) – including Amazonia, New Guinea and North America's Pacific Northwest Coast – are unlikely to be directly analogous to Northwest Europe's.

18 See also the Oldeboorn Site, whose sandy outcrop – hosting both Bell Beaker and Middle Bronze Age usage – yielded huge quantities of fish and significant numbers of beaver (Fokkens *et al.* 2016, 119-34); see also Louwe Kooijmans 1993, 94-5 on 'extraction camps' (*cf*. Fokkens *et al.* 2016, 292).

19 Any strict pigeon-holing of peoples is, of course, inappropriate. In his *The Empire of Nature* of 1988 MacKenzie details how nineteenth century zoological classification studies promoted and justified much 'game-hunter' trophy collection. Similarly, Social Darwinism prompted over-rigid colonial labelling of tribal groups as either hunter-gathers, pastoralists *or* farmers, when these distinctions were far from absolute and often varied according to immediate economic/environmental factors (*e.g.* hunting as 'fall-back' 1988, 7, 37-41, 80-81).

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Maintaining fertility of Bronze Age arable land in the northwest Netherlands

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Stable isotope analysis of charred Bronze Age emmer wheat and barley excavated in the northwest Netherlands reveals high values of δ15N. Cultivation of the same cereal species under controlled circumstances on the appropriate substrates provided baselines indicating that the prehistoric cereal fields must have been manured. Reconstruction of the size of the arable fields and livestock suggests that animal dung cannot have been the only source of fertilizer. Application of household waste and mud from ditches is considered as well as a possible effect from burning stubble. Growing of pulses was not practiced and therefore this method of ameliorating the soil has to be left out of the question. The outcome of the study presented here is that the Bronze Age farmers of the northwest Netherlands used several means to maintain the fertility of their arable land and that they may have adapted their strategy according to circumstances.

1 Introduction

Before the 'taming' of the environment through the construction of dykes and other ways of water management in historical times, large parts of the Netherlands were characterized by a very dynamic landscape. Phases during which land was inhabitable alternated with phases when habitation was possible. In the case of the northwest Netherlands one of these phases suited to habitation is dated between 1700 and 800 BC, the Middle and Late Bronze Age (Van Zijverden 2017, 132-133). The dates are based on calibrated ^{14}C dates. Farming communities occupied the land (fig. 1). They relied on both crop cultivation and animal husbandry (Van Amerongen 2016).

Population was dense, especially so during the Middle Bronze Age (1700-1100 BC). The flat landscape was a mosaic of lakes, marshes and dry areas (Van Zijverden 2017, 132). Dry land suitable for crop cultivation was restricted. Van Amerongen (2016) calculated the areas required by contemporaneous households and concluded that the population could live off the land, but only with short fallows with a maximum of two years. The Late Bronze Age farmers were less numerous, but still had not enough dry land for practices other than short fallow.

Short fallow alone seems hardly sufficient to have provided the Bronze Age population with a living through the centuries. Other means of maintaining fertility of the arable soil will be explored in this paper.

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2 Proof that fertility was maintained

2.1 Arable weeds

A well-established means of assessing the fertility of prehistoric soil is to look at the nature of the weeds harvested together with the crops. Some weeds are

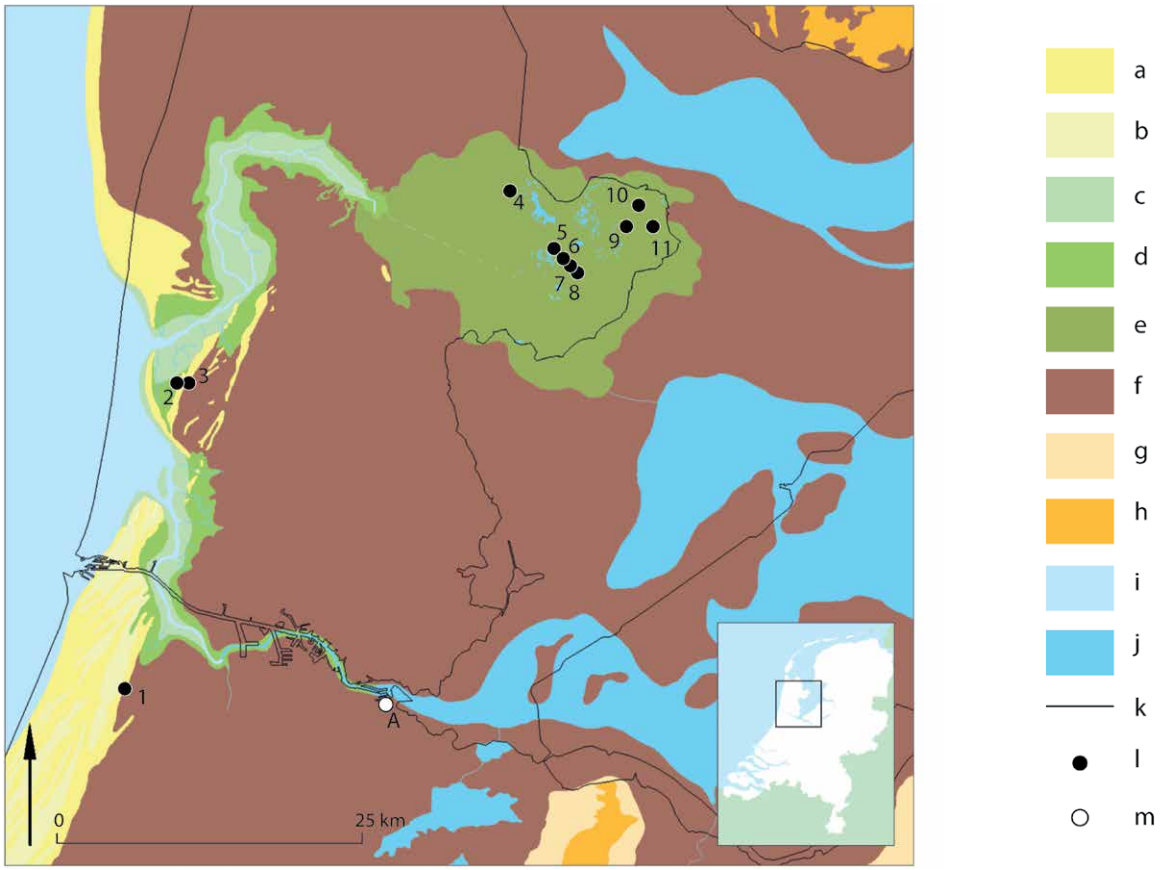

Figure 1 Map of the northwest Netherlands in the Bronze Age with the sites mentioned in the text. Map after Van Zijverden 2017 and Van Amerongen 2016; a (former) beach ridge, b (former) beach plain, c tidal flat, d tidal marsh and levees, e former tidal marsh and levees, in the Bronze Age fresh water environment, f peat, g Pleistocene sand, h Pleistocene ice pushed ridge, i North Sea, j fresh water lake, k outline of the recent Netherlands, l Bronze Age site, m present Amsterdam; 1 Haarlem-Zuiderpolder, 2 Heiloo-Zuiderloo, 3 Heiloo-Kennemerstraatweg, 4 Twisk, 5 Wervershoof-Eendenkooi, 6 Zwaagdijk-Noorderboekert, 7 Westwoud, 8 Hoogkarspel-Watertoren, 9 Bovenkarspel, 10 De Rikkert, 11 Enkhuizen

characteristic for poor soils, others are indicators for rich soils. The weeds in question are found in waste from crop processing retrieved during excavations. Buurman (1988) performed the earliest analysis of such weeds in waste from the northwest Netherlands. She studied the site Bovenkarspel-Het Valkje and her conclusion was that "the weed species identified, including *Chenopodium album* L., *Chenopodium ficifolium* Sm, *Solanum nigrum* L., *Stellaria media* (L.) Vill. and *Urtica dioica* L. indicate that the soil was very rich in nitrogen, possibly as a result of manuring". Analysis of another site, Twisk, yielded the same result (Buurman 1989). Van Amerongen (2016, 197) made an overview of all sites known and studied up till 2015 and concluded that "the results from the nitrogen level of crop weeds shows that nutrient conditions on the arable fields were very high, although some lesser values are observed in the late Bronze Age. Such high nitrogen levels are often related to the practice of manuring".

2.2 $\delta^{15}N$ values of charred cereals

2.2.1 $\delta^{15}N$ values of the Bronze Age cereals

A more recent approach centres on the measurement of stable nitrogen isotope ratios. It has been established that the ratio ^{14}N-^{15}N, expressed as $\delta^{15}N$, in the crop is linked to the intensity of manuring (see for instance Bogaard *et al.* 2007). This ratio can also be measured in charred cereals (Bogaard *et al.* 2007; Kanstrup *et al.* 2012). Charred cereals retrieved during

Northwest Netherlands			
Site	**Cereal**	**δ15N**	**Difference with the highest baseline**
Bovenkarspel het Valkje 7	naked barley	13.50	11.01
Bovenkarspel het Valkje10	naked barley	12.72	10.32
Bovenkarspel het Valkje 105	naked barley	9.63	7.23
Twisk	naked barley	8.16	5.76
Westwoud	naked barley	9.13	6.73
Bovenkarspel het Valkje 7.1	emmer wheat	9.65	6.35
Bovenkarspel het Valkje 7.2	emmer wheat	9.57	6.27
Bovenkarspel het Valkje 105	emmer wheat	10.00	6.70
Twisk	emmer wheat	6.60	3.30
Enkhuizen-Haling	emmer wheat	11.63	8.33
Westwoud	emmer wheat	10.30	7.00

Table 1 The $\delta^{15}N$ values of the Bronze Age cereals

six excavations in the northwest Netherlands have been subjected to this kind of analysis.

In the Centre for Isotope Research, University of Groningen, the Netherlands, 10 to 20 grains were pre-treated with the acid-base-acid (ABA) method, as commonly used for samples intended for ^{14}C dating, to remove possible contamination. This number of grains is considered to be sufficient to even out individual differences between grains (Kanstrup *et al.* 2012). The grains were manually pulverized in a mortar and the powder homogenized. The results are presented in table 1.

Values for *Hordeum vulgare* var. *nudum* (naked multi-rowed barley) range from 8.16 to 13.50 and those for *Triticum dicoccum* (emmer wheat) from 6.60 to 11.63. Naked barley and emmer wheat were the staple crops of the Bronze Age in the northwest Netherlands. Except for *Linum usitatissimum* L. (flax) no other crops of any significance were found (Van Amerongen 2016, 184).

Such values are meaningless without knowledge of the $\delta^{15}N$ values of crops grown without manure, *i.e.* without knowledge of the baseline (Bakels 2018a). One means to obtain a baseline is to analyse contemporaneous plants that are considered to have grown under natural circumstances rather than connected with human actions. Wood or seeds from trees are used, but as plant species differ in their N uptake including shifts in the ratio between ^{14}N and ^{15}N, this is not an optimal approach, especially when the trees are dependent on fungi (mycorrhiza) or bacteria for their growth (Hobbie *et al.* 2005; Szpak 2014). This is the case in the region considered in this paper.

Another approach is through the analysis of collagen of wild herbivores (Aguilera *et al.* 2017a; Aguilera *et al.* 2017b; Vaiglova *et al.* 2014). Here the question arises to what degree their digestion shifts the ratio. It enhances the $\delta^{15}N$ value, but whether this is always to the same degree, is still not firmly established (Sponheimer *et al.* 2003). Nevertheless the shift may be rather consistent in the late Holocene (Richards and Hedges 2003).

Still another approach is through cultivation of crops on soils that have not been fertilized for a long time. Such conditions are present on experimental farms, for instance in England, Germany and Denmark (Bogaard *et al.* 2007; Kanstrup *et al.* 2012). As such unmanured fields are not available in the Netherlands and, moreover, baselines may be different for different soil types, the plan arose to grow barley and emmer wheat in tubs under controlled conditions.

2.2.2 Growing grain for baselines

An advantage of working within the northwest Netherlands is that the Bronze Age surface is buried under thick layers of later deposits. The sandy clays on which the ancient crops were grown are not contaminated with sub-recent or recent manuring. The construction of a new motorway with semi-tunnelling provided the opportunity to reach these clays. The archaeological firm Archol B.V. delivered big bags with this clay to the Hortus Botanicus in Leiden, the Netherlands, in a part not open to the public. Large

Figure 2a Growing cereals for baselines in tubs. Photo C.C. Bakels

Figure 2b Summer emmer wheat in 2014. Photo C.C. Bakels

year of harvest	2014	2015	2015	2016	provenance sowing seed
summer barley	2.40				Dutch landrace
summer barley		0.72			Dutch landrace
winter barley			1.68		Dutch landrace (Zeeland)
winter barley				- 1.31	Dutch landrace (Zeeland)
summer emmer	3.30				Umbria, Italy
summer emmer		0.72			Umbria, Italy
winter emmer			0.16		Bavaria, Germany
black winter emmer				2.09	Biofarm, Groningen, Netherlands
white winter emmer				0.93	Biofarm, Groningen, Netherlands

Table 2 The $\delta^{15}N$ values of the cereals grown for baselines

plastic tubs were filled, placed on concrete slabs to avoid contact with recent soil and set in a cage to keep out birds and cats. Cats were to be avoided because they like to use fresh soil as a latrine (fig. 2). Cultivation was practiced during three years. Summer and winter varieties of barley and emmer wheat were sown. This was done because it is not entirely known whether Bronze Age farmers sowed in spring or in autumn. Also the experiment had to do with modern sowing seed. Its provenance is mentioned in table 2. The barley had to be a hulled barley, because naked varieties could not be found. The first batch of winter emmer, sown in 2015 (provenance Bavaria) did so poorly that in the next year sowing seed with another provenance was sought and two land races were found, a black and a white winter emmer.

The only action between sowing and harvesting was watering the crop with tap water during long periods with no rain. Present day rain contains more N than rain in the past, but this could not be avoided (Vitousek *et al.* 1997; Zardini *et al.* 1989).

The ears were harvested and the straw was chopped up and worked into the soil. This was the only addition. Soil was not renewed and each subsequent crop grew on a most probably increasingly impov-

erished substrate. The ripe grain, still covered by its husks, was wrapped in aluminium foil and charred in an oven at 250°C during 2 hours. No special atmosphere was created. A control showed that charring in an oxygen-free environment did not alter the results. The same was found by Kanstrup *et al.* (2012). The temperature was chosen because the Bronze Age grain became charred between 200°C and 280°C. This was established by A. van Hoesel, Amsterdam, using Fourier Transform Infrared Spectrometry (FTIR). The time was chosen on the basis of the experiments executed by Kanstrup *et al.* (2012). Charring was done to obtain the best comparison with the prehistoric material. After charring, the grain was dehusked as husks may differ in their $\delta^{15}N$ value from kernels (Bogaard *et al.* 2007) and the grain retrieved during excavations had lost its husks and kernels should be compared with kernels.

The Centre for Isotope Research in Groningen analysed the charred result in the same way as the Bronze Age grain. The results are presented in table 2. As might be expected, $\delta^{15}N$ values fell during the years. The value for winter barley even became negative.

2.2.3 Comparison of the Bronze Age and baseline values

The baselines are lower than the values obtained for Bronze Age grain. They are in the range of other values published for experimental and ethnographic situations (Bakels 2018a). In the last column of table 1, the difference is shown. Presented are the prehistoric values with the highest baseline subtracted, 2.40 in the case of barley and 3.30 in the case of emmer wheat. In Danish work on the experimental farm at Askov, the average offset between crops grown on fields heavily manured with cattle slurry and unmanured fields was 9.4 for both emmer wheat and barley (Kanstrup *et al.* 2012, table 4). The offset between bread wheat crops manured with solid cattle manure and control plots at the Rothhamsted farm (England) range between 3.1 and 8 and in the case of barley between 2.5 and 7.6 (Fraser *et al.* 2011). At Bad Lauchstädt (Germany), the offset between crops of bread wheat manured every second year with 20 tons of farmyard waste per hectare (t/ha) and the control crops ranges between 2.2 and 4.0, and between 2.6 and 4.7 in the case of manuring with 35t/ha. For barley these values are respectively 3.6-3.7 and 4.3-4.6 (Fraser *et al.* 2011).

The conclusion must be that the Bronze Age fields in the northwest Netherlands were manured and some even heavily.

3 The manure

3.1 Dung

The first kind of manure that is to be thought of is animal dung. Dung is rich in nitrates and ammonia, and enhances N concentrations in plants. Faeces are higher in ^{15}N than urine, and solid dung therefore is higher in ^{15}N than slurry. Most of the ammonia from the urine fraction volatizes, thereby carrying a larger proportion of the lighter ^{14}N away (Bol *et al.* 2005). The application of slurry is not very probable in the case of prehistoric farming practice. Therefore a closer look into a possible application of solid animal dung is warranted. The Bronze Age farmers kept animals, but the sizes of the herds were limited. The number of animals belonging to one household, as reconstructed by Van Amerongen (2016, 152), would have been 5-8 cattle, 5-15 sheep/goat, 3 pigs and 1 horse. She also offers an estimate of the surface covered by crops, 1-3 ha with an average of 1.8 ha (Van Amerongen 2016, 168). The question is whether the livestock would have provided enough dung to achieve the high $\delta^{15}N$ values noted for the cereals.

The Askov $\delta^{15}N$ values are of the same magnitude as the Dutch results, but the arable land on which the crops were grown was manured with cattle slurry (Kanstrup *et al.* 2011; Kanstrup *et al.* 2012), a fact that hampers calculations. The Rothhamsted plots produced comparable results and were manured with a more solid manure, *i.e.* farmyard manure of which an important component was animal dung. The matching values were obtained by applying 35 tons per hectare (Fraser 2011). On the Bad Lauchstädt farm the high input of 35t/ha resulted in a slightly lower increase in $\delta^{15}N$ than in the Rothhamsted case, but the values are still important.

It is difficult to calculate the exact number of animals that provided these amounts of dung in the Bronze Age, but a guess can be hazarded. Bronze Age cattle were small and the modern breed most approaching their size is Dexter cattle. A Dexter cow kept on roughage leaves 15 litres dung per day (pers. comm. A. Slagter 2014). Seven Dexter cows would be sufficient to provide the 35t/ha/year (specific gravity of the dung 0.9). Modern sheep with a live weight up to 25 kg drop 0.85 m^3 solid dung per year (specific gravity of the dung 0.7), which sets the yearly production at 595 kg (Mestbeleidtabellen 2016). Some 55 modern sheep would suffice to provide the required amount of dung. As the Bronze Age sheep had about the same live weight (IJzereef 1981, 98), their dung production

may have been of the same order of magnitude. With 1-3 ha to be manured the livestock may have been just enough to provide the dung, but this kind of calculation is not realistic, even if all dung was collected.

In farming societies where dung is actively sought after and collected, the result of these activities is modest. Small farms in Talamalai, India, have an average herd size of 8-10 cattle. Five per cent of the animals are stabled and stall-fed, the other 95% graze in the environment for around six hours in daytime. At night they are kept on the yard and fed with extra dry fodder. The farmers collect the dung that is dropped in and around the farm. The average yield is 6.5t per farmer per year. Most of this dung is intended for fuel and not spread out on fields (Chandra 2000).

Another example comes from Debre Berhan, Ethiopia (Gryseels 1988). Arable land is of the same size and livestock of the same order of magnitude and composition as in the northwest Netherlands during the Bronze Age. The animals are herded in the environment during most of the day, but are kept in a pen at night. Their dung is an important commodity. During the herding all droppings are collected and transported to the homestead. The faeces dropped in the pens are collected as well. Here too most of the dung is not used to fertilize the arable fields, but is made into dung cakes to be used as fuel. Only dung collected during the wet season is too wet and muddy to turn in to dung cakes, and is used to manure the fields. This is a minor part. Fertility of the arable soil is mainly maintained by a fallow up to 15 years and by burning the vegetation on the fallow land just before it is turned into a crop-producing field again. Crop rotation is also applied with one year of growing pulses (horse beans and peas).

Merden Kidul on Java, Indonesia, provides an example from a society where dung is not used as fuel. Its inhabitants practise permanent dry farming based on maize and cassava, and this compels them to use dung. The need for dung is one of the main reasons to keep livestock, in their case goats. The animals are kept in a shed where fodder is brought to them. The manure collected in this way amounts to an average of 2.3 t/ha, provided by an average of 7.6 goats, and is mainly applied to the maize. In present times the dung is supplemented by artificial fertilizers (Palte 1989, 157).

These examples are food for thought. Folding is not proven for the Dutch Bronze Age and the capacity of the stable part of the farmhouses is such that only some very valuable animals were kept under a roof (Van Amerongen 2016, 158). Therefore, the amount of dung that could be collected may have been minor. Wood is considered to have been the main source of fuel in these societies and dung was probably not the main source of fuel, although pieces of burnt dung have been found during excavations (pers. comm. W. Roessingh 2017). But even the yield of dropping collection outside the farmyard may have been insufficient to produce the high level of $\delta^{15}N$ measured. It is often suggested that droppings left by animals during the grazing on stubble fields would suffice. In Ethiopia, where this practice exists, animals graze on stubble only 2 per cent of their time (Gryseels 1988, 89). This would not contribute much.

The question may even arise whether dung was present on the fields at all. But in this respect palynology of deeply buried Bronze Age arable fields helps (see for these fields also section 3.2). During the analysis of such arable soils at Zwaagdijk-Noorderboekert and Heiloo-Kennemerstraatweg spores produced by coprophilous fungi were detected. At Zwaagdijk-Noorderboekert it concerned *Podospora*-type (known as HdV type 368) and *Sordaria*-type (HdV type 55A) (Bakels 2018). At Heiloo even three other dung fungi were recognized in addition to the two mentioned above: *Cercophora*-type (HdV type 112), another *Sordaria*-type (HdV type 55B) and *Tripterospora* (HdV type 169) (Zoet 2012). These micro-remains show that dung was actually present. Moreover, in one instance actually recognisable excrements were found. In the process of sieving to retrieve household waste from the youngest field at Heiloo-Zuiderloo (see below), intact pellets of sheep or goat dung were detected.

3.2 Household waste

Animal droppings are not the sole component of farmyard manure. Remains of bedding and feed are also part of it. A share of human faeces has also been suggested, but this is difficult to assess. Another component may have been household waste.

The thought that household waste was part of the manure is supported by the fact that tiny pottery sherds, bone fragments and pieces of charcoal are found in Bronze Age arable soil (Buurman 1988, 283). Documenting such waste ('field scatters') as evidence of the spreading of household waste over part of the landscape is a long-standing practice (see for instance Bintliff and Snodgrass 1988; Wilkinson 1982). In most cases the preserved witnesses are met during field surveys of the recent surface. In the northwest Netherlands it is possible to investigate the Bronze

Figure 3 Bronze Age arable field with ard marks at The Rikkert. Photo W. Roessingh

Age arable land directly. The region is remarkable for the preservation of prehistoric fields, including the arable soil. The dynamic processes forming the landscape caused old surfaces to be deeply buried under new depositions, thereby preserving the ancient surface from later influences and disturbances (fig. 3). However, if pieces of debris are found, the question arises whether they have been actively spread over the land or whether the fields were laid out on top of earlier homesteads. To answer this question, arable land was sampled over larger surfaces to discover whether the debris displays a more or less even distribution or shows concentrations. The first points towards a deliberate spreading out, the second towards the clustering expected on a yard. It must be added that the fields in the northwest Netherlands were true fields, not of garden-size. They were tilled with ards, which left their marks in the subsoil. In cases where excavations were large enough to allow the following of the marks over some distance, it turned out that fields covered a quarter of a hectare or even more. Examples are the fields at Haarlem-Zuiderpolder, Hoogkarspel-Watertoren and Zwaagdijk-Noorderboekert (Bakels 2000; Bakker *et al.* 1977; Fokkens *et al.* 2016).

As yet three sites could be investigated in this way.[1] The first is De Rikkert near Enkhuizen, where in 2013-2014 a Middle Bronze Age arable field was investigated by digging test pits. The work was conducted under the supervision of W. Roessingh and P. Valentijn (Leiden University) In a number of test pits the ancient arable soil could not well be defined, but in others 3 litres soil samples were taken and wet-sieved over a 3 mm mesh. Pottery sherds, bone (burnt and unburnt), fragments of stone and pieces of charcoal were then counted. The numbers were taken together as 'debris' and its concentration per litre of soil is presented in figure 4A. Controls were analysed from the sediment below and above the arable soil to establish whether the debris had already been present in the subsoil

or represented intrusions from above. Neither was the case, and the waste displayed a more or less even distribution.

The second case is Wervershoof-Eendenkooi, an excavation led by M. van der Heiden (RCE, Amersfoort). Originally the samples were not taken for debris hunting; they were rather small in size, 200-240 cc. To extract a maximum of information, they were wet-sieved over a 0.5 mm mesh. In this way also the tiny angular fragments of quartz that represent the temper of pottery, could be retrieved. Bronze Age pottery from the northwest Netherlands is not well-fired and has a tendency to fall apart into its constituents. Four samples were available, but only three are considered to belong to the same field, dated to the Early Bronze Age (pers. comm. M. van der Heiden 2017). The results are presented in figure 4B. Traces of other use of the terrain are later and control samples have shown that no matter has infiltrated from above. The subsoil did not contain debris either.

The third case is Heiloo-Zuiderloo, excavated by Archol B.V. in 2017. The site is not quite comparable with De Rikkert and Wervershoof, because it is not situated on sandy clay but on sandier soil, a former beach barrier. A pre-Bronze Age shift caused this low ridge to become part of an inland landscape free from the direct influence of salt or brackish water. Despite the sandier soil, the inhabitants of the site had the same cultural background, and as the question is whether farmers used household waste to fertilize their fields, Heiloo-Zuiderloo serves the purpose. The excavation revealed several arable layers separated by drift-sands, but also homesteads. Whereas the older fields were too close to the farmyards to allow for answers to the question, the uppermost, youngest fields were not because at that time the farms were abandoned and covered with a thick layer of drift-sand. Traces of the field were separated from the former occupation by an 80 cm thick layer of sterile sand. As an ard only reaches a depth of 20 cm (Gebregziabher *et al.* 2006), the chance that material

Figure 4A De Rikkert, debris of household waste per litre of Bronze Age arable soil, mesh used 3 mm; B Wervershoof-Eendenkooi, debris of household waste per litre of Bronze Age arable soil, mesh used 0.5 mm; C Heiloo-Zuiderloo, debris of household waste per litre of Bronze Age arable soil, mesh used 1 mm. In this case it is quite possible that the samples are derived from two or more arable fields

from below was ploughed into the arable field is near zero.

Samples from the youngest fields were wet-sieved over 1 mm mesh. The result is presented in figure 4C.

The sets of values obtained for the three sites are not comparable, on the one hand because the mesh size was not the same, on the other hand because the number of years during which the field was in use and the number of times it was manured are unknown. Per field the number of samples is rather restricted. De Rikkert approaches the ideal sampling procedure best, but then this excavation was made expressly to study the field. Nevertheless, it turns out that all fields contain debris and that the differences within a field do not show a huge variation. Therefore the conclusion must be that bringing household waste to a field formed part of maintaining its fertility. What at present is impossible to assess, is to what extent this practice influenced the $\delta^{15}N$ value of the crop.

3.3 Mud from ditches

A Bronze Age field at Haarlem-Zuiderpolder revealed yet another source of manure, *i.e.* mud from ditches (Bakels 2000). It was detected by the presence of unnatural amounts of fresh water algae in the arable layer, found during pollen analysis.

A similar analysis at Heiloo-Kennemerstraatweg revealed the use of organic mud as well (Zoet 2012). Her study brought an even more interesting fact to light: the mud indicators appear when the dung indicators mentioned in 3.1 disappear. The lower part of the 47.7 cm thick arable soil contains indicators of dung and the upper part shows an important share of aquatic plants such as pondweed (*Potamogeton*) in the record. Zoet (2012, 21) rejects the possibility that Bronze Age farmers stopped keeping livestock because there are no archaeological indications for this. She considers the possibility that people instead changed how they kept livestock, which made it more difficult to collect dung. But she also considers the possibility that the landscape became wetter during the Bronze Age, which made localities where organic mud could be collected more numerous. A shift towards wetter conditions has indeed been noted for the northwest Netherlands (Van Zijverden 2017, 38)

In two other studies, *i e*. Zwaagdijk-Noorderboekert and De Rikkert, the use of mud was not recorded (Doorenbosch 2015; Doorenbosch pers. comm. 2017).

3.4 Burning of stubble

Burning of vegetation following fallow, and burning of stubble and straw remains after harvest is considered to improve the fertility of the soil. Burning is part of swidden cultivation and its effect is the subject of numerous studies. Szpak (2014) offers an overview. The outcome is that burning results in an increase in available N in the soil, not because the ash itself contains a lot of N, as much of the N will be lost by volatilization, but because the increased temperature enhances mineralization of organic substances and increases the soil pH which in its turn activates extra microbial activity. However, in those cases where the burning is a low temperature affair, the plant matter is not reduced to ashes but ends up as charred material. Less N is lost and, not unimportant for $\delta^{15}N$ studies, the charring causes enrichment of ^{15}N in the soil N pool. Szpak evaluated numerous studies related to the effect of burning on $\delta^{15}N$ values on plants. The outcome does not present a consistent pattern, but "nonetheless, higher $\delta^{15}N$ values in post fire vegetation initially, followed by a return to pre-fire $\delta^{15}N$ values is the most common pattern recorded" (Szpak 2014, 7). And "these differences in foliar $\delta^{15}N$ are comparable to, or in some cases greater than, those reported between unfertilized plants and those fertilized with cattle manure. Accordingly, the potential impact of burning on crop $\delta^{15}N$ values within the context of shifting cultivation requires additional investigation" (Szpak 2014, 8). In a study where $\delta^{15}N$ values were measured in the leafy (foliar) parts of plants, the effect of burning on $\delta^{15}N$ values lessens after a period of several years or decades (Leduc *et al.* 2013).

The studies mentioned refer to situations within a context of swidden cultivation, and the question is whether they are also relevant for the Bronze Age northwest Netherlands with its short fallow and stubble presumably grazed by the livestock. Micromorphological research at De Rikkert showed charred particles in the arable soil. A study of phytoliths conducted by W. Out at this site was extended to discover whether some of these microfossils showed traces of burning, but the distinction between charred phytoliths and material coloured dark by another process was not possible (W. Out pers. comm. 2017). Charred fragments of non-wood plant matter were observed at Heiloo-Zuiderloo. The unpublished laboratory pollen record of the Haarlem-Zuiderpolder field also mentions particles of charred plant matter.

However, these records do not prove that the fields were burned. The material may also have been part of household waste. Be that as it may, whether burning the herb vegetation of the short fallow and the leftovers of stubble grazing by animals provided much N for the growth of the next crops is questionable. Compared with a newly cleared part of forest or shrub vegetation, the effect of burning may have been meagre.

3.5 Other possible additions

In the literature other sources of manure such as peat ash and seaweed are mentioned (Meharg *et al.* 2006; Chapman and Chapman 1980), but of such kinds of manure there is no trace. Another possibility is the use of leaves and especially alder leaves. Buis (1985, 823) mentions in his Historia Forestis that leaves shed by alder trees are a valuable kind of manure. As alder was a very common tree in the Bronze Age environment (Van Amerongen 2016, 19-22), this is a possibility that should be considered, but is not supported by investigations as of yet.

3.6 Pulses

Cultivation of pulses together with or in alternation with cereals enhances N fertility. But in the case of the northwest Dutch Bronze Age this source of N can be left out of consideration. Remains of pulses are absent in the archaeological record (Van Amerongen 2016, 184)

4 Discussion and conclusion

The $\delta^{15}N$ values of cereals retrieved during the excavation of Bronze Age settlements in the northwest Netherlands reveal that the inhabitants successfully maintained the fertility of their arable fields. A natural cause of supplementing the soil with fresh nutrients, for example by annual floods, is out of the question in the landscape they occupied. In this the Bronze Age farmers were not unique. The last decade saw several important publications ending with the conclusion that manuring was perhaps common practice (see for instance Boogaard *et al.* 2007; Kanstrup *et al.* 2011). As to the source of the manure, most authors think of solid animal dung. A logical thought, because the farming societies studied combined the cultivation of crops and the keeping of livestock. This was also the case in the northwest Netherlands.

In the study presented here it is considered whether dung would have been sufficient and the answer is 'probably not'. Other sources were looked for, and found. One is household waste that may have been added to mere dung and as a component of farmyard manure may have been applied to the fields. Another is mud from ditches. A minor contributor may have been the ash that remained after the burning of stubble fields. What turns up is that the manure may have been variable as to its source. The shift from dung towards mud, encountered at Heiloo-Kennemerstraatweg, is a first indication. Farmers may have adapted their strategies following the supply.

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Note

1 Fokkens *et al.* (2016, 94) published the results of sieving soil samples retrieved during the excavation at Zwaagdijk-Noorderboekert. After careful study by the excavator S. Knippenberg the conclusion is that the household waste found must be attributed to a late Neolithic field.

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Bronze Age ancestral communities

New research of Middle Bronze Age burials in the barrow landscapes of Apeldoorn-Wieselseweg[1]

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Dedicated to our teacher, colleague and friend, prof. dr Harry Fokkens.

In the natural reserves of the Veluwe in the centre of the Netherlands, there are hundreds of mounds that are registered as 'prehistoric burial mounds' (Fontijn 2011, table 1.1). Some are protected as National Heritage, but many are not. Only a small part has ever seen professional archaeological investigation, and there are many for which no more is known than that they are likely to represent 'prehistoric burial sites'. This applies particularly to mounds in the municipality of Apeldoorn, where large numbers are known to exist and fortunately protected as heritage, but where in most cases not much is known on their dating, nature or potential significance as source of knowledge on the past. This article presents the results of a fieldwork campaign where three newly discovered, small barrows were investigated that are part of a much larger barrow landscape on which so far nothing was known. In spite of their small size and the fact that some were heavily damaged by forest ploughing, the research yielded detailed information on their use history and the social and ritual significance that they had in the Bronze Age. Even the most inconspicuous mound, of which it was initially seriously doubted whether it was a prehistoric monument, appears to contain the remains of many special prehistoric features.

It is argued that this small group of three barrows dates to the beginning of the Middle Bronze Age, the period between the 18th and 15th centuries BC and probably represents what was perceived as one 'community of ancestors' among a larger ancestral whole. There are indications that it originated around a location that had an older – Late Neolithic – history. It is suggested that this monument had a special role and was the focus of ceremonial activities the likes of which have so far not been detected in the Netherlands: the deposition of loads of stones and pottery in a pit row directed at the location where a barrow would eventually be constructed. Deceased were buried at two locations nearby, both of whom were also covered by mounds. These were collective graves, in which many deceased of both sexes and all ages were buried and no clear distinctions between deceased were emphasized in the burial rituals. There are similarities in the mode of interment in both mounds, and we suggest these barrows are each other's successors. The fieldwork at the Wieselseweg shows the high potential small-scale research of inconspicuous and damaged burial mounds can have to further our knowledge on the prehistoric legacy of the Netherlands.

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1 Introduction – the barrow landscape of Apeldoorn-Wieselseweg

If one follows the west-east track through the forest north of Apeldoorn currently known as the 'Wieselseweg' for several kilometers, one passes along small groups of circular mounds. Upon entering the forest of the Royal Estate, the area rises and gets increasingly more relief by dry valleys cutting through the ice-pushed sediment, turning a rather flat plateau into a high steep and conspicuous 'promontory' at the end (the so-called 'Koningseik' area), which commands a fine-view of the low-lying plains around. There are round mounds close to where the Wieselseweg enters the forest, and there is a row of mounds more or less parallel to it in a more westerly direction ('AMK-monument 145'). The 'Koningseik' itself is crowned with several mounds (fig. 1).

None of the mounds along the Wieselseweg have ever been researched by archaeologists, but it has always been assumed that they were funerary monuments from prehistory. The row of mounds and a number of those of the 'Koningseik' even attained the status of National Archaeological Monument. But what are we dealing here with? Are they really burial mounds? And if so, when were they built? What was done in and around them? What role did they play in the prehistoric landscape? Can anything be said on the significance they once had for people who built them?

These questions became more important once it was realized that intensive forestry activities were carried out in the nature reserve that could have a profound impact on the preservation of potential archaeological features. Also, in 2006, the size of the protected area around both the barrow row and the Koningseik monuments was shrunk to a size of a diameter of 10 m around each individual mound, without prospective research of the area that was now 'given up'. The lack of archaeological knowledge on this area became more acute when inspection of LiDAR images in 2007 (Fig. 1) indicated the presence of a so far unknown round mound situated in the unprotected zone between the barrow row (n. 145) and the 'Koningseik'. Intriguingly, this mound is in the same line as the barrow row, and also aligns with one of the Koningseik mounds. Visible inspection by some of these present authors (DF, QB, CvdL) and the then municipal archaeologist, Maarten Wispelwey convinced us that the LiDAR-detected mound (hereafter indicated 'Mound 1') resembled the others in the vicinity. However, we also found two other small mounds nearby that we thought could represent comparable monuments, labelled 'Mound 2' and 'Mound 3'.

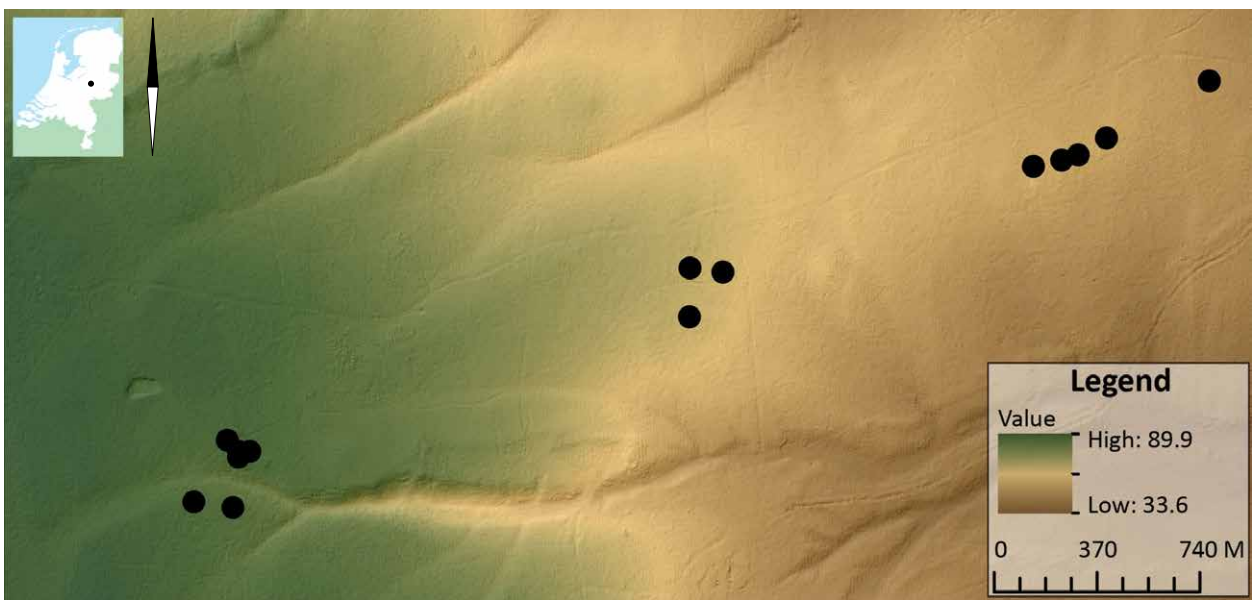

Figure 1 The three mounds at Wieselseweg (centre). The group of barrows in the west goes by the name of 'Koningseik' and the row of mounds in the east concerns the protected terrain registered as 'AMK-monument 145'. Background: Actueel Hoogte Bestand Nederland (www.ahn.nl). Insert: The Netherlands with the location of Apeldoorn. Drawing by J. van Donkersgoed

There were many doubts on their nature and interpretation, however, as they both were very low and had an irregular shape. This was in particular the case with mound no. 3. Having a height of only some 40-50 cm, it hardly seemed to deserve to be called 'mound'. Core drillings in the elevations were unhelpful. Those in 'Mound 2' yielded some charcoal fragments in the mound's body, which suggested it was anthropogenic in nature. The complete coring from top to deep in the natural subsoil, however, showed a homogenous soil in which no traces could be distinguished at that time. One would at least expect remnants of a buried ancient soil when dealing with an anthropogenic mound. It was even worse for no. 3, where only tiny specks of charcoal were detected and where it was even harder to find any distinction in the build-up of the soil here. Corings carried out at a later stage by colleagues from the National Heritage Agency (RCE, by Jan-Willem de Kort) led to the same conclusions: Mound 2 might represent a prehistoric barrow, but there were serious doubts about Mound 3.

In order to get an idea on the archaeological value of this barrow landscape, and an evidence-based notion on what sort of sites we are actually dealing here with, it was decided that a part of the area needed to be archaeologically inspected. Forestry activities that need to take place regularly in this landscape added to the urgency of doing this, as tree-cutting and forest ploughing may severely damage archaeological features in the subsoil. This applied both to the as yet unprotected, newly discovered mounds, as well as to the unprotected environment beyond. With much help, enthusiasm and support from both the land owner, the Royal Estate (Kroondomein 't Loo), the National Heritage Agency (RCE, particularly dr Hans Huisman and dr Liesbeth Theunissen), the Apeldoorn amateur archaeologists AWN group, and the municipality of Apeldoorn, sections of each of the newly discovered mounds were excavated in order to get a better idea on their dating, function and on the nature and preservation of the archaeological evidence they might still potentially contain. It was hoped this would also enhance our understanding on the role such monuments had in the broader prehistoric (barrow) landscape. The environment would also be sampled by excavating small trial trenches through it to establish whether there were archaeological traces that could inform us on any activities carried out in the surroundings of such mounds. By focusing on the newly discovered barrow group in between Koningseik and the barrow row, research on this sub-group of monuments would indirectly contribute to our understanding on the barrow landscape of Wieselseweg as a whole. Gaining insight in the newly discovered group was particularly acute as forestry activities in the area are ongoing and the foresters would like to know what archaeological sites still existed and how to preserve these for the future.

In the summer of 2008 and 2009, the Faculty of Archaeology carried out fieldwork in and around mounds 1-3 and their immediate surroundings, as well as in that part of the environment of the barrow row that lost its status as an archaeological monument previously (Louwen and Fontijn 2018). In what follows, we will present some of the results of this fieldwork, where we focus on the results of the excavation of Mounds 1-3. The excavations of the environment were largely inconclusive, since the surroundings were heavily damaged by extensive forest ploughing (Louwen *et al.* 2018a and b). A detailed account of the excavation results, detailed reports on the human bone finds (by Liesbeth Smits), thin sections (Hans Huismans), charred wood (Erica van Hees) and pollen analyses (by Marieke Doorenbosch) are presented in Louwen *et al.* 2018a, d and e). Detailed information on the Bayesian modelling of ^{14}C-datings from Mound 2 and 3 is published in Radiocarbon (Bourgeois and Fontijn 2015).

2 Some notes on the geology, soils, and excavation method

The barrows are situated on a hilly area which originated in the Saalien glacial, when land ice pushed up fluviatile sediment, creating relatively high elevations. During the last glacial, the Weichselien these ridge became more pronounced as the melting of ice created deep valleys (Berendsen 2004, 157, 170-2). The dry valleys that mark the plateau on which our barrow group is situated probably were shaped during that period (Berendsen 2000, 44). The sediment at the excavation site can generally be characterized as relatively coarse sand, but lithology can vary considerably within a few metres. In most places, a Moder Podsol developed in the top layer during the Holocene (gY30),[2] though locally Humus Podsols developed as well (cf. Huisman's study of soil thin sections in Louwen *et al.* 2018a). An important feature of this site is that the soil formation that took place here led to a severe homogenization. This resulted in soils in which prehistoric anthropogenic features are extremely hard to recognize, if at all. The research of Huisman shows that this is due to the fact that these grounds have seen more biological activity than elsewhere at the ice-

Figure 2 The excavation of a quadrant of Mound 2, looking north. The discolouring of the mound body to an orange hue is well visible, The small plateau in front is Grave 3, the one in the in the background is Grave 5. Photograph by A. Manders

pushed ridges of Apeldoorn. He relates this to the soils being relatively fertile and well-drained; therefore, there was a stronger degradation of organic matter than elsewhere. At the site of the Echoput barrows in Apeldoorn, which are built on and with comparable sediment, and also in a setting with Moder Podsol soils, traces of pits, sods and graves were relatively easy to read (Fontijn *et al.* 2011) and the prehistoric soil underneath the mound was relatively well visible. At the Wieselseweg, an orange hue characterizes the entire mound profile (fig. 2). Sods, pits, or the prehistoric soil underneath it were impossible to recognize, or only due to the fact that they contained charcoal, charred wood or cremated bone. The stronger organic activity may also be the reason why no pollen grains were preserved here – again unlike at the nearby Echoput site (Doorenbosch in Louwen *et al.* 2018a and Doorenbosch 2011).

In historical periods, at least after the Middle Ages, the area was used as heathlands and forest. Since the beginning of the 20th century, it has been property of the Royal Family and was in use as production forest and hunting grounds (Bleumink and Neefjes 2010; Louwen 2018). This part of the forest has seen intensive ploughing, probably as result of the reclamation in the beginning of the 20th century (Louwen 2018). If there were archaeological features around the mounds (as is suggested by the find of one large pit with stones and fragment of an amber pendant in trench 24 south of Mound 1), these must have largely been ploughed away. The barrows themselves were also damaged by ploughing, particularly no. 3.

One quadrant of each barrow was excavated. It was expected that this would provide enough information to get a clear idea on the nature and history of the mound. Material found in profile sections was left in

situ and usually not investigated or sampled. The top soil was removed with a mechanical excavator, but the excavation itself was carried out manually, as previous experiences taught us that this is the most reliable way to detect minor and sometimes hard-to-identify features (cf. Bourgeois and Fontijn 2010). We excavated by creating several horizontal levels (usually with some 10-15 cm in between). When a piece of cremated bone, or an artefact was found that could indicate the presence of an ancient feature, its location was investigated with a mini-excavation using a grid of smaller profile sections over the feature (sizes vary depending circumstances; see for example Fig. 2). For each grid, soil was excavated by trowel and sieved with a 3 by 3 mm mesh width in order not to miss small finds. Apart from disturbances by ploughing, tree roots did a lot of damage to the ancient graves. All levels were systematically surveyed with a metal detector by André Manders.

3 Mound 1

3.1 Description of the mound and general stratigraphy

Mound 1 is the largest and best preserved monument at this site. It is ca. 13 m diameter and 0.70 m in height. It has a ca. 40 cm deep depression in its centre, which caused tree roots growing in it to locally penetrate deeper, causing damage to the archaeological features here (esp. Grave1). The top of the mound has been damaged by forest ploughing (visible in the western section). Only the southwest quadrant has been excavated. Eleven horizontal levels were created to monitor and describe features (Louwen *et al.* 2018c for details). It was only at the lowest levels (9-11) that prehistoric features like pit fills were observed (figs. 3-4).

Like the other mounds, its top consisted of a dark humus soil (A0-horizon; fig. 5) which covered part of the remnants of an older Moder Podsol soil (visible in places, like in the south profile section). The body of the mound itself consists of coarse sand with some gravel, which rests on a surface that contains significantly more pebbles and gravel, interpreted as the natural subsoil (Fig. 5). Outlines of sods could not be detected, but this may be due to later soil formation by which the entire mound came to have its present orange-brownish hue. The texture difference between mound material and coarse natural subsoil indicates the mound was constructed out of the top layer (original A-B horizon) of the prehistoric soil, in the form of sods or possibly as loose sediment.

Underneath several decimetres of orange-coloured mound material, traces of a thin, light-greyish horizon are visible at level 9 or 10. This horizon contained some particles of charcoal to which it owes its darker colour. A true buried prehistoric soil could not be recognized, however. It was at this level that we started to find artefacts and other indicators of human activity (levels 9-11). The first outlines of pit fills also became recognizable from this level downwards (fig. 5). We therefore argue that, even though a true prehistoric soil could not be detected, this horizon marked the top of the prehistoric surface covered by the barrow. The prehistoric soil may either have been levelled before mound construction, or became invisible due to the strong soil formation creating the overall orange-brownish hue. The greyish horizon also marks the top of coarser sediment which has the same orange-brownish hue, up until some 15-20 cm below the greyish horizon. At a lower depth, sediment has a bleaker, greyish-yellow colour (fig. 5). It was particularly in this transitional zone below the grey horizon that features were clearly visible due to the colour contrast.

The following features, relevant to reconstructing the history of the burial mound, were recognized at or just under the greyish horizon.

3.2 Features

3.2.1 A palisaded ditch

At level 10, clearly underneath the mound, traces of an irregular ring ditch became visible. The ditch fill had a light orange colour and was only visible in the yellowish B-C matrix underneath the mound. Traces may have been present already at level 9, but the overall orange hue of the soil would render it invisible (Figs. 3-4). The ditch has an estimated circumference of 11 m. Having extrapolated its circumference, the centre of the ring should not be expected to lie in the quadrant we excavated. In sectioning the ditch, traces of at least 17 posts were recognized, with depths of 20 to 40 m. The ditch thus functioned as a foundation for – somewhat irregularly placed – posts. As far as we know, comparable ditches are unknown from the Bronze Age. They are more common underneath Late Neolithic burial mounds in the Low Countries though (Bourgeois 2013, 32; Lanting 2007; 2008, 62-3). Such palisaded ditches are usually part of mounds. If we consider the position of this ditch, it is clear that it is buried underneath the still-existing mound. This could mean that the ditch was flanking an original, smaller mound that was later extended As the soil formation in

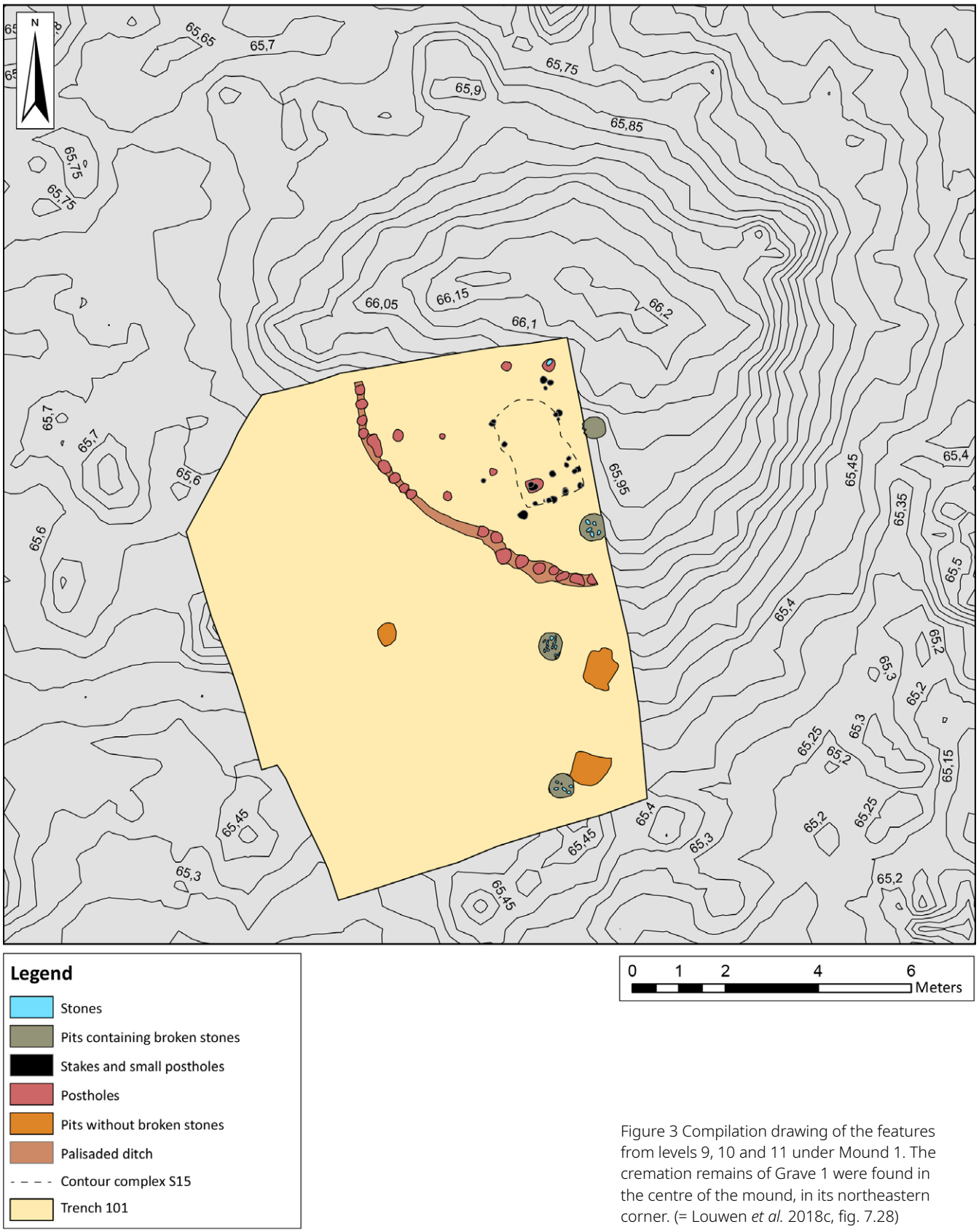

Figure 3 Compilation drawing of the features from levels 9, 10 and 11 under Mound 1. The cremation remains of Grave 1 were found in the centre of the mound, in its northeastern corner. (= Louwen *et al.* 2018c, fig. 7.28)

Figure 4 Mound 1, level 10, looking northeast. The oval pit close to the centre of the mound is S15. Part of the palisaded ditch feature is visible halfway the flank of the mound. Photograph by Q. Bourgeois. (=Louwen *et al.* 2018c, fig. 7.19)

Figure 5 S54,traces of a pit filled with Middle Bronze Age pottery sherds. The gravely subsoil and the orange hue of the mound body is well visible. Photograph by Q. Bourgeois

the mound itself prevents us from seeing more detailed structures or construction phases, we cannot provide a definite statement on this, although what is clear is that the intermediary *position* of the ditch implies there were are at least two phases in this monument, the oldest one being connected with this ditch.

3.2.2 Grave 1

In the corner of the quadrant, close to the projected centre of the mound, loosely scattered cremated bone was found (Fig. 3). It was observed at level 9, just in or above the horizon we interpret as indicating the top of the prehistoric surface beneath the mound. Traces of a pit were not recognized. The spatial configuration of the bone scatter was recorded using a grid in

which units of 10 by 10 cm were sieved (with mesh width 2 mm). No clear spatial pattern could be recognized. In total, 86 gr. was collected, and interpreted as human remains, probably of an adult (Smits 2018). ^{14}C-dating of a bone fragment indicates a dating in the 17th to 15th century cal BC (App.). Some charcoal fragments were also found and ^{14}C -dated, yielding a comparable dating (17th-16th centuries cal BC; App.). In the profile section to the east of this scatter, traces of a pit containing cremation remains were discovered. These have not been excavated and are still preserved *in situ*. As tree roots from above have penetrated through the fill of this pit, it is well possible that the scatter of cremation remains we found originally came from it and was transported by processes of bioturbation (from the growing tree roots). To the west of the cremation scatter, we found a scatter of charcoal fragments (S68). ^{14}C -dating of a sample yields a comparable dating (17th-16th century cal BC; App.). We seem to have excavated the fringes of a charcoal concentration, the majority of which is still in the unexcavated quadrant. It is likely that the pit with cremated bone in the profile section and the charcoal scatter around it are part of one structure: a Middle Bronze Age A (MBA A) cremation grave with separately deposited charcoal debris (remnants of a pyre?) close to it. We have comparable examples thereof in Mound 3 (graves 11 and 12). A barbed flint arrowhead lay next to the cremation scatter. This find, however, cannot be easily linked to an MBA cremation grave, as they are characteristic for a much older period (the Bell Beaker phase, second half of the 3rd millennium BC; cf. Butler and Fokkens 2005, 392-3). This may have been an object that was already in the soil (for example in a grave that so far lies undetected in one of the other quadrants) long before the cremation remains were deposited here, and disturbed due to Bronze Age digging activities or later bioturbation.

3.2.3 An oval pit marked with stakes

Southwest of the centre of the mound, also at level 9, we recognized traces of a north-south oriented longitudinal, oval-shaped pit (complex S15; fig. 4) with a conspicuous brownish colour (ca. 220 by 100 cm at its deepest level). The pit contained 10.4 gr. charcoal, small pottery fragments and four flint flakes/splinters, three broken stones and loose grains of quartz. In fabric and rim shape, the pottery sherds fit well with the general characteristics of Middle Bronze Age pottery (Louwen *et al.* 2018c).

The pit was flanked by round features that were placed at irregular intervals (Fig. 3). Four of them were sectioned and appeared to have a pointed bottom, which implies we are dealing with remnants of wooden stakes. For other, larger round features, it is unclear whether we are dealing with traces of posts or small pits. Be this as it may, by its shape and fill the pit surely must be anthropogenic and The pottery fragments mentioned above that were found in it suggest that the pit silted up during the Middle Bronze Age, providing us with a *terminus ad* or *post quem* dating for the construction of the mound at this location.

Because of its shape, the pit was expected to contain an inhumation grave, and therefore divided into four segments and carefully deepened in horizontal layers. As unburnt skeletons do not tend to survive in these soils, we expected to find a body silhouette – soil formation indicating the position of a body (see Modderman 1954 for several examples found in comparable ice-pushed sediments as we have here). The pit was carefully excavated to a depth of ca. 15 cm (level 11), creating horizontal surfaces of equal level in each segment. A body silhouette was not detected. The difficult-to-read soil conditions mean that we should not make too much of this; in these conditions a body might have decayed without leaving a clear trace. In sum, we seem to be dealing with a shallow pit, flanked with at least a few posts or stakes, but too few and too irregularly placed to suppose there was a substantial construction here – the posts perhaps only served to mark the location. The finds do not provide a further clue as to its function.

A comparable pit, also with a Middle Bronze Age dating and in the centre of a burial mound, was found at Leusden-den Treek (province of Utrecht) by Modderman (1955, 59). It was also flanked by irregularly placed posts or stakes. Modderman suggests it originally was the pit of an inhumation grave, where the body did not materialize in a soil silhouette (this barrow was also built on ice-pushed sediment comparable to where our mound was built on). A cremation grave was later dug into it – something that did not happen at the pit in Wieselseweg (fig. 6).

A comparable pit flanked with posts was found under a Middle Bronze Age barrow in Gasteren (Tumulus 37), in the northern province of Drenthe. Unlike in our case, however, the excavators found cremation remains in it, proving it indeed had the function of a burial pit (van Giffen 1945, 73-74; afb. 12).

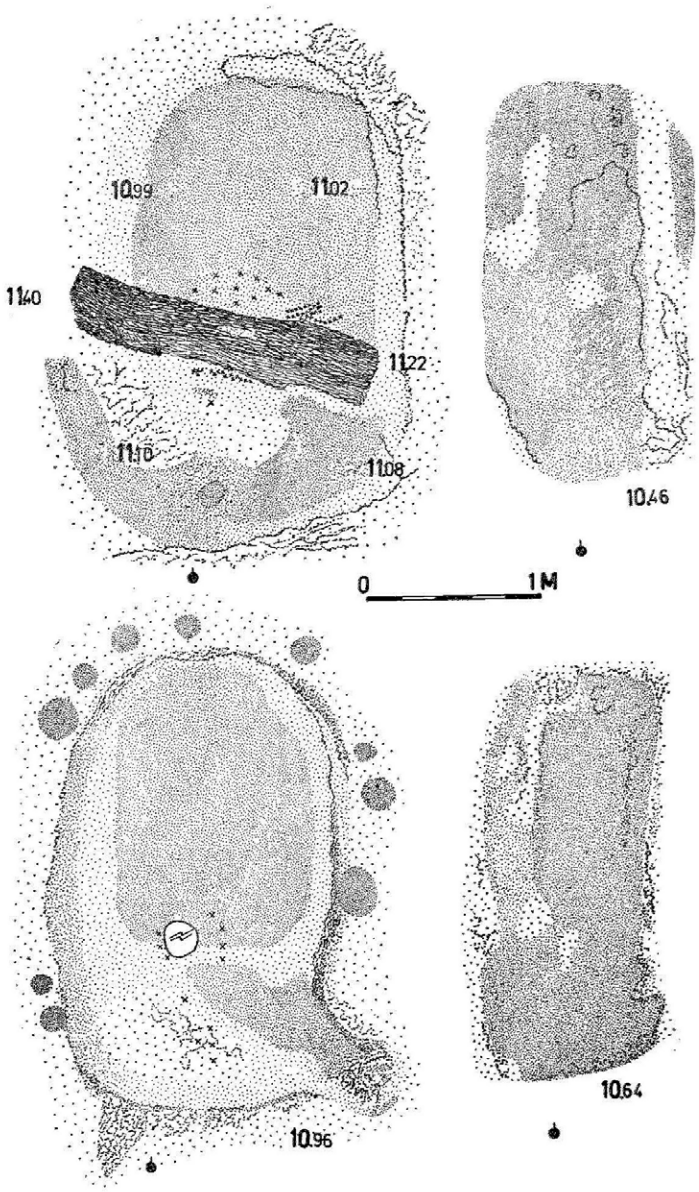

Figure 6. Pit found in the centre of Mound I at Leusden-Den Treek (province of Utrecht) excavated and published by Modderman. Depicted are four excavation levels through a N-S oriented rectangular pit flanked with posts, comparable with S15 in Mound 1 of the Wieselseweg. Later, an urn with cremation remains was dug in it, which was covered by a large charred beam, a practice which has similarities with the burial carried out in Grave no. 8 in Mound 2 of the Wieselseweg. Figure reproduced with permission of the National Heritage Agency (RCE, formerly ROB) from Modderman 1955 60; Fig. 11

3.2.4 Middle Bronze Age pits

Several traces of pits were recognized at level 9-11. These are both situated underneath the mound and in its immediate periphery (Fig. 3). In the latter case, it was unclear whether they were just outside the actual mound, or still underneath its flank. Four pits have a dark fill and contain numerous broken stones. Small pieces of charcoal were found in two of them and almost all contained small amounts of pottery sherds and small pieces of flint (Louwen *et al.* 2018c for details). The fabric of the sherds (coarse mineral temper) indicates a Middle Bronze Age dating (ibid.). This is in line with a ^{14}C-dating of charcoal from one pit, S54 (App.) which results in a dating in the 17th-15th centuries cal BC.

These pits are arranged in a more or less linear pattern, running north-south. Other pits do not, or hardly contain stones. All but one of these contain pottery sherds and its fill mostly has a striking orange colour. They are situated on either side of the stone-filled pits (to be discussed in section 3.4), in the edge of the mound or just outside it (Fig. 3). The pottery is characteristic for what was in use during the Middle

Bronze Age (cf. Louwen *et al.* 2018c). A number of the sherds are burned.

3.2.5 Other features and stray finds underneath the mound

Six other features were discovered underneath the mound. Four possibly represent remnants of posts (Fig. 3) and have a comparable orange colour to those filled with pottery sherds described above. Another may be what is left of a small pit. The pit that is the closest to the centre of the mound (S69; Fig. 3) has the same orange fill as seen in the other Bronze Age pits, and with a depth of 25 cm and a diameter of 30 cm is comparable to those containing pottery. S69, however, just contained a broken stone of 1865 gr, a few grains of quartz and some charcoal. Apart from this latter feature, which may be related to the other pits containing stones, it is impossible to link these 'loose' features to a prehistoric construction or activities.[3]

At the lowest level of the mound and in and under the prehistoric surface (level 7-11), a few stray finds of pottery sherds were done (120 gr. in total). Their fabric (coarse mineral temper) in general suggests they are comparable to the finds done in the pits and date to the Middle Bronze Age (see Louwen *et al* 2018c. for details).

3.3 Interpretation

On the basis of the observations described above, and taking into account that the visibility of features is problematic due to later soil formation, we interpret the history of the mound as follows.

The palisaded ditch indicates that the construction of this mound at least had two phases. Typochronology of the ditch suggests the oldest phase dates to the Late Neolithic. The find of a flint arrowhead in the centre underneath the mound would fit in with this and suggest a dating to the Bell Beaker phase. We assume the location was marked with a low mound.

In the Middle Bronze Age, this location was the focus for new burials. This at least included cremation Grave 1, in the centre of the mound (17th-15th century cal BC). Possibly, the oval pit S15 also was a grave. A row of pits filled with pottery sherds and pits with (fire-cracked) stones (see below) indicate activities directed at this mound. Finally, the mound was considerably extended to its present form.

4 The Middle Bronze Age pit alignment

Perhaps the most remarkable discovery done here is the row of pits containing stones: four dark-coloured pits containing numerous amounts of stones and small amounts of pottery sherds and charcoal. These are flanked by the rectangular pit-with-stakes S15 and orange-coloured pits containing pottery. The former also contains a few broken stones. Intriguingly, some 30 m to the south of Mound 1, in Trench 24, there is another larger, stone-filled pit that is positioned on one line with the four pits under Mound 1 (figs. 7-8). The area in between is heavily disturbed by forest ploughing and we do not know whether there were originally more stone-filled pits here.

This larger pit stands out not only due to its larger size, but also because it contains a fragment of an amber spacer plate (used in necklaces with multiple strands of beads), a very rare find in this region, but fitting within the 17th-15th centuries cal BC date argued for the stone-filled pit row under the mound (cf. Harding 1993; Verkooijen 2013 on dating spacer plates). The content of the pit was sieved (2 by 2 mm grid) and did not yield other fragments; it did contain 7953 gr. broken stones, a few small fragments of pottery and some burnt loam (Louwen *et al.* 2018c for more details).

Pits with stones and charcoal are found in all sorts of contexts on Northwest European late prehistoric sites, ranging from settlements to barrows (Løvschal and Fontijn 2018). The combination of stones and charcoal is usually seen as indicating remnants of cooking activities. However, there is no reason to believe cooking itself took place inside the pits as there is no impact of fire visible on the surrounding pits.[4] Rather, we argue that the remains of fires were deposited in these pits. The cracking and breakages of some stones in it may have been caused by abrupt changes of temperature – as achieved by throwing cold water over heated stones, which creates steam.. A purely practical explanation for depositing remains of fire in pits that are situated in a line is hard to come up with (Løvschal and Fontijn 2018), and the close association with a burial practice (Grave 1) and a burial mound indicates it might relate to funerary activities. It is possible, for example, that people were preparing food here, or producing steam in relation to the funerary rites – activities that would leave no direct trace. But at Wieselseweg, we do not know if all the stones collected in the pits were used for fires. For many stones it is unclear whether they were touched by fire at all. What we do have evidence of, is that whatever these activities were, the remnants of it were deposited in pits which were placed in a line. Although

Figure 7 Amber spacer plate fragment between the (broken) stones of pit feature S 24.1. Looking west. Photograph by Q. Bourgeois (Louwen *et al.* 2018f, fig. 11.10)

stones occur locally, concentrations as seen in these pits are exceptional and can only come about through human collection and massive deposition. Alongside the stone-filled pits, there were also pits containing pottery sherds, indicating other depositional activities (Fig. 3). At the large pit outside the mound, even the fragment of a special object, an amber spacer plate, was included in such a pit, underlining the special nature of the depositional activities.

Strange as it may seem, stone-filled pits in lines are not unique and it is noteworthy that we have parallels of such pit lines that are also placed in relation to Bronze Age barrows. We so far have not found a parallel in the Netherlands, but Bronze Age pits filled with stones in lines are known from Germany (Hüsby, only a three-pit row; Freudenberg 2012) and, especially, Seddin (162 pits; May and Hauptmann 2012). Further north, in Denmark, many more examples are known (Kristensen 2008; Løvschal and Fontijn 2018). There, fires are known to have burned in the pits. Many of them are linked to barrows, suggesting a link to funerary activities, but there are also examples unrelated to funeral activities (Heske *et al.* 2012). The German and Danish barrow-related examples date to the Dutch later MBA (Per II; Hüsby), but mostly to the Later Bronze Age. With its dating in 17th-15th centuries cal BC, our pit line is older, but in structure and its link to a barrow it shows the same characteristics.

Summing up, we suggest that the burial of deceased in Mound 1 involved several activities (cooking? steam production?) and apparently it was thought important that the remnants of these activities were deposited in a formalized manner. Stones and pottery tend to be deposited primarily (but not exclusively) separately. The pits with stones were placed in a row that was partly covered by the mound later on. The pit in Trench 24 indicates the line ran on outside the mound,

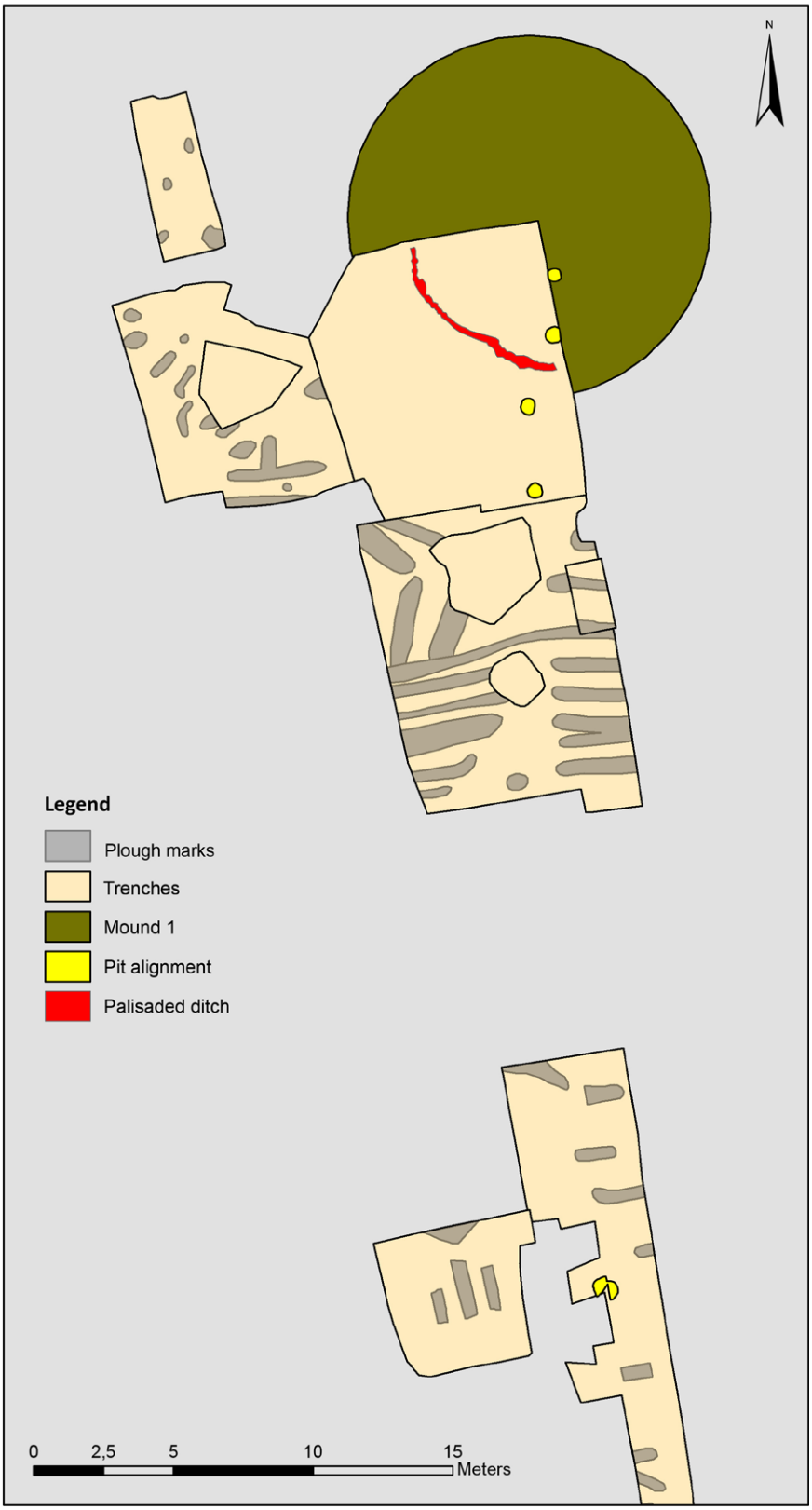

Figure 8 Trenches in the surroundings of Mound 1 showing the pit alignment. Drawing by A. Louwen. (Louwen *et al.* 2018f, fig. 10.5)

though the modern forest ploughing obliterated most traces. We do not know how long this pit line originally was and why it has the southsouthwest – northnorth-east orientation it has – did it, for example, indicate a specific route through the landscape to or from mound 1?

5 Mound 2

1 Description of the mound and general stratigraphy

Mound 2 is situated at the edge of a dense pine forest and the mound itself was grown with deciduous trees at the moment of discovery, the roots of which

Level	Graves	Excavation level in relation to Mound 2 soil stratigraphy
1		Mound: topsoil
2	2	Mound: bottom topsoil
3	4, 7	Mound body
4	3	Zone prehistoric surface underneath mound
5	5, 8	
6	6	Zone below prehistoric surface
7		

Table 1 Schematized description of relation between graves (indicated with yellow number), excavation level and the stratigraphy of the mound (adapted from Louwen *et al.* 2014)

Grave no.	Level	Grave type	Stratigraphic position	Horizontal position in mound	Sex/age	artefacts	Remarks
2	2	Unclear	S	Centre	Adult	-	Disturbed by ploughing
3	4	Zone, unclearly defined (max. diam. 95 cm)	P (probably)	Foot of mound	F??, 20-30 years	-	Covered by soil that does not contain bone fragments
4	In uppermost part mound	Concentration bones in pit	S	In between foot and centre	F, 20-30 years	MBA pottery sherds; probably from associated ceramic vessel; burnt pin/needle	In profile section; pit fill visible by pink texture (due to eluviation dis-integrated vessel; bone also pink colour
5	5	Zone unclearly defined (max 55 by 35 cm; 5 cm deep)	Unclear (P?)	In between foot and centre	Adult, 20-40 years	-	No bone found here at level 4, therefore possi-bly covered by mound; no pit visible, but 2 separate concentrations of bone at lower level
6	6	Zone unclearly defined in pit (75 by 85 cm)	P (probably)	Foot of mound	2 individuals: F, 17-24 years; F, adult, younger than 40 years	Burnt bone nee-dle and worked animal bone	No pit traces or bone concentration at higher level; therefore probably covered by mound
7	West profile		S	In between foot and centre	F, 20- 30/40 years	-	Close to Grave4 but bones lack pink colour; must be a different grave
8	5 (and in section)	Large pit with charred wood	P	Centre	(incomplete; only sample studied): M?, older than 20 years	-	Grave partly preserved in situ. Charred wood (*Quercus*) on top of pit with crema-tion; clearly covered by mound

Table 2 Summary of information and interpretation of each cremation grave found in the excavated quadrant of Mound 2. Determination of the human bone has been done by E.. Smits (2018), charred wood by E. van Hees. P = primary; S = secondary

damaged some graves inside the mound (Fig. 3). It has a round outline, with a current diameter of at least some 8 m but its irregular shape makes it difficult to determine its precise diameter. The mound is currently some 60 cm high. In the top of the mound a thick humus layer (A0 horizon) developed, beneath which there is a brownish illuviation zone (B-horizon). Some traces of forest ploughing are covered by this soil, which indicates that the humus soil developed relatively recently (in the 20th century AD). During the ploughing, part of the top must have been distorted, as can be seen in the case of Grave 2 (see below). The mound itself consists of coarse sand which contains some gravel. Below the young soil, the remnants of a Moder Podsol soil are vaguely visible (the original top soil). Underneath, there is an orange-brownish zone which extends up to 60-70 cm below the top of the mound in the centre until it fades out into a greyish colour. It was particularly at this 60 cm transition that several prehistoric features became visible for the first time. In places, there are patches of charcoal. The texture of the soil is comparable to that of the mound. Though a clear buried prehistoric soil is barely visible, the presence of features indicates this is where the original prehistoric surface was that was covered by the mound. This zone is 10 – 20 cm thick. A metre below the top of the mound (as measured from the centre), the subsoil contains more gravel and pebbles (the original C- horizon).

The southwest quadrant was excavated, and in total 7 horizontal levels were created to investigate features. Distances between consecutive levels are approximately 10-15 cm. In total, seven cremation graves were discovered. Table 1 schematically illustrates the position of the graves in relation to the excavation levels and the stratigraphy of the soils in the mound. Soil formation homogenized the mound material, making it hard to detect features or sods. Pits in which cremation remains must have been buried were hardly or not visible and this creates problems as it is sometimes difficult or even impossible to see whether a pit was dug in from above through the existing mound (*i.e.* post-dating its construction), or whether it was covered by the mound. For a number of graves we can be certain that they are covered by the mound and thus pre-date it. We indicate these as 'primary' graves ('P'). For a few others, we can state with confidence that they were dug through it and post-date it. These are indicated as 'secondary' graves ('S'). There are also graves where we are unsure about their stratigraphical position. Table 2 summarizes all information on the content, nature, grave gifts and sex/age of the graves discovered in this mound. Louwen *et al.* 2018d and Louwen *et al.* 2014, provide the reader with more extensive (photographic) documentation of each grave, and on why we chose to interpret it as a primary or secondary grave. Fig. 9 shows the position of the graves in the excavated quadrant.

5.2 Features

Apart from the seven cremation graves, a scatter of ten pieces of flint, measuring 13 cm in diameter, was found at the transition of level 4 to 5. These are two small cores and a few flakes, six of which could be refitted to each other. They are not associated with a grave, and cannot be dated more precisely. Their position and integrity suggest they were left at the prehistoric surface covered by the mound. All cremation graves have been ^{14}C-dated (App.) and represent Middle Bronze Age A burials. Bayesian modelling (Bourgeois and Fontijn 2015, 58) indicates that the graves were interred here between roughly 1625-1535 cal BC. In a number of cases, we are dealing with pits in which we found 'zones' or scatters of cremation remains. It is unclear if we are dealing here with bones that were originally covered in an (organic) container that later decayed, or whether they were spread out in a pit during the funeral itself. The fragments of a ceramic vessel found in Grave4 probably do not represent an urn, but rather an accessory vessel (Louwen *et al.* 2018d). Two graves contained the remains of a burnt bone pin or needle, which probably represents a dress fitting that survived the cremation. Grave 8 is noteworthy for its construction. It consists of a small pit with cremated bone, which was covered by charred oak beams (fig. 10).

It may be expected that the wood fragments are remnants of the pyre, but these must have been carefully re-ordered before the final burial, as the charred wood covers a small pit in which cremation remains were placed. This is comparable to what happened with the cremation grave of Leusden-den Treek (fig. 6). Charred wood and bone were sorted out afterwards and carefully positioned in relation to each other in the final burial. A comparable concern with sorting of wood and bone is found in Mound 3 (see below: graves 11-13).

The bones of all the graves discovered represent the burial of adults.[5] Children's graves have not been found here. There is one double grave, all others are single burials. Four out of the eight individuals interred here are females. No. 8, centrally positioned

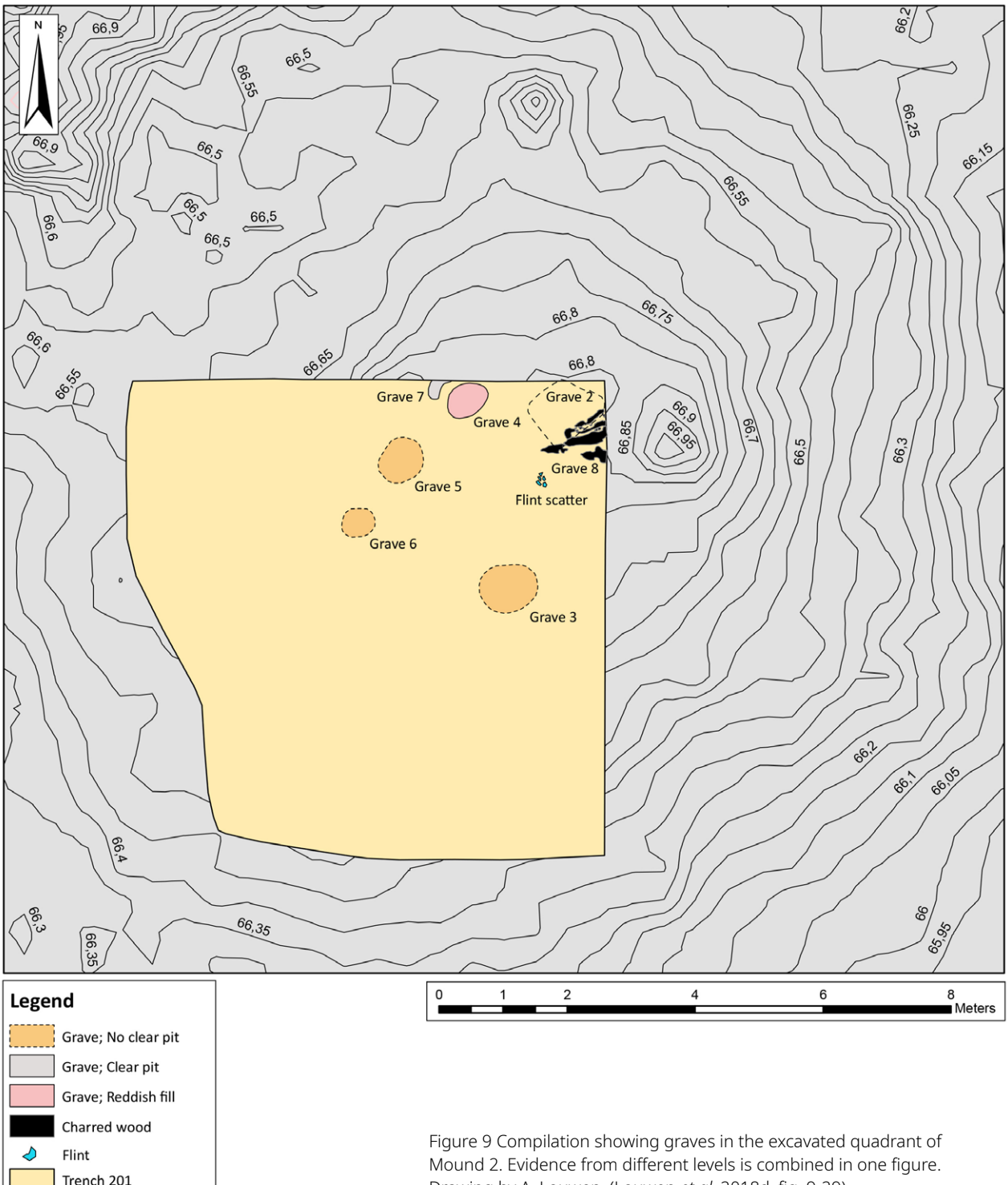

Figure 9 Compilation showing graves in the excavated quadrant of Mound 2. Evidence from different levels is combined in one figure. Drawing by A. Louwen. (Louwen *et al.* 2018d, fig. 9-29)

in the mound, is of a male. In all cases, the weight of cremated remains is too low to represent a complete skeleton. Some graves, however, could not be completely excavated as they are in the profile sections, and we also suspect bones got lost due to bioturbation and forest ploughing (this applies particularly for the truncated Grave2 situated in a ploughed-out zone in the top of the barrow).

Figure 10. Compilation of photographs of Grave 8, seen from different directions. Arrow indicates north. Photographs by Q. Bourgeois. (Louwen *et al.* 2018d, fig. 9.18)

5.3 Interpretation

We are dealing here with a Middle Bronze Age A barrow that, like contemporary ones (cf. Lohof 1991; Modderman 1954; Theunissen 1999), functioned as a collective grave. Unlike Mound 1, there is no evidence to suggest that there was a monument at this location before the Middle Bronze Age.

The graves of eight individuals were found here. As we only have excavated a quarter of the mound, not too much should be made of the fact that we lack children's graves here, and that the majority of the interred are females. There are no clear distinctions between graves, though the central Grave8 is the only one to have a different construction containing remnants of the pyre. It is also the only one for which we know for certain that it was deposited before the mound was built and which was positioned in what came to be the centre of the mound.

We have reason, however, to suppose that graves 6, 5 and 3 might also pre-date the building of the mound, although we cannot be certain here due to the homogenized soils which makes it hard to recognize pit features. Particularly for no. 6 we see a pre-barrow dating as a serious possibility, as this grave, to our surprise, was found at the deepest level, in an area where not a piece of cremated bone was recognized at higher levels (cf. Louwen *et al.* 2018d, and Louwen *et al.* 2014). At least, we should take seriously the possibility that there may have been more than one grave at this location, before the location was finally marked with a mound.

Subsequently, burials 2, 4 and 7 were dug into the body of the burial mound at a later phase, probably until the early 15th century at its latest.

6 Mound 3

6.1 Description of the mound and general stratigraphy

Unlike Mounds 1 and 2, there were initially serious doubts whether no. 3 really represented a prehistoric burial mound. It has an irregular shape and low height (only 50 cm at its highest). It was only during the excavation that we found out that this is the result of forest ploughing. It is difficult to see where the mound ends and if its original shape was round at all. If so, it had an estimated diameter of some 9 m. Furrows of the forest ploughing penetrated deep into the mound, in places they were visible as deep as level 4 (fig. 11).

Eight horizontal levels were created in the excavated quadrant to detect features. Like the other mounds, its body consisted of coarse sand containing some loam. Only below what we interpret as the prehistoric surface does it contain more gravel. The soil-stratigraphy is comparable to that of Mound 2. In the top, a humus zone developed (A horizon). Below it, the remnants of an older Moder Podsol (B horizon) were visible. The body of the mound itself consists of an orange-brownish zone. Some 30-40 cm below the top of the mound in the centre, there is a faint, unclearly bounded greyish horizon visible, of some 15 cm thickness. A comparable zone was visible underneath Mound 2, though this one was even less well visible. The greyish shade was probably caused by the presence of small charcoal particles. Around this zone (level 5), many graves became visible. We assume this greyish zone marks the prehistoric surface covered by the mound. Below it, there was an orange coloured zone (B horizon) on top of a coarse yellow one that showed no traces of illuviation (C horizon). Table 3 indicates schematically the relation between the excavation levels, the stratigraphic position of the graves and the soil-stratigraphy of the mound. Table 4 provides a summary.

6.2 Features

The main features discovered here are ten cremation graves containing the remains of one individual – double graves are lacking. A number contain charred wood: Graves 11, 12 and 13. The latter is the only one to contain some artefacts: eight sherds of pottery with a fabric which is characteristic for the Middle Bronze Age. No traces have been found that indicate activities taking place at this area before the interment of the cremation graves. Three pottery sherds found in the mound at level 4 have the mineral temper characteristic of Middle Bronze Age pottery and are therefore contemporary with the graves. They may originally have been included in one of the graves (no. 13 contains a few pottery sherds of this fabric). Five other sherds deviate due to their slickened surface (*besmeten* in Dutch), which is a characteristic of Iron Age pottery (Louwen *et al.* 2018e). These finds indicate Mound 3 was used or visited during the Iron Age as well. The sherds come from the uppermost levels of the mound and from their flanks, underlining they are later additions. No graves or other features can be linked to these sherds. Figure 12 gives a schematized overview of the position of all graves found.

It was more difficult to recognize pre-mound from post-mound graves here than it was in the case of Mounds 1 and 2. Only for Grave 12 can we be confident

that it was dug in before the mound was constructed. Likewise, only for Graves 9 and 10 can there be no doubt that they post-date the mound. For all other graves, there remain uncertainties as to their precise stratigraphic position due to the homogenization of the soils. For a few graves, it is even possible that they were positioned beyond the zone where the mound was constructed. Nevertheless, ^{14}C-datings demonstrate that all ten graves date to the first half of the Middle Bronze Age (ranging from the 18th to the 15th centuries cal BC; App.). Graves 11 and 12 are the cremation graves with the oldest datings. As the stratigraphic relation between no. 11 and the mound is unclear, only the evidence of no. 12 was included in the

Figure 11 The excavated quadrant of Mound 3, level 4. Point of trowel points north. The low height of the mound can clearly be seen here, as are the traces of forest plowing (the rectangular N-S oriented dark furrows along the tree trunk).Photograph by Q. Bourgeois. (Louwen *et al.* 2018e fig. 9.5)

Level	Graves										Interpretation stratigraphic level
1											Mound: topsoil
2	**9**										Mound: bottom topsoil
3		**10**									Mound
4											
5			**11**	**12**	**13**			**16**			Zone prehistoric surface underneath mound
6						**14**	**15**		**17**		
7										**18**	Zone below prehistoric surface
8											

Table 3 Horizontal levels at which prehistoric graves in Mound 3 were discovered. Shown are level 1 (top) to 8 (bottom). Numbers marked in yellow indicate the position of graves in relation to excavation level and soil

Bayesian modelling. This indicates that of all graves known to us, it may be the first grave created here (Bourgeois and Fontijn 2015, 57-9). This grave would best qualify as a central grave for its spatial position in the mound (as no. 8 was in Mound 2), though the irregular shape of the mound admittedly leaves some reason for doubt.

There are clear differences in the way in which the cremation remains were buried here (figs. 13-14). In a number of cases, we are dealing with packed clusters of cremation remains that may have been wrapped in an organic container that later decayed but left its structure intact (Graves 15 and 18).

In other cases, we see that cremation remains were placed in broader pits. In three cases (no. 11, 12

Grave no.	Level	Grave type	Stratigraphic position	Horizontal position in mound	Sex/age	Artefacts	Remarks
9	2	Zone unclearly defined; disturbed	S		Adult, 20-40 years	-	In top of mound; disturbed by ploughing but cannot come from deeper levels
10	3	Zone unclearly defined; disturbed	S		F? adult	-	In top of mound, disturbed by tree roots
11	4-5	SW-NE oriented pit with scatter of cremation remains and charcoal and charred wood	Unclear	Off-centre; could also be situated just outside mound	M? 20-40 years	-	max length 2.30 m, max width 1.50 m; core of zone: 1.60 by 0.80 m; bone in one part, charcoal and charred wood in another, like nos 12 and 13.
12	4-5	WSW-ENE oriented pit; cremated bone on one side; charred oak wood on the other	P	Centre zone of mound	M? 20-40 years	-	Not entirely excavated as it is partly in the profile section; Spatial separation of bone and wood fragments, like nos. 11 and 13
13	4-5	SSW-NNE oriented pit; bone deposited on top of charred wood fragments	Unclear	Off-centre, could also be situated outside mound	Child, 1-4 years	Several pottery sherds	Damaged by ploughing; 1.30 m, width 35-55 cm. Ordering and separation of wood and bone like in nos. 11 and 12, but here in vertically.
14	6	Small pit (D. 25 cm; depth 20 cm) with cremated bone	Unclear	In flank of mound	Child, (18 months +/- 6 months)	-	Damaged by ploughing; cremated bone in small pit in prehistoric surface; as it is in flank of mound it is not clear if it was dug through the mound or covered by it
15	6	Small pit (D. 45 cm, depth 40 cm), greyish colour indicates charcoal parts	Unclear	Off-centre, could also be situated outside mound	F, 20-40 years	-	Cremated bone at bottom of pit; probably deposited in organic container which decayed later
16	5	Zone unclearly defined; disturbed, no pit visible	Unclear	Off-centre	Child, 2-6 years	-	Disturbed by tree roots. Scatter of bone D. 40 cm; depth 30 cm; some charcoal parts
17	6	Zone	Unclear	Off-centre	F, 20-40 years	-	Close to 10, but lower in mound; but different individual than the one in no. 10
18	7	Small pit	Unclear	Off-centre	F?, 20-40 years	-	Packed concentration, probably in original container which later decayed; (D. 45 cm); depth 18 cm; in prehistoric surface, but unclear if it pre-dates mound

Table 4 Summary of information and interpretation of each cremation grave found in the excavated quadrant of Mound 3. Determination of the human bone has been done by E. Smits (2018), charred wood by E. van Hees. P = primary; S= secondary

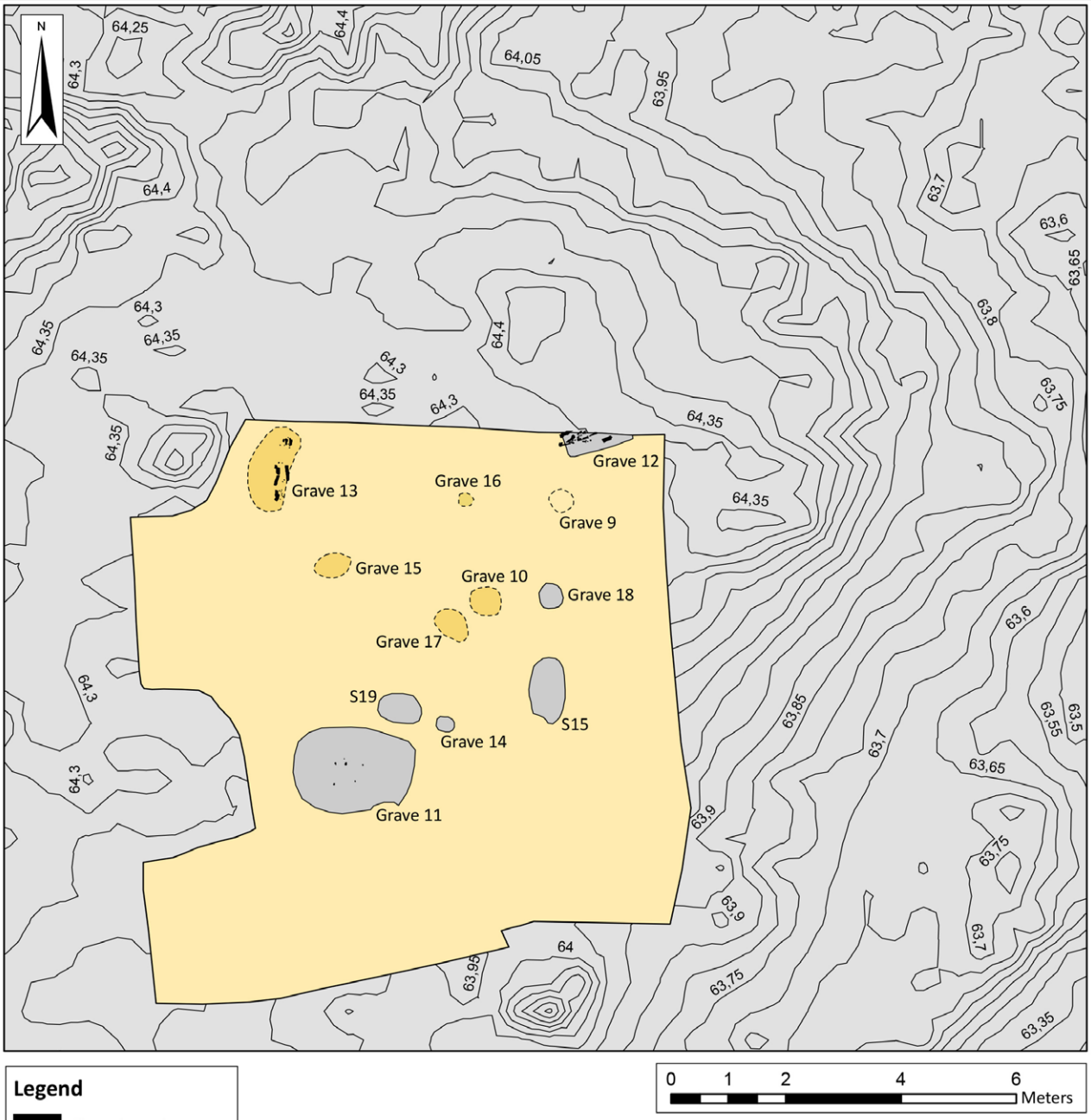

Figure 12 Compilation of graves in the excavated quadrant of Mound 3. Evidence from different levels is combined in one figure. Drawing by A. Louwen. (= Louwen *et al.* 2018e, fig. 9.25)

and 13), charred wood was also included. The neat ordering, however, implies we are not dealing with the remnants of the pyre itself, but rather with a case where bone and charred wood were collected, deposited and ordered together afterwards. In two cases, wood was placed on one side, and cremated bone on the other. In Grave 13, they did the same, but vertically: the bone was placed on top of the wood (Louwen *et al.* 2014; Louwen *et al.* 2018e). We have seen a similar concern with the separation of wood and bone in Grave 8 in Mound 2, although the order there was reversed when compared to Grave 13. In no. 8, the wood was placed on top of the bone. As we have at least three of such charred-wood-with-bone graves here, in Mound 3 this clearly was not a 'privilege' for the centrally interred one (as one would perhaps expect for Mound 2, where the central grave is the only one found to have charred wood and bone).

Figure 13 Grave 18, facing south. Here, the cremated bone shows a tight concentration. Photograph by A. Louwen. (Louwen *et al.* 2018e, fig. 9-21)

6.3 Interpretation

Mound 3 is, just like Mound 2, clearly a collective grave – a burial location for cremation graves. ^{14}C-dating indicates burial at this location started before the events in Mound 2, making it the oldest Middle Bronze Age funerary site of this group (keeping in mind that we only investigated one quadrant of each mound and that it is possible that the unexcavated parts of the other mounds might still have graves that are older). The excavated quadrant in Mound 3 even contained more graves than in Mound 2, in spite of its small size and the much heavier damage it underwent in more recent times.

There are minor differences in the way the cremated bone fragments were buried here (packed in a container or positioned in a larger pit). Apart from this, there are no clear distinctions between graves. Both sexes and all ages are represented, including very young children. It remains unclear if people first buried several deceased in a small flat cemetery before they raised the mound as we supposed for Mound 2; the unfavourable soil conditions, the considerable post-depositional disturbances and the low height of the mound make it impossible for each grave to ascertain whether it was dug through the mound or covered by it.

The carefully ordered charred-wood-with-bone pits seem to represent a local (?) way of burial that was also repeated again in Mound 2 (Grave 8). As it was done for what probably were the graves of two males (Graves 11 and 12) and for a very young child (Grave 13), we wonder whether there was a (genealogical) connection between the individuals buried here.

7 Summing up – a small Bronze Age barrow group in the barrow landscape of Wieselseweg

Before we started the research, we had no clue as to the nature of any of the mounds situated along the Wieselseweg. The fieldwork showed that the newly discovered group of three, located between the barrow row and the cluster of mounds at the prominent 'Koningseik' cape represents a separate barrow group that was in use between approximately the 18th and the 15th centuries cal BC. People started to bury males, females and children at a location that became covered by a low and small mound: first at the location of Mound 3, and later at that of Mound 2. Males, females of all ages, and children, including very young ones, were buried here, all after having been cremated. We found the remains of 19 Middle Bronze Age graves in

Figure 14 Grave 12. Note the ordering of finds in the pit, with cremated bone on the south side, and charred wood north of it. The dark feature at the top of the profile section represents furrows of forest ploughing. Facing north. Photograph by A. Louwen. (Louwen *et al* 2018e, fig. 9-14)

three barrows, but given that we only investigated one quarter of each mound, it is possible that perhaps over 50 people were buried in Mounds 2 and 3 alone. In spite of their small size and inconspicuous nature, the Wieselseweg mounds must have been central points in the funerary landscape for many generations.

There is nothing to suggest that people took pains to emphasize distinctions in death. With one exception, all graves excavated are of single individuals. In the graves found in the excavated quadrants, there appear to have been no strong distinctions between graves placed in the centre underneath the mound and those inserted later in it, nor between those in peripheral and central positions. Rather, there are similarities in burial ritual, particular in an action in which charred wood (presumably from the pyre) was included in the burial pit but neatly deposited in a separate, ordered position. This applies to graves in one mound but in different spatial positions (Mound 3: no. 12 central, and nos. 11 and 13 peripheral or even outside the mound) and between the mounds (central Grave 8 in Mound 2 has the same concern with charred-wood-with-bone ordering as we see in aforementioned graves of Mound 3.

Bayesian modelling of the ^{14}C-datings indicates Mound 3 was the oldest Bronze Age burial site (Bourgeois and Fontijn 2015). With the evidence we have now (which may be incomplete as only one quadrant of each mound was excavated), the model suggests people started to bury deceased at the Mound 2 location at a later stage, though there may have been an overlap with the latest burials inserted in Mound 3. The old dating of a grave in a position which is rather peripheral to the later mound, no. 6., at least suggests we should be open to the idea that the Mound 2 area was first used as a small cemetery and only later covered with a mound (cf. the Bayesian model; Bourgeois and Fontijn 2015, 59).

Mound 2 is remarkably similar to Mound 3. They are comparable in their modest size and height (Mound 3 is more damaged though). There is a comparable number of graves found in both. Traces of any feature that could be interpreted as an inhumation have not been found in either Mound 2 or 3. Both are characterized by the exclusive presence of cremation graves. As Modderman's excavations at Ermelo show, many barrows from the Veluwe have both inhumations and cremation graves (Modderman 1954). At the contemporary Middle Bronze Age group of Garderen-Bergsham, not that far from our site, there are several mounds positioned close to each other. Nevertheless, each barrow has different features (Van Giffen 1937; for chronology: Bourgeois and Fontijn 2015). Some graves in Mounds 2 and 3 also represent similar actions (the ordering of charred wood and bones in a rectangular pit). In both, we lack evidence for other constructions, like mortuary houses, ring ditches or post circles (cf. Van Giffen 1937 for examples from the Veluwe). We therefore think that Mound 2 may be regarded as the successor to Mound 3 and used by the descendants of the social group who used Mound 3.

By contrast, Mound 1 is very different. The earliest indications of activities at the location suggest there was a late Neolithic burial monument enclosed by a palisaded ditch. whether or not it was covered by a small mound remains difficult to ascertain. It was certainly covered by a mound in the Bronze Age and at least one person was interred here. It is impossible to say whether this burial pre- or postdates the oldest grave in Mound 3 as we lack information on the oldest interment here.

Whatever the case may be, that this barrow was regarded differently from the other ones becomes clear from a rare pit row filled with stones, and pottery which runs towards it and was finally covered by a mound in the Bronze Age. We have interpreted this as an example of a 'stone pit row' as known from German and Danish barrow landscapes, and given its dating in 17th-15th centuries cal BC, a rather old one at that. An enigmatic oval-to-rectangular pit probably covered by the barrow may be linked to this row or represent an inhumation grave. Only one, perhaps two, Middle Bronze Age cremation graves were found in this mound – which stands in marked contrast to the numerous graves found in the smaller Mounds 2 and 3. It thus seems that Mound 1 had a special significance to people, stimulating them to carry out actions (the pit row and possibly the burning that went with it) we rarely see in other Dutch Middle Bronze Age barrows. It was this mound which was positioned in one line with the barrow row to its east, and with one of the mounds at the barrow cluster at Koningseik to its west.

Summing up, the small newly discovered barrow group of Wieselseweg makes manifest the ancestral domain of a small group of people (perhaps the size of one or two extended families?) who represented their deceased as a collective ancestral whole for a period of at least two centuries in the beginning of the Middle Bronze Age. In their actions and in the landscape, they seem to have expressed their identity by both emphasizing links to a broader whole (visually lining up with the nearby barrow groups – members of other social groups?), as well as by emphasizing something of a separation and self-definition. They did this by using a separate area in between two other major barrow groups and by the use of one collective burial ground in which all deceased were treated similarly and repeating that after some time in a very similar way. They may have anchored the position of their particular group by linking themselves to a site that possibly held ancestral significance and the use of which was marked by unusual ritual practices, resulting in the pit rows.

This research intended to establish a preliminary understanding of a barrow landscape that extends over kilometres and which has never before been investigated. The mounds discussed here are among the smaller, and certainly heavier damaged ones. We should therefore keep in mind that the interpretation presented here cannot be complete. Also as only one quadrant of each mound was investigated, interpretations expressed here may need to be adjusted or even corrected if in the future new research would take place. What the investigation hopefully at least has demonstrated is that small-scale research of inconspicuous mounds – even those in a bad state – can provide new and unexpected information on the people who thousands of years ago buried their deceased at the hills of what we now call the Wieselseweg.

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Poelen and dr. ir. J.H. Kuper for their help, support and enthusiasm. Mark de Wilde operated the mechanical excavator and was good company. Prof. dr. L.P. Louwe Kooijmans, dr. Joanne Mol and dr. Jan Boerma gave valuable advice regarding the interpretation of the soil stratigraphy. Prof. dr. Corrie Bakels was of great help in the fieldwork in many ways, and is also thanked for her support in getting this article finished. Maarten Wispelwey, Masja Parlevliet, and Janneke Zuiderwijk of the municipality of Apeldoorn made this research possible. Special thanks is also due to the Dutch Organisation of Scientific Research, for funding the research project 'Ancestral Mounds' (360-60-080) and 'Economies of Destruction' (VICI 277-60-001) in which it is embedded. We are happy to dedicate this contribution to prof. dr. Harry Fokkens, who himself took part in the fieldwork several times and was of great value in the discussions on the often complex features discovered here.

Notes

1 DF: project leader and synthesis; AL: post-excavation analysis of finds and features; LS: human bone analysis; QB: analysis Mound 1; CvdL: fieldwork leader.

2 Bodemkaart van Nederland 1:50.000 toelichting kaartblad 33W Apeldoorn, 27, 67-8.

3 At the rim of the mound, there are six more features which are hard to 'read' due to soil formation (8, 18, 21, 22, 23 and 24). None contained any finds and only for S22 and 23 we have reason to suggest they are anthropogenic. Nothing can be said on their dating, however.

4 As for example happened in many pit lines found in Denmark (cf. Kristensen 2008, Pit type 1; f.i. Fig. 14, 16).

5 See Smits 2018 for more information on the analyses of the cremated bone.

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Appendix. ^{14}C Datings (from Louwen and Fontijn 2018).

Mound 1

Context	Feature.	Find no.	Lab code	BP	cal BC 1s (68,2%)	cal BC 2s (95,4%)
Grave 1	101.14	686	GrN-32582	3320 +/- 25	1635 – 1535	1682 – 1527
Grave 1	101.14	680	GrA-51705	3280 +/- 35	1611 – 1518	1636 – 1460
Grave 1?	101.68	668	GrN-32580	3330 +/- 20	1658 – 1561	1683 – 1532

Pit row

Context	Feature.	Find no.	Lab code	BP	cal BC 1s (68,2%)	cal BC 2s (95,4%)
Pit with stones	101.54	825	GrA-48880	3285 +/- 40	1613 – 1521	1661 – 1456

Mound 2

Context	Feature.	Find no.	Lab code	BP	cal BC 1s (68,2%)	cal BC 2s (95,4%)
Grave 2	201.2	20	GrA-51581	3280 +/- 35	1611 – 1518	1636 – 1460
Grave 3	201.3	123	GrA-51707	3275 +/- 30	1608 – 1511	1626 – 1462
Grave 4	201.4	291	GrA-51942	3315 +/- 30	1629 – 1534	1665 – 1510
Grave 5	201.8	273	GrA-51700	3295 +/- 35	1615 – 1530	1660 – 1499
Grave 6	201.13	522	GrA-51587	3380 +/- 35	1734 – 1630	1762 – 1562
Grave 7	201.15	471	GrN-32578	3295 +/- 15	1611 – 1535	1621 – 1526
Grave 7	201.15	471	GrA-51712	3285 +/- 30	1611 – 1529	1629 – 1500
Grave 8	201.22	672	GrN-32581	3345 +/- 20	1662 – 1616	1728 – 1546
Grave 8	201.26	828	GrA-51702	3280 +/- 35	1611 – 1518	1636 – 1460

Mound 3

Context	Feature	Find no.	Lab code	BP	cal BC 1s (68,2%)	cal BC 2s (95,4%)
Grave 9	301.2	11	GrA-51589	3240 +/- 35	1600 – 1451	1611 – 1439
Grave 10	301.3	722	GrA-51963	3360 +/- 30	1688 – 1622	1742 – 1546
Grave 11	301.6	443	GrN-32577	3305 +/- 20	1617 – 1535	1631 – 1521
Grave 11	301.6	409	GrA-51951	3395 +/- 30	1740 – 1644	1756 – 1620
Grave 12	301.7	664	GrN-32579	3345 +/- 20	1662 – 1616	1728 – 1546
Grave 12	301.7	700	GrA-51953	3340 +/- 30	1683 – 1565	1729 – 1531
Grave 13	301.12	419	GrA-51721	3325 +/- 35	1658 – 1534	1690 – 1513
Grave 14	301.18	332	GrA-51952	3330 +/- 30	1661 – 1546	1689 – 1528
Grave 15	301.22	452	GrA-51710	3370 +/- 35	1730 – 1623	1749 – 1546
Grave 16	301.23	378	GrA-51696	3345 +/- 35	1688 – 1565	1737 – 1530
Grave 17	301.24	734	GrA-51701	3385 +/- 35	1736 – 1636	1769 – 1565
Grave 18	301.26	678	GrA-51719	3365 +/- 35	1727 – 1620	1746 – 1535

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And the river meanders on…

The intertwined occupation and vegetation history of the river area Maaskant and adjacent sand area of Oss (Netherlands) in Late Prehistory till Early Roman Period

Richard Jansen and Corrie Bakels[1]

The river area Maaskant and adjacent sand area of Oss, located 'between' the current course of the river Meuse and the city Oss, are among the most intensively researched regions in the Netherlands. Extensive archaeological and palynological research provides ample opportunities for an interregional research of the occupation and vegetation history of both areas. This article describes the intertwinement between the Holocene river area and the adjacent Pleistocene sandy soils, to eventually get a first insight of the relation(s) between the inhabitants of both regions in late prehistoric and Early Roman period (3000 BC – 250 AD).

1 Introduction

People tend to settle close to water. All over the world, villages and towns are situated on riverbanks. In prehistoric times rivers also held a strong attraction for people. Rivers were trade and communication routes, indispensable for the transport of people and animals, and provided fertile land, drinking water and food. However, they have an ambivalent character. Rivers also caused flooding and danger and sometimes formed a barrier. Nevertheless, the dynamic living environment of a river area is attractive for occupation, and was certainly so for prehistoric farming communities.

The river area *Maaskant*, located in the northeast of North-Brabant (Netherlands) can, with its dozen of (surface) sites from the Neolithic till the Middle Ages, rightly be called an 'archaeological treasure trove' (Dutch: '*archeologische schatkamer*'). From *c*. 3000 BC onwards, the first agricultural communities settled here, close to the river. Their occupation history is closely linked to the vegetation and geological history of the area. The occupation of the Maaskant was also not an isolated phenomenon. Large-scale archaeological research has been carried out on the adjacent sandy soils over the past forty years. An interregional research offers excellent opportunities to investigate the relationship between contemporaneous occupation in the flood valley of the river Meuse and on the neighbouring sandy soils; between people from the clay and people from the sand.

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2 A short research history

The Maaskant-area is now wedged between the sandy soils of a coversand ridge and the river Meuse (fig. 1). It literally includes the transition between the higher and drier Pleistocene coversand area and the lower and wetter Holocene river area

of the eastern Netherlands. The different landscapes here gradually and almost imperceptibly merge into one another, with the sand gradually disappearing 'under' the clay.

2.1 Research on the sandy soils …

Since the early 1970s, the Institute of Prehistory Leiden (IPL; now the Faculty of Archaeology) has been carrying out small- and large-scale research in the Maaskant area, in particular on the adjacent sandy soils. In 1979, this research was incorporated into the Maaskant project (Van der Sanden 1987, 100). Since 1983, this project has been led by Harry Fokkens (1996).

In the 70s more regional projects, inspired by the *Archäologische Landesaufname* in Germany, were launched in the Netherlands. The general goal of these projects was the development of (occupation) models of (pre)historic societies on different scales and themes (Jansen and Van Wijk 2007, 82-85; Bloemers 1999, 318-320). Forty years later the Maaskant-project is the only ongoing project. During its duration the objectives of the project have changed several times (Fokkens 1996). Presently the main goal is how (local) prehistoric communities shaped and transformed their environment and dealt with their own (pre)history, with a keen eye for the entanglement of practical, social and ritual aspects.[2]

Until a few years ago, the fieldwork focused mainly on the sandy soils to the north of the city of Oss.[3] The research in Oss is now one of the largest excavation projects in Northwest Europe. Dozens of hectares have been excavated, revealing settlements, cult sites and depositions, cemeteries and burials, as

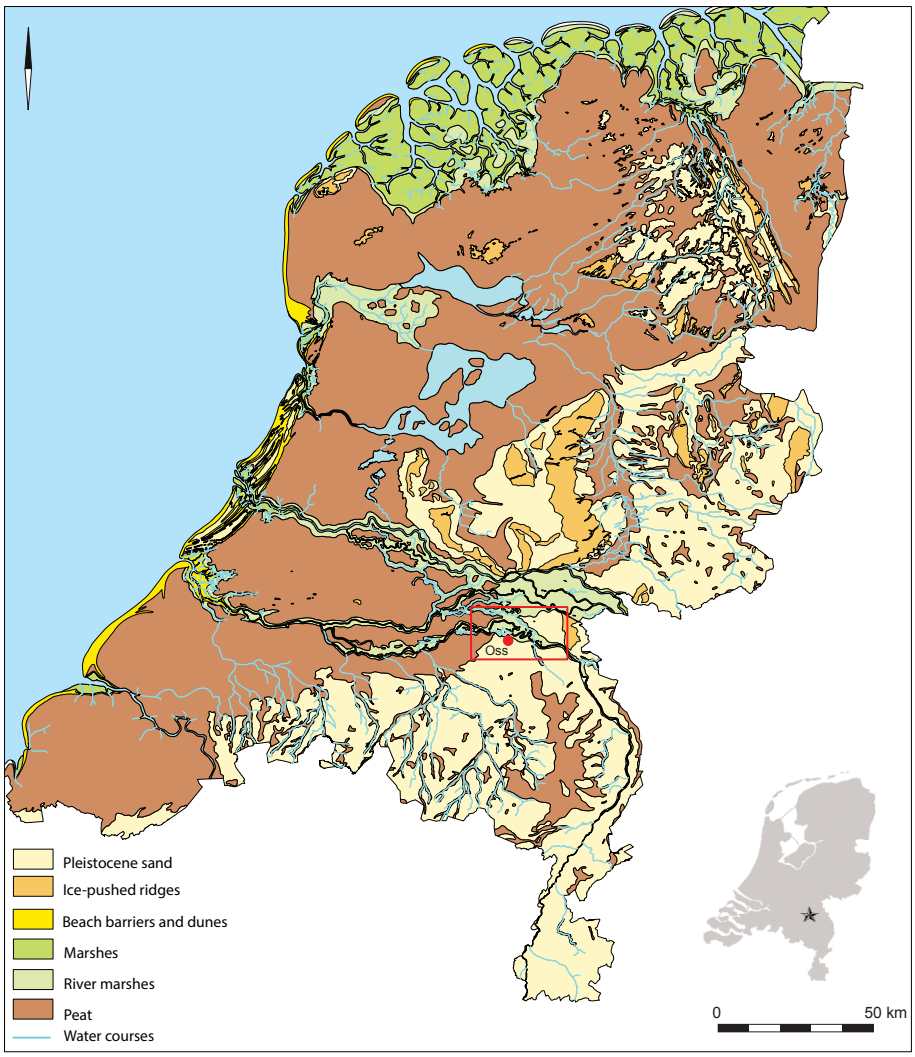

Figure 1 The river area of the Maaskant (red square) lies in the northeast of North-Brabant, wedged between an extensive Pleistocene coversand area in the south and the river flood plains of the Meuse in the north (after Vos and De Vries 2013)

well as extensive land use systems, activity areas and wastelands from the Bronze Age up to the Roman Period (fig. 2). The results have been incorporated in various syntheses and form an important input for the modelling of late prehistoric and native Roman communities on the Pleistocene sandy soils in the south of the Netherlands (a.o. Fokkens *et al.* in prep.; Fokkens and Jansen 2002; Fokkens 1998; Gerritsen 2003; Hiddink 2003 (part one); Jansen in prep.; Schinkel 1998; Wesselingh 2000).

2.2 ... and on the clay soils

During the research on the sandy soils, the idea gradually developed that an important dimension was missing: knowledge about the occupation in the adjacent river area. Through an initial inventory of the Maaskant in the 1950s and because the area had been visited intensively by amateur-archaeologists for decades, it was known that dozens of sites from Late Prehistory and Roman Period were located here (Modderman 1950; Ball and Schiltmans 1998; Jansen 2014a; b; fig. 3). Until recently, only one site had been explored in more detail[4], but since the introduction of the so-called Malta-archaeology in the Netherlands a large number of archaeological desk-based researches as well as coring and field surveys has been carried out here, in addition to various (small-scale) excavations. This not only brought to light sites from the later Bronze Age till Roman Period, contemporaneous to the occupation on the sandy soils, but also sites that were absent on the sand. Examples of this are settlements dating to the Middle and Late Neolithic and the earliest phases of the Bronze Age (Jansen and Smits 2014, 89-93). Traces of occupation from after 250 AD are also rare on the sandy soils, while during the Late Roman Period (3rd to 5th centuries) occupation continued at various sites in the Maaskant (Heeren 2014, 264-265; Jansen 2014b, 459). The presence of the river also lead to specific sites such as regional centres, river cult sites and activity areas for *e.g.* clay extraction. Finally, the

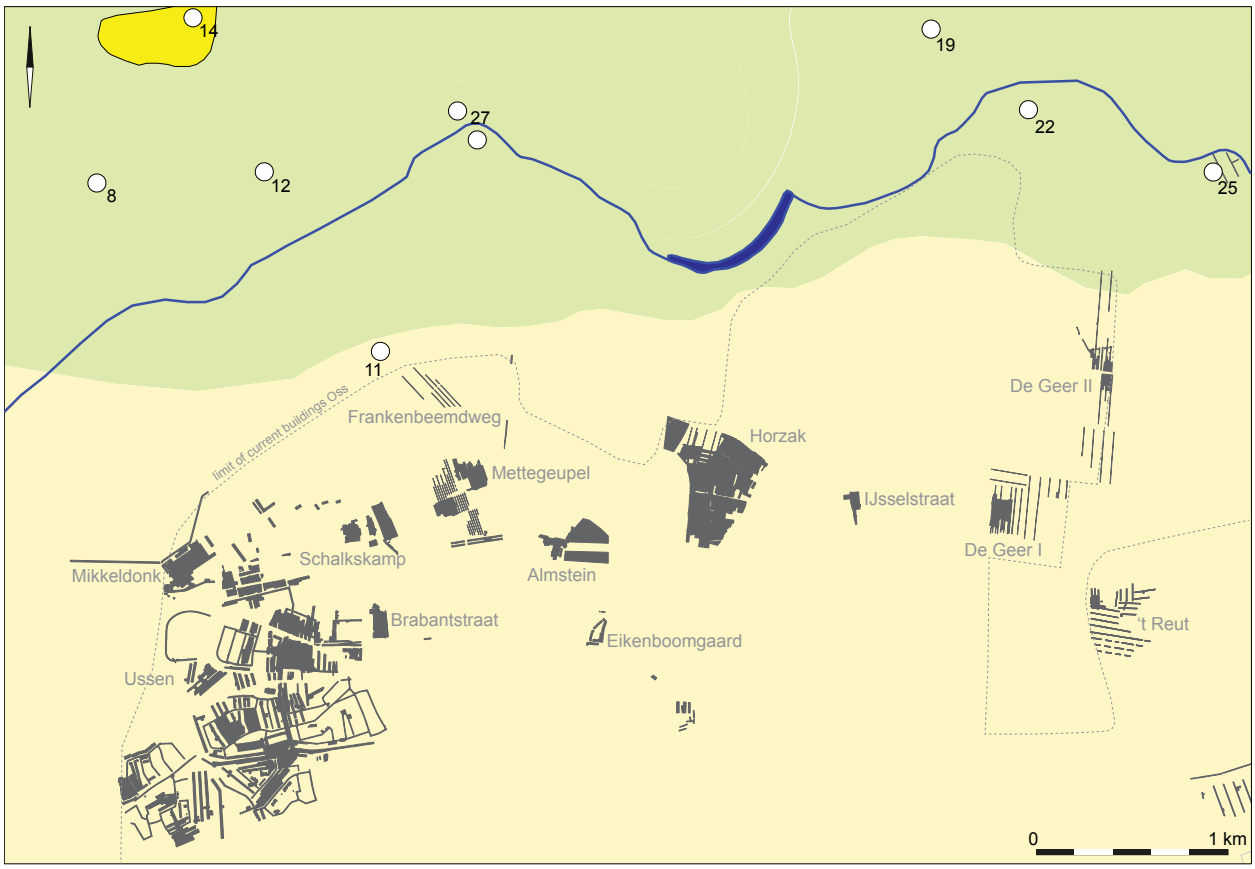

Figure 2 Overview of the excavated areas (dark grey) on the sandy soils (yellow) around Oss including the main sites (white dots) in the neighbouring clay soils (green) and river dune (bright yellow) (for site names see table 1) (after Fokkens in prep. a)

Nr.	Village	Toponyhm	Nr.	Village	Toponyhm
1	*Maren*	*Dorp*	22	*Berghem*	*T(W)inkel*
2	Maren-Kessel	Liesdaal	23	Oss	De Geer
3	Kessel	Lithse Ham	24	*Berghem*	*In 't Broek*
4	*Lith*	*Dorp*	25	Berghem	Hoge Tussenrijten
5	*Lith*	*Tussen de Stegen*	26	*Haren*	*Spaanse Steeg-West*
6	*Lithoijen*	*Dorp*	27	Lith/Oss	Oijensche Hut/Paalakker
7w	*Lithoijen*	*Aan de Tiendweg*	28	*Megen*	*Aan de Berksestraat*
8	*Lithoijen*	*In de Kampen*	29	*Haren*	*Dorp*
9	Oss	Frankenbeemdweg	30	Haren	Groenstraat
10	Oss	Mikkeldonk	31	*Dieden*	*In de Pachtkamp*
11	Oss	Kennedybaan	32	*Berghem*	*In het Berchems Broek*
12	*Teeffelen*	*De Korte Voor*	33	Berghem	Waatselaar
13	*Teeffelen*	*'t Rot*	34	*Dennenburg*	*Dorp*
14	*Teeffelen*	*Dorp*	35	*Deursen*	*'t Steenwerk*
15	*Teeffelen*	*Oost*	36	*Ravenstein*	*'t Hoge Veld*
16	*Oijen*	*De Klootskamp*	37	Herpen	Hertogswetering
17	*Oijen*	*Dorp*	38	Herpen	Putwielen
18	*Macharen*	*In de Rotten*	39	Herpen	Wilgendaal (Dorp)
19	Macharen	Hoge Morgen	40	*Megen*	*Dorp*
20	*Macharen*	*Dorp*	41	*Dieden*	*Dorp*
21	Oss	Horzak	42	Overlangel	Asboom (Dorp)

Table 1 The main archaeological sites in the Maaskant area as detected by Modderman (1950; *italic*) and local archaeologist Gerard Smits (Ball and Schiltmans 1998; Jansen 2014b) (see also figures 2 and 3)

better preservation in clay soils results in material categories and find complexes that are lacking on the sandy soils *e.g.* metal and organic materials.

3 'A peculiar contact zone'[5]: sand versus clay[6]

Rivers have a major influence on the landscape they cross. They erode and transport material in order to eventually deposit it elsewhere. Depending on climate, subsoil, flow velocity and sediment, they develop their own character. Today, the Meuse is 'fixed' in a single riverbed, which is bounded by floodplains and summer and winter dykes. The largest meanders have been cut off and sluices ensure regulated water flow. As a result, the 21st century 'man-made' river landscape of the Maaskant forms a stable living environment, incomparable to the originally dynamic character of the area (fig. 3). In later Prehistory and Roman Period, the inhabitants of the Maaskant lived in a frequently changing environment, in which favourable occupation places regularly changed location.

An important tool for a reconstruction of the landscape dynamics of the Maaskant is a detailed soil survey of the area by Van Diepen (1952). Unfortunately, his maps are not sufficiently detailed for research on a site level. For example, the deeper subsoil has not been taken into account and there is no sand depth map, which is important for determining possible occupation locations. A more recent source are studies by Berendsen and Stouthamer (2001) and Cohen and Stouthamer (2012) who include the Maaskant in their paleogeographic reconstructions of the Rijn-Maas estuarium.[7] Still for site contextualisation it is important to map out the fossil Meuse landscape at a local level.

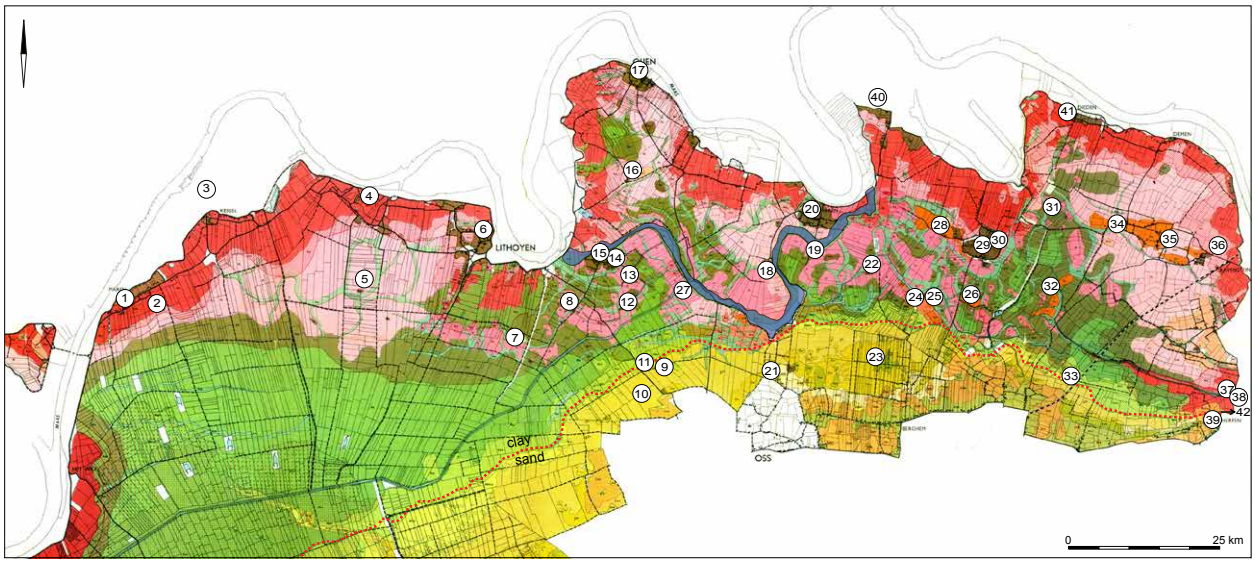

Figure 3 The soil map of Van Diepen (top) show various fossil Meuse streams and smaller channels. In the Iron Age and Roman Period the Meuse had a much more southerly course of which the current Ossermeer – open water to this day – formed the southernmost meander. Modderman detected dozens of archaeological sites based on surface finds; in later years more sites were found (for site names see table 1) (after Van Diepen 1952 and Modderman 1950 appendices)
Legend: yellow-orange: sand deposits; green: clay deposits; pink: deposits due to dike breaches; blue: presumed Iron Age – Roman Period stream; red: border between sand and clay

This shows that different landscape zones were attractive places to live and that preferences and/or possibilities differed from period to period (Wink *et al.* 2014, 47; Van de Meer 2010; Wink 2009).

Pleistocene river dunes
During most of the last Weichselian Ice Age (120,000-10,000 years ago) the Meuse had a braiding character. The river consisted of a system of intertwined (narrow) channels that regularly changed location. During this period, a foundation of coarse, gravel-rich sand was deposited on which the Holocene landscape is founded. Sand plains developed between the various river channels on top of which the wind formed dunes. Locally, these Pleistocene river dunes protrude above later deposits and still lie at, or directly below, the surface. They are attractive occupation locations, both in present as in the past.[8]

Levees and point bars (Dutch: kronkelwaarden)
From the end of the last Ice Age (about 10,000 years ago) the river Meuse got an anastomosing or meandering character whereby the river consisted of one main channel. Deposition of sand on the banks of the river due to regular flooding created levees along the river channel. Raised due to its coarse(r) sedimentation levees lies higher than the clayish floodplains and therefore formed attractive occupation locations.

The meandering rivers transport and deposit material. Depositions at the inner bank of a meander are referred to as the point bar. The typical lateral accretions, with coarser material at the base and and finer material at the top also formed attractive occupation locations in the past.

Crevasse splays
Crevasse splay deposits were the result of breakthroughs along the levees. Water laden with sediment is carried out into the floodplain were it formed sandy zones. Crevasse splay deposits are characterised by upward coarsening sediment and were attractive occupation locations within the clayish floodplain.

Channel belts
Because the Meuse regularly moved its course, a widely branched system of successive channel belts emerged. From *c.* 9000 BP onwards channel belts were formed, active and abandoned by natural processes (Cohen and Stouthamer 2012). In the last two millennia

these processes were also affected by human actions resulting in the current embankment of the river. Eventually the channel belts formed drier and higher ridges within the marshy environment along and on occupation concentrated (table 2; fig. 4).

Coversand ridge

To the south, the clay soils of the Maaskant borders on an extensive, east-west orientated coversand ridge. The Pleistocene coversands were deposited tens of thousands of years ago but still lie close to the surface

	Name channel belt	Start sedimentation (BP)	End sedimentation (BP)	Start sedimentation (cal BC/AD)	End sedimentation (cal BC/AD)	Occupation
1	Molenblok	5700	4500	-4570	-3232	Early- and -Middle Neolithic
2	Haren	4570	3020	-3355	-1363	Middle Neolithic-Middle Bronze Age
3	Lithoijen	4300	4100	-2920	-2615	Middle-Late Neolithic
4	Lith	3500	2734	-1810	-867	Bronze Age
5	Huisseling-Demen	3000	2000	-1237	-11	Middle Bronze Age-Middle Roman Period
6	Macharen	3000	2000	-1237	-11	Middle Bronze Age-Middle Roman Period
7	Maas (binnen-dijks)	1760	850	288	1200	Late Roman Period-Late Middle Ages
8	Maas	2000	0	-11	present active	Early Roman Period-Modern Times

Table 2 Overview of the fossiled Holocene channel belts in the Maaskant region with (an estimate of) the start and end of the sedimentation in years BP and cal BC/AD (based on Cohen and Stouthamer 2012) (after Boshoven *et al.* 2018 tabel 2.1 and Wink *et al.* 2014, 42; see also figure 4)

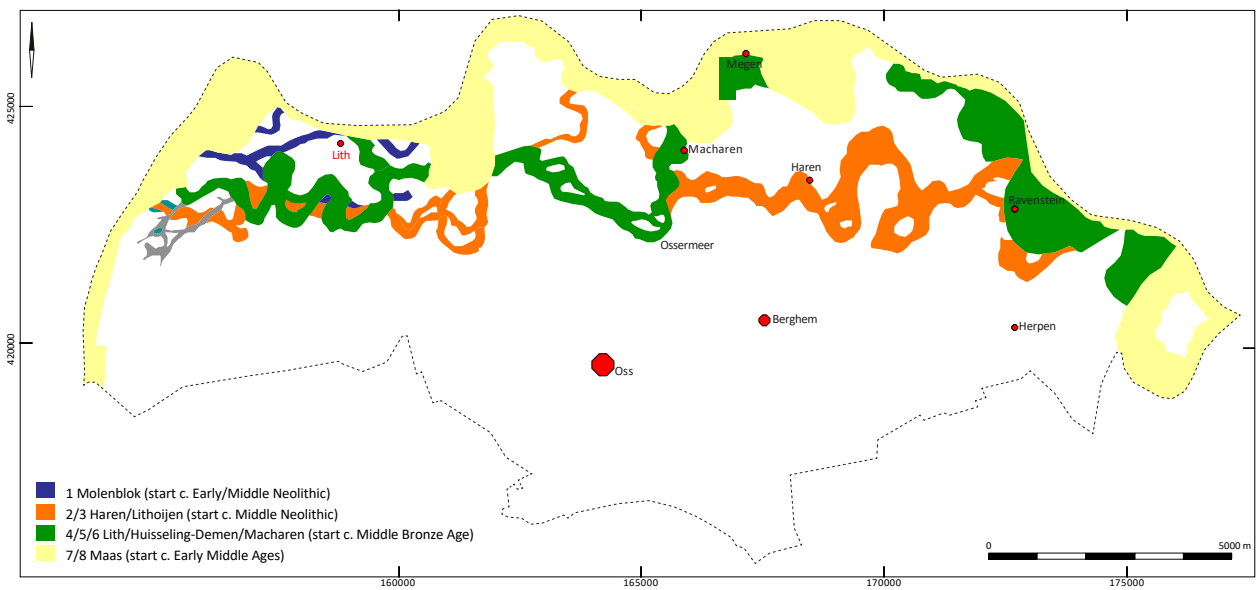

Figure 4 Since the Neolithic the Meuse has shifted to its current position. During the Bronze Age, for example, the Macharen/Huisseling-Demen channel belt was created, which also formed the main stream of the Meuse for the Iron Age and a large part of the Roman Period (after Boshoven *et al.* 2018 figure 2.1 and Botman and Van der A 2009 figure 3.8 and 3.9; based also on Cohen and Stouthamer 2012)

here. This homogeneous and stable sandy landscape lies relatively high in relation to the Maasdal (Meuse valley) and forms a good occupation location.

4 Vegetation history of the Maaskant and adjacent sand ridge[9]

The changing environment is also clearly reflected in the vegetation history. Seven pollen studies or series of pollen studies from the research area are available for the Holocene up to and including Roman times. Five come from sandy soils and two from the valley of the Meuse (table 3; fig. 5). Based on these pollen studies, an almost continuous vegetation history for the area can be compiled, including the Middle Ages. Here we limit ourselves to Prehistory and the first centuries AD.

4.1 The first half of the Holocene

Information on plant growth in the first half of the Holocene is provided by the investigations of a former watercourse in Herpen-Wilgendaal (fig. 6). At the end of the Pleistocene, during the Late Glacial, a stream cut metres deep into the subsoil. At the start of the Holocene the gully lost its function as a watercourse. The gully became filled with peat.

The oldest demonstrable plant growth was birch forest. The preserved fruits show that the birch was

No.	Location	Context	Reference
1	Lith-Herenengstraat	Deposit in the valley of the Meuse	Bunnik 2010
2	Oss-Ussen	Ditch fills from Roman Period cemetery	De Jong 1982
3	Ossermeer	Old branch of the river Meuse	De Haan 2009; Bakels 2014; Bakels and De Haan in prep.
4	Oss 45E/346	Old branch of the river Meuse	Bakels 2002a
5	Herpen-Wilgendaal	Abandoned watercourse	Bakels 2002b
6	Oss-Zevenbergen	Old surface under barrow	Bakels and Achterkamp 2013
7	Oss-Vorstengraf	Old surface under barrow	De Kort 2002; De Kort 2007

Table 3 Overview of pollen analyses from the Maaskant and adjacent sandy soils (after Bakels 2014, 52)

Figure 5 Locations of the pollen analyses. 1 Lith-Herenengstraat; 2 Oss-Ussen; 3 Ossermeer; 4 Oss-45E/346; 5 Herpen-Wilgendaal; 6 Oss-Zevenbergen; 7 Oss-Vorstengraf (after Bakels 2014 figure 1)

silver birch (*Betula pendula*). This forest was gradually replaced by a poplar-dominated forest. Both types of forest were relatively open. On the ground grew wormwood (*Artemisia*) and various other herbs including alpine plantain (*Plantago alpine*). These herbs represent the last remains of the cold steppe that must have characterised the region before the first tree growth. The diagram also shows willow (*Salix*). These willows may have grown both in the dry environment and in the wet gully. Aquatic plants such as water lilies (*Nymphaea*) were found in the gully as well, but these data have not been included in figure 6. The diagram is not provided with ^{14}C-dates, but this kind of plant growth belongs in the first half of the Preboreal (*ca.* 9500-8000 BC). A large part of the region must have been covered with this type of light forest, although the proportion of poplar will have varied locally.

The light deciduous forest was succeeded by a dense pine forest (*Pinus*, in this case Scots pine), which must have covered both the higher and lower parts of the Maaskant. This forest roughly dates to the end of the Preboreal and a large part of the Boreal (*ca.* 8000-7500 BC). Gradually, however, more deciduous trees and shrubs arrived in the area, beginning with hazel (*Corylus*), oak (*Quercus*) and elm (*Ulmus*). Hazel, and to a lesser extent elm, replaced the pine. Oak then replaced the hazel. Lime trees (*Tilia*) and ash (*Fraxinus*) followed. A deciduous forest developed on the higher ground, but there were also open spaces. The fact that birch was able to hold its own, as well as the presence of plants such as the fern polypody (*Polypodium*) and heather (*Calluna*), is a clue. It is quite possible that there were already small areas covered with heather at that time, but a counter argument that can be made is that the pollen analysis also shows high percentages of peat moss (*Sphagnum*) during this period. This peat moss does not fit in with the vegetation in the low-lying areas. In the period when on the higher ground oak dominated, the wet areas became overgrown with alder (*Alnus*) and herbs such as simplestem bur-reed (*Sparganium erectum*); it should be noted that a plant such as reed cannot be shown in the diagram because pollen from reed cannot be distinguished from other grasses. This means that the wet environment was nutrient-rich, which is not compatible with the growth of peat moss. The traces of that moss were probably blown over from the Peel

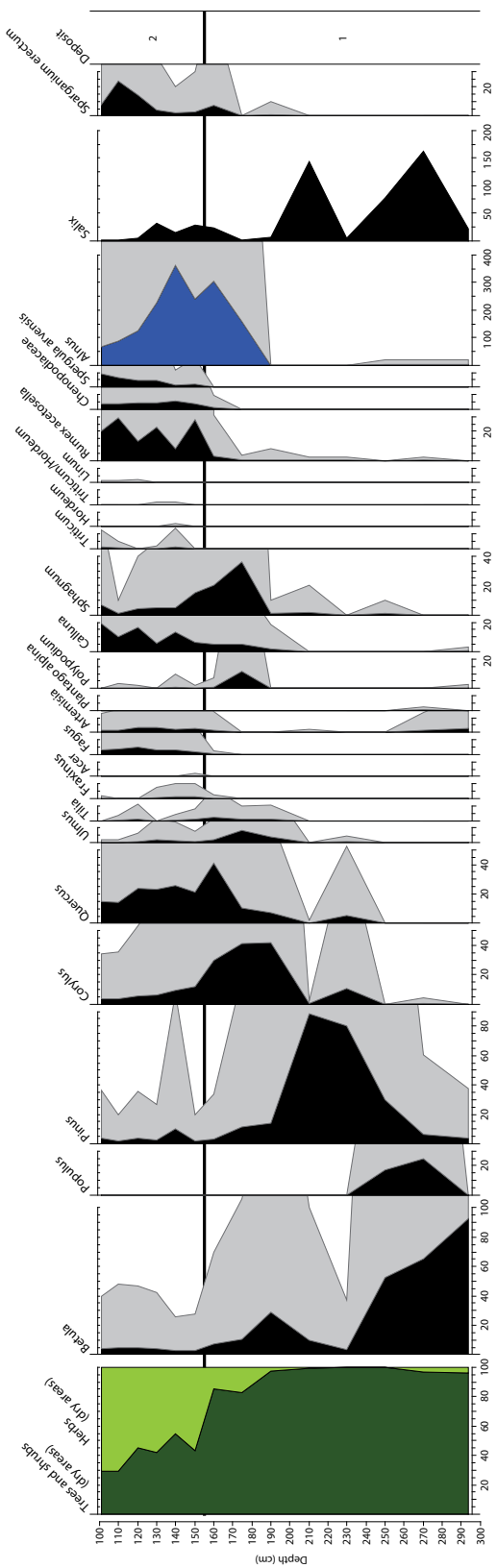

Figure 6 The pollen diagram from Herpen-Wilgendaal, a selection of taxa; in grey the curves 10x; the black line shows the hiatus in deposition (after Bakels 2014 figure 2)

region where the heather might have grown as well. However, research in recent heaths has shown that the pollen of heather does not spread far from the parent plant (De Kort 2002; Doorenbosch 2013), which would mean that the heather pollen of Herpen-Wilgendaal came from local open spaces and not from far away.

So there were open spaces and that is not surprising, because open spaces are needed for forest regeneration. Rooting, grazing and browsing wildlife also keeps such places open, temporarily or not (Vera 2000). How large they were, however, cannot be said. The mixed deciduous forest vegetation on higher grounds and alder carr in the lowlands belong to the end of the Boreal, transitioning into the Atlantic period (7500-5000 BC).

This is followed, unfortunately, by an interruption (hiatus) in the deposit. The development outlined above, from birch forest to pine forest, to mixed deciduous wood on the higher soils and to marsh forest in wetland situations, undoubtedly applies to the entire region. However, it should be borne in mind that the changes did not occur at the same time in all cases. As Van Leeuwaarden (1982) has shown, the microclimate plays a major role in this. In sheltered places, everything happens more quickly.

4.2 Man's earliest influence

The vegetation of the second half of the Atlantic period is not represented by the right kind of deposits in the Maaskant area. This is common in the Netherlands. Apparently, this is a period in which less abandonment of stream and river courses and peat growth occurred than in the previous and subsequent periods.

In the pollen diagram Oss 45E/346, which was obtained from an abandoned course of the Meuse (Bakels 2002a), the oldest sedimentation was (AMS) ^{14}C-dated between 3100 and 2900 BC and thus belongs to the Subboreal. The higher grounds were still covered with a mixed deciduous forest consisting of oak, elm, lime, ash and birch, as well as rarer species and some shrubs and herbs indicating open areas (fig. 7). On the low grounds in the Maaskant, there were alder trees, willows and, if it was wetter. marsh vegetation with bur-reed. It can be assumed that the second half of the Atlantic period, which was not represented in the pollen data, was characterised by similar plant growth.

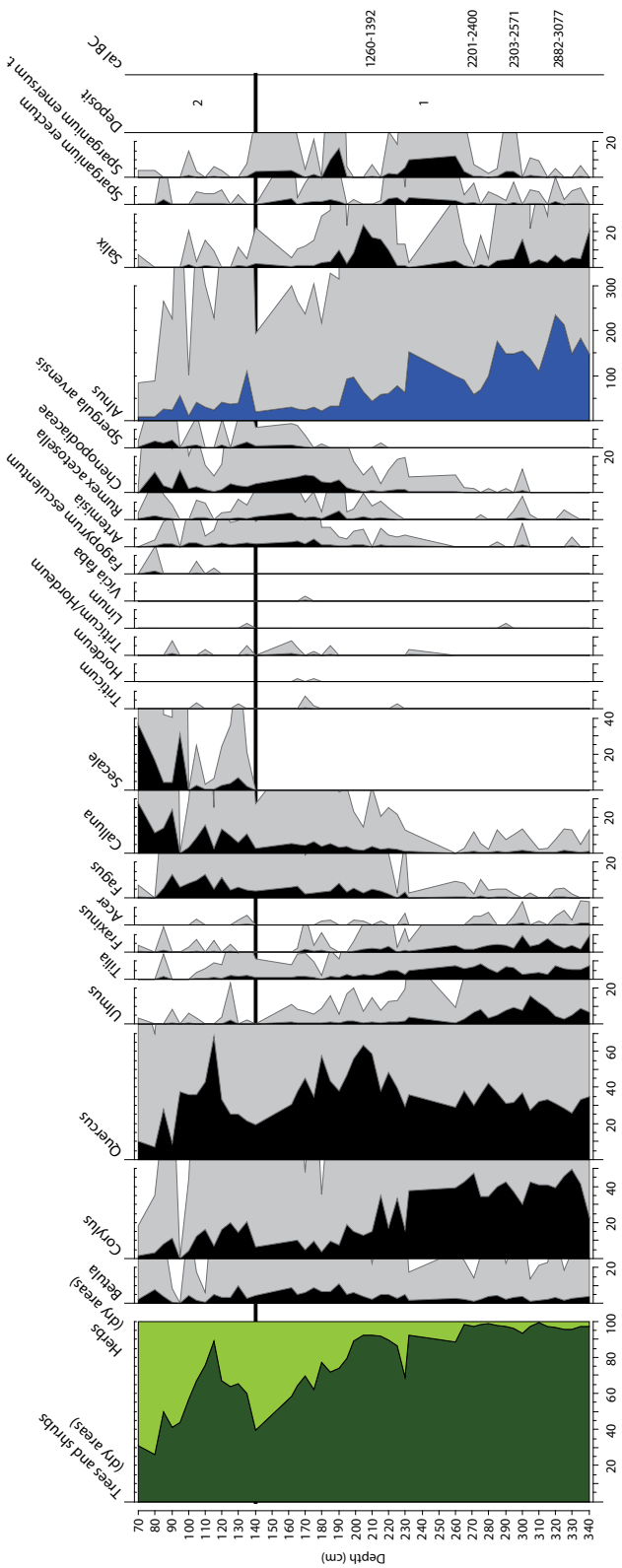

Figure 7 The pollen diagram from Oss 45E/346, a selection of taxa; in grey the curves 5x; the black line shows the hiatus in deposition (after Bakels 2014 figure 4)

Halfway through the diagram the number of herbs starts to increase. In addition, somewhere between 2400 and 1350 BC, on a level that unfortunately could not be more accurately dated due to the absence of suitable material, a new tree species, beech (*Fagus*), appeared in the landscape. The low numbers of beech pollen from before that time may have come from elsewhere, even from very far away. Other species of trees growing in dry areas declined in number, with the exception of oak and birch. In the valley of the Meuse the alder lost ground. Willow and marsh plants, again represented by bur-reed in figure 7, replaced them. The appearance of beech is a natural process, but the rest of the developments in this period are attributable to farming people. Pollen grains of wheat (*Triticum*, in this time almost certainly emmer wheat), barley (*Hordeum*) and horse bean (*Vicia faba*, here most probably var. *minor*), among other things, indicate human activity. The main developments date to the Bronze Age, but the beginning of the changes in tree growth and the first advance of herbs, may be attributed to prior habitation. Pollen grains from the cultivated crops barley or wheat (*Hordeum/Triticum*) and flax (*Linum usitatissimum*), present at deeper levels in the diagram, are among the arguments in favour of this. Like Herpen-Wilgendaal, the diagram Oss 45E/346 shows a gap in the Late Bronze Age (after 1100 BC).

4.3 Fulltime agricultural communities

The continuation of the vegetation construction is based on pollen from old soils under burial mounds, found immediately to the south of the Maaskant. These barrows were built in existing open spaces, not specially cleared for the occasion (Doorenbosch 2013). These are the open areas that were indicated by the increase in the number of herb pollen in diagram Oss 45E/346. Already in case of the oldest studied mounds, those from the Early and Middle Bronze Age, those places were mainly covered with heather. Their size is difficult to determine because the old soils mainly contain pollen from the strictly local vegetation smothered by barrow construction. But the mounds were also made up of heath sods and with some calculation it can be said that they represent heathlands at least half a hectare in size. Mounds from the Late Bronze Age and Early Iron Age show the same (fig. 8). The burial mound complexes of Oss-Vorstengraf and Oss-Zevenbergen show that one and the same heathland could remain in use from the Middle Bronze Age up to and including the Early Iron Age. The heathland thus remained heathland for centuries and that means that it was maintained by man. The possible techniques for this are sod-cutting, burning or grazing. The construction of the burial mounds already demonstrates sod-cutting was used. In addition, the samples for pollen analysis often contain very small pieces of charcoal, which may indicate that burning

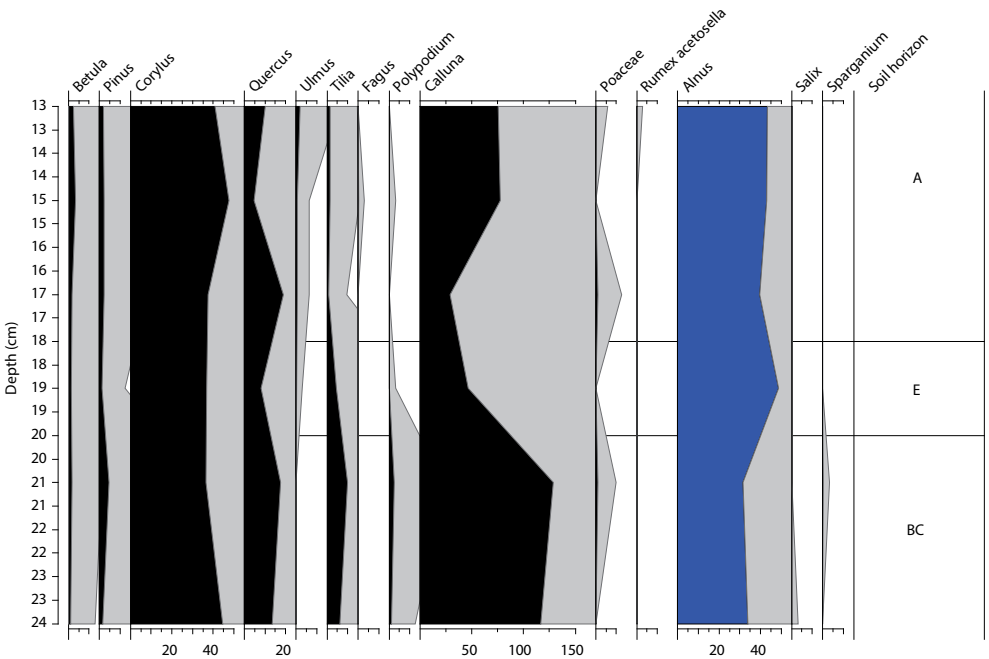

Figure 8 The pollen diagram of the soil under Oss-Zevenbergen Mound 7, a selection of taxa; in grey the curves 10x (after Bakels 2014 figure 5)

was practiced as well. However, grazing by livestock is probably the most important factor. Because the old surface under the oldest burial mounds already shows the presence of heath, the heathlands have to date from before the Middle Bronze Age. They may have been there already in the Late Neolithic. The first sand drifts in the area also date from the Late Neolithic, as can be seen for example at Oss-Zevenbergen (Fokkens *et al.* 2009).

In addition to the heather, there was still forest present, consisting mainly of oak with some elm, lime, ash and birch, with lime increasingly replaced by beech in the Late Bronze Age. Hazel grew along the edges of the forest. It is difficult to determine whether the landscape was made up of woods with large clearances with heather, or whether it was a mosaic of heathland and small forests. There must have been arable fields somewhere, but it is not clear where they were situated.

The wetter areas in this period were still covered with alder carr, although the pollen diagram Oss 45E/346 shows that this forest also suffered from human activity.

For the vegetation history of the Late Bronze Age – Early Iron Age, or the Late Subboreal early Sub-Atlantic, we have at our disposal not only the burial mounds but also the youngest pollen-containing deposit of Herpen-Wilgendaal, the material from after the hiatus (fig. 6, deposition 2). At that time the former gully was an open pond that slowly filled up with humus-rich sand. The diagram shows the extensive deforestation of the surrounding area. Only the oak tree still plays a significant role and beech was on the rise. Pollen of wheat, barley and flax indicate arable crops in the vicinity. Sheep's sorrel (*Rumex acetosella*), goosefoot (Chenopodiaceae), corn spurrey (*Spergula arvensis*) and heather account for a significant proportion of herb pollen, all of which is related to human influence. The pond was eventually filled with wind-blown sand, which is also related to human activity.

From the Maaskant, information from the subsequent centuries is lacking, except for one spectrum from Lith that demonstrates man's lasting influence (Bunnik 2010). However, on the basis of information obtained elsewhere in North Brabant and the Rijk van Nijmegen, we can assume that deforestation continued, also in the lower areas (Van Beurden 2002; Teunissen 1988).

4.4 The Roman Period

The story is continued by the fill of ditches that were constructed around Roman burial monuments in Oss-Ussen. They date from the 2nd century AD. The pollen from these ditches is dominated by alder, hazel, heather and grass. This means that there was still alder in the valley of the Meuse, but that the forest on the higher grounds had largely changed into coppice with a lot of hazel. The heathlands are clearly still present and there was grass in the open areas where no heather was growing. That grass may, of course, have dominated the cemetery itself. Most of the pollen will have come from the immediate vicinity of the graves. This certainly applies to pollen from either corn or long-headed poppy (*Papaver rhoeas* or *P. dubium*) found in considerable numbers. Poppies grow well on reworked soil and the cemetery of Oss-Ussen may have been coloured red by it at times. But, as said, the scope of a vegetation reconstruction based on the contents of ditches is limited and says something about the site itself, but possibly little to nothing about the wider surroundings.

4.5 The late Roman Period (and the Middle Ages)

History is continued by pollen from the sediments at the bottom of the Ossermeer, an old branch of the river Meuse (fig. 9). Sampling was carried out at the western end of this still existing lake. Although the age of these deposits was not determined by ^{14}C-dating, it is clear from the pollen analysis that the old course started to fill from the 3rd century onwards (De Haan 2009; Bakels 2014). During this period the last remains of the alder carrs were cut down. Meadows and hay fields with a wealth of flowering herbs replaced them. The forest continues to deteriorate in the higher areas. Only oak trees were apparently spared and perhaps partly used as oak coppice. Traces of arable farming are abundant. The diagram shows the beginning of rye cultivation (*Secale cereale*). Rye only gained significance in the southern part of the Netherlands when Germanic tribes arrived, first as part of the Roman army and later on their own initiative (Lauwerier *et al.* 1998-1999). The emergence of rye as a main crop dates back to the early Middle Ages. An even later arrival is a well-known field weed, the cornflower (*Centaurea cyanus*). This plant has only been present en masse in our fields since the full Middle Ages (Bakels 2012). The upper fill of the other abandoned branch, Oss 45E/346, the filling after the hiatus (fig. 7, deposition 2), also originates from the full Middle Ages and shows exactly the same results.

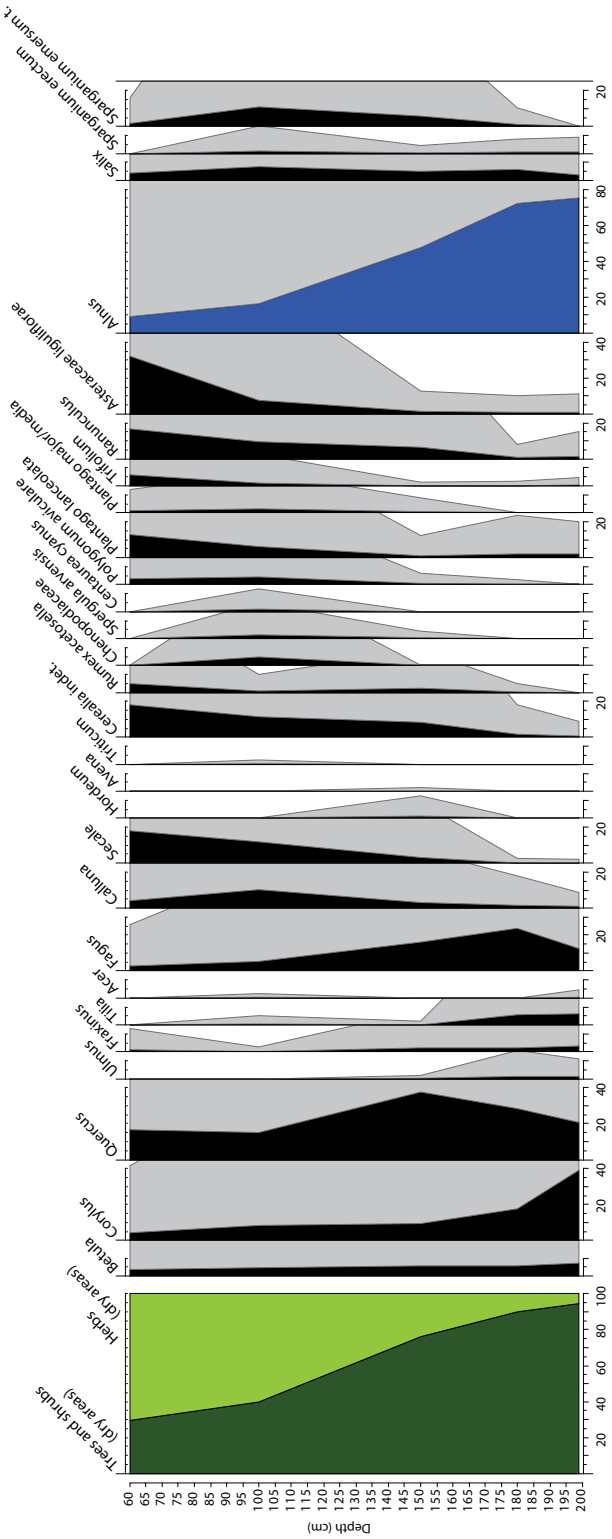

Figure 9 The pollen diagram of Ossermeer, a selection of taxa; in grey the curves 10x (after Bakels 2014 figure 8)

4.6 A changing and varied living environment

From a *longue durée* perspective, the Maaskant forms a strongly changing landscape. This peculiar contact zone' of sand and clay formed an ideal living environment for Late Prehistoric and native Roman agricultural communities, judging by the amount of sites. The diversity of the landscape was an attractive feature rather than a hindrance.

5 Occupation history of the Maaskant and adjacent sandy soils[10]

Central in our narrative are the general dia-chronical developments of the occupation history of local agricultural communities living between about 3000 BC and 250 AD in the Maaskant. We consider a local community a group of people who lived together in an area, who buried their dead in the same cemetery and revered the same ancestors (Gerritsen 2003, 111-113; Fokkens 1996). These communities will have had a strong bond with the environment they (daily) lived in. That environment consisted of places that were meaningful to the identity of a community implying a reciprocal and historically grounded relationship between community and landscape (Gerritsen 2003, 113). An important question in this respect is how people used and organised their living environment, and how this changed over time?

C. 4200-2000 BC: the first farmers?

It is difficult to determine *when* farming and husbandry as basis for existence was introduced in the research area. The footprint of Mesolithic and Early Neolithic hunter-gatherers as well as the earliest (partly) agricultural communities is very modest. The oldest excavated site (Haren-Groenstraat) dates from the beginning of the Late Neolithic and is located on the flank of a river dune. A small concentration of ceramics, flint tools and flakes and a handful pig bones indicates a short-term occupation during the Stein/Vlaardingen period, approximately 3400-2900 BC (Knippenberg 2014, 74-76). The location of the site fits the broad-spectrum subsistence economy that is presumed for this period. Finds from this period are also known from the sites Herpen-Putwielen and Berghem-Waatselaar but both have hardly been excavated (Jansen *et al.* 2014) (fig. 10). Both sites are also situated in a transition zone in the landscape.

Sites from the last phase of the Neolithic are also scarce. In Macharen-Dorp, in the middle of a Pleistocene sand dune, a number of post holes with Late Neolithic Bell Beaker pottery has come to light

Figure 10 Pot from the Stein/Vlaardingen period found at Herpen-Putwielen (© L. Mulkens)

(De Leeuwe 2014). In Herpen-Wilgendaal, a number of sharpened flint axes and Bell Beaker as well as pot beaker was were found in the filling of a brook from the Middle and/or Late Neolithic (Ball 2014). Finally, sherds from the Late Neolithic and the Early Bronze Age have been collected at various locations between Oss-Frankenbeemdweg and the Hertogswetering, in a clayey area directly north of the sandy soils (Jansen and Smits 2014; Jansen *et al.* 1999).

Thus in the course of the 3rd millennium BC there were communities in the Maaskant that – in addition to hunting and collecting – also farmed crops and livestock part-time. The question of whether this concerns newcomers or that local communities gradually embraced an agricultural subsistence economy on their own initiative cannot be answered. It is no coincidence that sites from this period are concentrated on the flanks of higher sand dunes and levees and in particular in the transition zone from the (higher) sandy soils to the river area (fig. 11). From these gradient zones the prehistoric inhabitants could easily exploit the heterogeneous landscape of the Maaskant with its strong ecological diversity, making optimal use of the natural environment.

The relatively homogeneous sandy landscape offered less favourable conditions from this point of

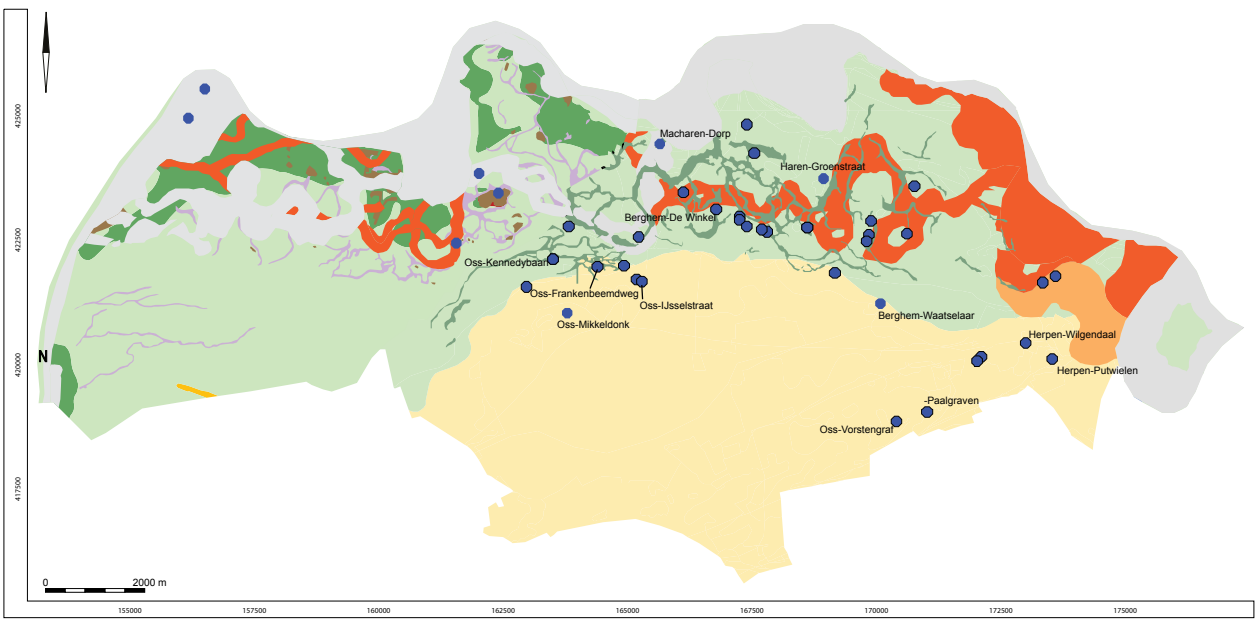

Figure 11 Distribution of the maim sites from the (Middle and Late) Neolithic period in the Maaskant (after Botman and Van der A 2009 figure 4.1)

view. It was apparently not attractive to communities that had not yet fully converted to farming. Only a handful of pits with finds from the Late Neolithic and/or Early Bronze Age are known from the sandy soils, spread over an excavated area of dozens of hectares (Fokkens in prep. b; Jansen and Arnoldussen 2007).

5.2 C. 2000-800 BC: farmers on clay and sandy soils

In the Early and probably also the first part of the Middle Bronze Age the same locations were prefered as in earlier periods (fig. 12). The amount of sites is still limited. This changed in the course of the Middle Bronze Age. From around *c.* 1500 BC onwards, the number of sites slowly increased, a development that occurred in large parts of the river area (*e.g.* Arnoldussen 2008, 387), whereby sites are also being found along fossil Meuse streams and creeks. Several (settlement) sites are known through surface finds like Oss-Ossermeer and -Paalakker. At the same time, we see the first clear reclamation of the sandy soils. From the transition from the Early to the Middle Bronze Age, the first wells and pits and later also houseplans occur here, increasing from the 16th century BC onwards (Fokkens in prep. a; Jansen and Arnoldussen 2007). The earliest houseplan date from the 15th-14th century and was found at Oss-De Geer (Jansen and Van Hoof 2003, 111-114). Later plans, dating in the 12th-11th century BC, were found at Oss-Mikkeldonk (Fokkens in prep. b) (fig. 12).

The oldest, unquestionable house plan found in the Maaskant also dates from the later Middle Bronze Age. At a small excavation in Deursen, on the flank of a river dune, the plan of a Bronze Age farm was found. Around the floor plan there were several pits with pottery from this period (Van de Glind in prep.).

In the Late Bronze Age, the number of sites in the Maaskant as well as on the sandy soils seemed to decline. This seems to be characteristic for large parts of the river area (*e.g.* Arnoldussen 2008, 410). The general idea is that (local) changes in the landscape led to a contraction of occupation instead of a population decline but also the visibility of sites forms a factor (Arnoldussen 2008, 413-415; Fokkens in prep. b).[11]

In general the later part of the Bronze Age is characterised by the first indications of human interven-

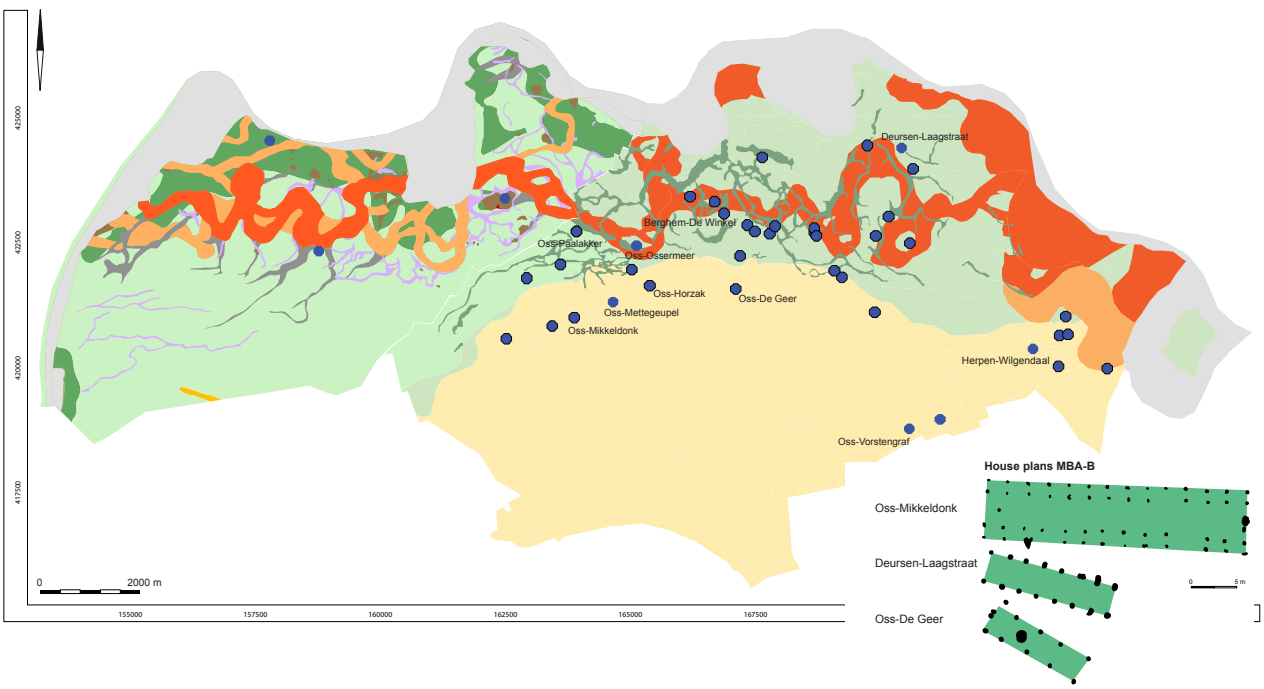

Figure 12 Distribution of the main sites from the Bronze Age in the Maaskant (after Botman and Van der A 2009 figure 4.3). Inset: Middle Bronze Age B house plans from three different sites in the Maaskant (after Fokkens in prep. a; Van de Glind in prep.; Jansen and Van Hoof 2003 figure 6.2)

tions in the landscape. The result of this pre-modern deforestation is the emergence of open spaces in the still vast forest area. Finally it is noticeable that the Middle and Late Bronze Age agricultural occupation is still concentrated on the edge of the coversand ridge, not far from the 'familiar' river area from where the reclamation of the sandy soils began.

5.3 C. 800-12 BC: strong increase in occupation

From the Iron Age onwards, the number of sites increased significantly, in both areas. Locations remained inhabited, but at the same time new locations were occupied. Various sites in the Maaskant were excavated in a fragmentary manner: settlements in Onze-Lieve-Vrouwenberg (Stikkelorum 2017) (fig. 13), Overlangel-Asboom (Van der Linde 2014), Herpen-Wilgendaal (Ball 2014), Berghem-Lallenberg (Beex 1955) and Maren-Kessel-Liesdaal (Van Kampen 2014), a cemetery in Haren-Groenstraat (Knippenberg 2014), a waste dump in Herpen-Hertogswetering (Van Wijk *et al.* 2004) and an activity area nearby Lith-Oijensche Hut (Jansen *et al.* 2002, 26)(fig. 3). One site stands out for the amount of (extraordinary) find material. Kessel, situated where the rivers Meuse and Waal closely flowed together (and possibly even were connected with each other), is interpreted as a Late Iron Age regional centre and cult place (Heeren 2014, 260-261; Roymans 2004, 133-134). Late Iron Age cult places are also found in Haren(-Spaanse Steeg) and Lith(-Oijensche Hut) (Jansen and Jacques 2014; Jacques 2014). In all cases findmateriaal – ceramics, animal and human bone material, glass and metal objects – were found in a filled-in channel of the Meuse (fig. 14). Maybe these river cult places were the counterpart of the rectangular cult sites found on the sandy soils?

Considering the distribution of the sites it is striking that the transition zone from sand to clay, including the utmost flanks of the coversand ridge,

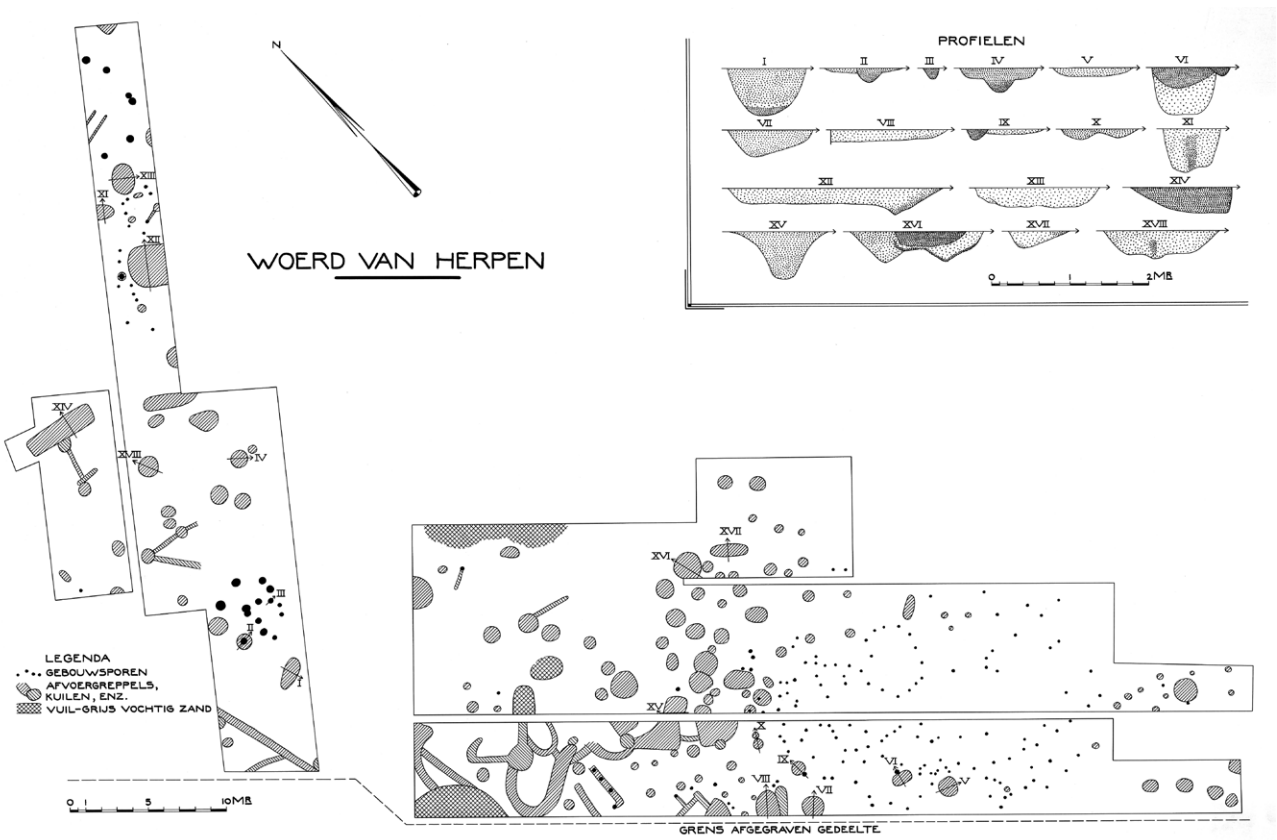

Figure 13 One of the few (partly) excavated Iron Age settlements in the Maaskant area was already researched in 1939. Sand extraction at the Onze-Lieve Vrouwenberg was reason for an excavation by the Museum of Antiquities in Leiden. The cluster of postholes and larger pits closely resemblance the Iron Age settlements on the sand (© RMO Leiden)

Figure 14 At the Late Iron Age cult site Lith-Oijensche Hut ceramics, animal bones, glass and metal objects, like this iron spearhead, were deposited in the edge of a then active course of the river Meuse (© H. Fokkens)

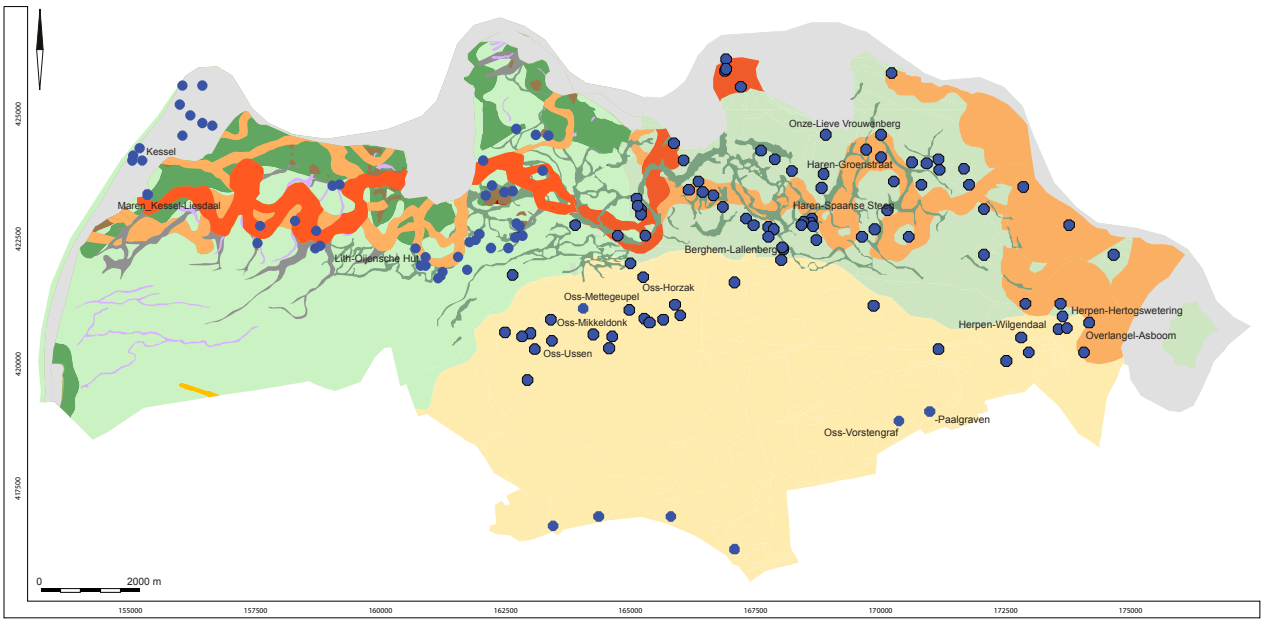

Figure 15 Distribution of the main sites from the Iron Age in the Maaskant (after Botman and Van der A 2009 figure 4.6).

were no longer inhabited. In the clay area the Iron Age sites are situated at almost all relatively higher lying zones: (Pleistocene) sand dunes, crevasses and channel belts (levees) (fig. 15). It's difficult to get a clear view of the settlement pattern. The ribbon development that emerges from the excavation Overlangel-Asboom suggests however clear that the settlement dynamics are (more) strongly determined by the landscape conditions (Van der Linde 2014, 163).

Contemporaneously, the still largely unreclaimed coversand ridge started to be exploited extensively. Here, extensive settlements from the different phases of the Iron Age have been excavated (*e.g.* Schinkel 1998; Fokkens *et al.* in prep. a). Settlement areas show a more far-reaching structuring of the environment. Farmers start to structure their environment, which at the end of the Iron Age results in enclosed yards and settlements.

Still the full-time Iron Age farming communities kept within a relatively short distance of the clay soils. Several large-scale exploratory researches on the coversand ridge further away from the Meuse yielded no indications for Iron Age and/or Roman Period occupation whatsoever (Jansen in prep.). So we not only have insight into where agricultural communities from the Iron Age and Roman Period lived, but also where they consciously did *not* live; not far from the river in this case.

5.4 C. 12 BC till 450 AD: structured landscapes

The distribution of sites from the first centuries AD is very similar to the distribution of sites from the Iron Age (fig. 16). For the the Maaskant as a whole we presume occupation continuity during the Iron Age and Roman Period although it is often difficult to demonstrate continuity for the individual sites. The latter is caused to a large extent by the fact that excavations of sites from this period are scarce; most sites with surface finds can, on the basis of the find material, be referred to as native Roman Period settlements. These sites – like Lithoijen-Lange Maaijen, Teeffelen-De Honing, Berghem-de Winkel and Berghem-Hoge Tussenrijten – are characterised by large numbers of finds, the dating of which indicates an intensive occupation of each site over a longer period of time (*e.g.* Louwen *et al* 2014, 185). At one location we may be dealing with stone constructions and/or a villa site based on the found building materials and the results of a geophysical survey (Macharen-De Hoge Morgen: Verschoof *et al.* 2014, 275-280).

The only excavated Roman Period feature concerns a burial monument at Berghem-Lallenberg (Beex 1955). This contrasts strongly with the sandy soils where eleven settlements, including two cemeteries (Oss-Ussen and -Horzak), cult sites (*e.g.* Oss-

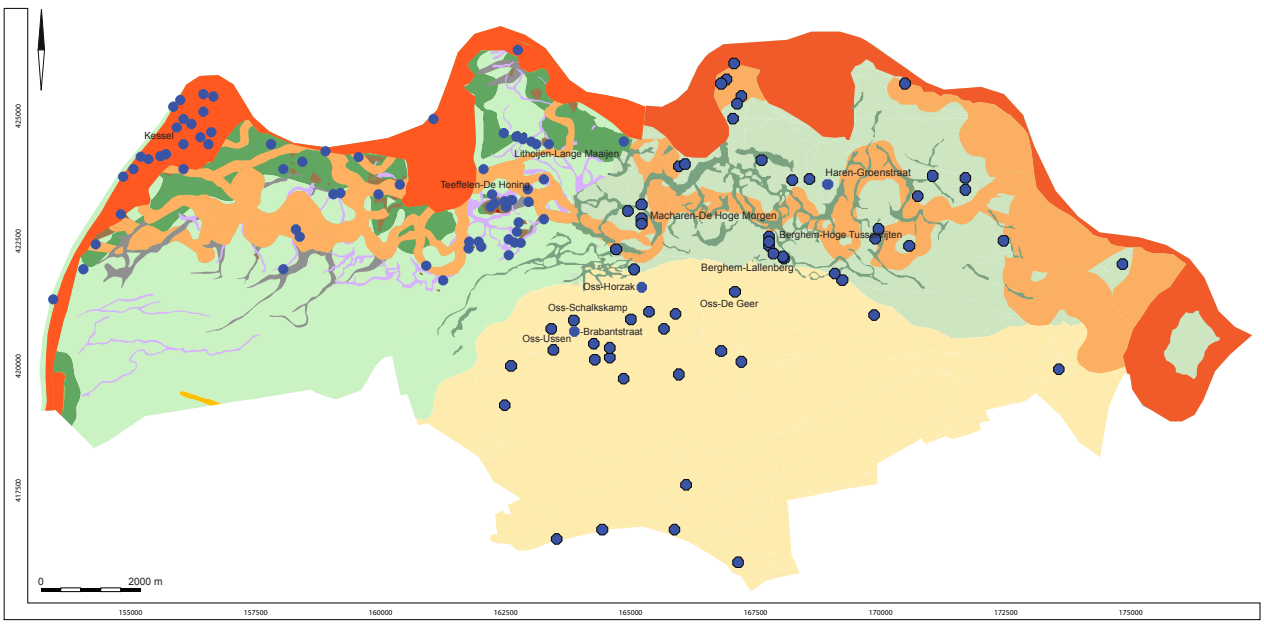

Figure 16 Distribution of sites from the various phases of the Roman Period in the Maaskant (after Botman and Van der A 2009 figure 4.9)

Brabantstraat) and a field system from the first two centuries AD have been (partially) excavated. Due to the scale of the research – tens of hectares were investigated here – it is possible to establish that the environment around and between the settlements was structured on a large scale by means of ditches (Jansen and Van As 2012). The difference between the different settlements also suggests a hierarchic organisation with smaller satellite sites structured 'around' a central site. Examples of the latter are the settlements Oss-Horzak and -Westerveld (in Ussen), both of which are surrounded by a square ditch system (Jansen and Fokkens 2010). It is not possible to determine whether the landscape in the Maaskant was also designed on such a large scale and with such a high degree of planning. The number of sites only indicates that the area was intensively inhabited. Based on the material culture a handfull of possible central sites only can be presumed. Illustrative perhaps is the research carried out at Wijk bij Duurstede in the river area of the Kromme Rijn, where the landscape also was subdivided on a large scale in the Roman Period (Vos 2009, 109-116).

In the course of the 3rd century AD, the population density on the sandy soils decreased sharply. A number of wells are the only evidence for occupation in the 3rd and 4th centuries (Jansen and Van As 2012). From the following centuries there are no indications at all. The number of sites in the Maaskant area also declines, although it seems to be less drastic. Ceramics and coins from the Late Roman Period, the 3rd to 5th centuries, have been found at various sites. Some of them were already inhabited in the Iron Age and/or Roman Period, but it is not possible to determine whether there was continuity at site level. A continuity of occupation for the whole Maaskant is however plausible, even though there is clearly a decrease in the number of sites. The latter applies not only to the sandy soils, but also to large parts of the southern Netherlands (Heeren 2005; Verwers 1998, 315-316).

The very modest occupation on the sandy soils and the more flourishing occupation in the Maaskant may be explained by political and military changes.

Figure 17 The site Kessel, situated at the 'junction' of Meuse and Waal, probably was a regional economic and religious centre in the Late Iron Age. This was strengthened in the Roman Period when a small Roman 'town' lay here (© G. van Alphen)

In the Late Roman Period, the civil character of the Meuse changed radically with the establishment of military reinforcements, among others at Kessel (fig. 17). In these centuries the Meuse plays a role in the (in depth) defence system of the northwest (Rhine) border of the Roman Empire (Roymans 2004, 127 note 349). Therefore, occupation of the hinterland – the Maaskant – was probably important.

6 Living near the Meuse (fig. 18)

From the beginning of the 3rd millennium BC onwards, the Maaskant was inhabited and exploited by communities whose basis for existence can be defined as a flexible extended farming economy. In addition to arable and livestock farming, hunting and gathering were also part of their livelihoods (Fokkens *et al.* 2017, 294-297). Sites from this period are mainly found on Pleistocene (river) dunes, relicts of a braiding river system that still protrude (just) above the Holocene clay deposits. They used the arable land on the dune, the grasslands in the flood plains and exploited the valley environment through fishing, fowling and hunting. The landscape is dominated by deciduous forests including oak, lime, elm, birch and ash, and alder carr in wet areas. In the first part of the Bronze Age the situation didn't differ that much.

During the later Bronze Age we see the occupation slowly 'expanding' to the sand ridge where deciduous forests interspersed with heathland. From at least 1800 BC onwards, both areas were inhabited. The early agricultural communities in the Maaskant region ultimately formed the seedbed for the 'colonisation' of the adjacent sandy soils whereby it is striking that in particular the flanks remain favoured for habitation, also on the sandy soils. Bronze Age farming communities still chose settlement locations that enabled them to exploit a diverse environment to the full extent; not only farming but also still hunting and fishing (Van Amerongen 2015, ch. 8; Fokkens in prep. a). Locational preferences thus did not change that much compared to earlier periods. With the gradually growing population density, except for the Late Bronze Age, we see the first clear indications of deforestation, both on the sand ridge as well as in the flood valley of the Meuse. More and larger open area's emerge in the landscape as a result of the localization of farming communities and their need of space.

From the beginning of the Iron Age, population density increased even more, as did the size of the occupied area. Farming had become the main source of existence giving the inhabitants the opportunity to settle in (almost) all environments. The large-scale excavations on the sandy soils show a discontinuous settled landscape wherein small groups of farms lie in a forested area. In the course of the Iron Age some of the yards and settlements were visibly demarcated through ditches. In general, the occupation on the sandy soils is still situated just beyond the flood plain, generally close to the Meuse, especially when we realize that in Late Prehistory and the Roman Period its river channels were closer by then now. The modest scale of research makes it difficult to get a clear picture of the Iron Age occupation in the Maaskant besides that the occupation dynamics are more determined by the landscape conditions compared to the extended sandy soils.

In accordance with the Iron Age the first part of the Roman Period both areas were intensively inhabited. For the sandy soils the structured settlement and landscape layout implies some kind of 'central planning' including a site hierarchy (Fokkens in prep. a; Jansen and Van As 2012; Jansen and Fokkens 2010). The landscape changed drastically into a much more open environment with forests at a distance. Changes are (also) the result of human intervention and subsequent events: forest clearing, drift sands and the expansion of heathland.

Broadly speaking, we can state that the Late Prehistoric and Roman Period occupation of the Maaskant is concentrated along active river channels or channel belts, Pleistocene sand dunes and crevasse deposits (a.o. Ball and Schiltmans 1998). The inhabitants of the Maaskant constantly had to take into account the ambiguous character of the river Meuse, which dominated the landscape in which they lived. On the adjacent sand ridge, occupation concentrated on the flanks, just beyond the sphere of influence of the river.

In both environments people kept returning to previously inhabited places. Specific locations were regularly (re)occupied for shorter or longer periods of time – one or more generations – and with shorter or longer intervals (*persistent places*). At the end of the Iron Age and the Roman Period we can distinguish a long(er) continuity of use and/or a more sustainable use of a place, especially on the sandy soils (Gerritsen 2003, 194-197; for Oss see Schinkel 1998, 174-179; Wesselingh 2000, 195-200) (*permanent places*).

In retrospective, there is a shift from adapting *to the* landscape to adapting *the* landscape. At a certain point in time farmers start to modify their environment. Extensive, limitless landscapes are gradually

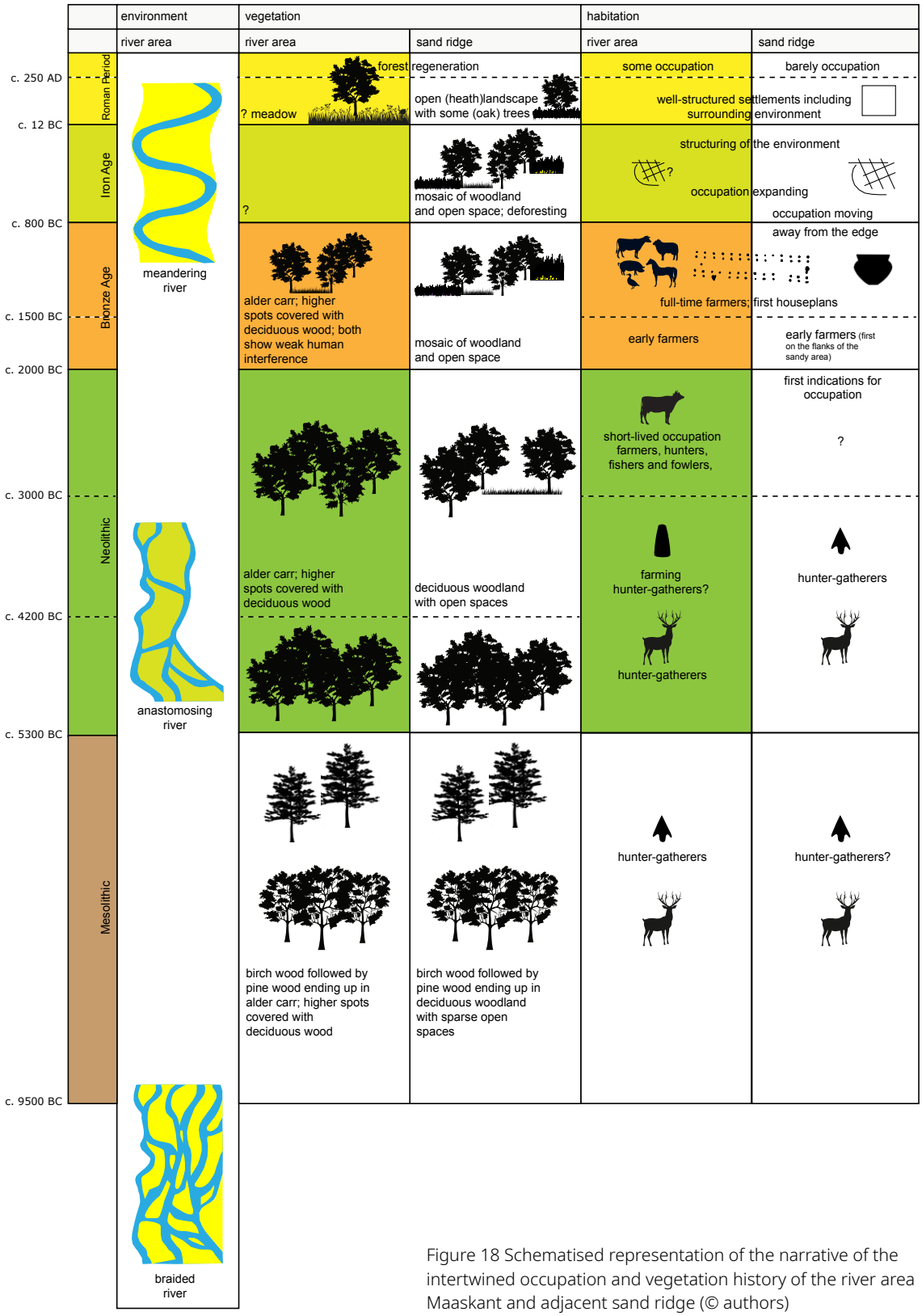

Figure 18 Schematised representation of the narrative of the intertwined occupation and vegetation history of the river area Maaskant and adjacent sand ridge (© authors)

transformed into limited landscapes in which visible boundaries of a yard, settlement and/or parcels of land occur more and more frequent.

The long-term occupation history shows a noticable repetitive pattern. In the Late Neolithic and Bronze Age, the occupation spreads gradually from the Maaskant to the adjacent sandy soils. In Late Roman Period the habitation continued in the river area. A few centuries later, in the Merovingian Period (6th century AD), the population slowly increased again, whereby the sandy soils became inhabited (again). This growth continues up to the present day, with the inhabitants of the sandy soils mainly living in a large city, while the clay area is characterised by dozens of smaller and larger villages and hamlets that follow the meandering of the Meuse more or less like a bead string. The occupation and vegetation history of the river area Maaskant and adjacent sand area of Oss is thus strongly intertwined, despite the fact that living environment is very different. But what can we say about the actual relation(s) between the inhabitants *on* the sand and *on* the clay, especially in the relatively densely populated period between the last centuries BC and the first centuries AD?

7 Clay versus sand – different environments, different identities?

Nowadays there are about twenty larger and smaller villages and hamlets scattered in the Maaskant, on the adjacent sandy soils lie the city Oss and two smaller villages. Both areas have their own identity: village versus city, industry versus agriculture, hustle and bustle versus tranquillity. In addition, people now living *on* the sand are reputed differently from people living *on* the clay.

Was that also the case in the past? Can we say something at all about the relationship between the inhabitants of the different areas through time, are there differences to be seen and does the environment play a role in this?[12] The landscape is an important factor in the 'identity' of communities especially for the (pre)historic (agricultural) communities that were closely bonded with their environment. A landscape has a history and evokes memories; it sets the mind as to say (Kolen 1999, 271; 284)?

It's clear that the daily environment of the inhabitants of the Maaskant and the inhabitants of the sandy soils differs. On the one hand a varying, heterogeneous clay landscape and on the other hand a homogeneous, hardly altered sand landscape. Each environment posed its own demands.

However, if we look at what we can observe, the material culture, the subsistence economic basis, house plans and land use, there are hardly any differences. Distinctions seem to be gradual rather than fundamental. It strongly appears that the immediate surroundings had relatively little influence, especially on the full-time agricultural Late Prehistoric and subsequent communities. The economic basis for existence was developed in such a way that it met the requirements of both the dynamic and fertile river landscape and the vast and less fertile sandscape. This flexible and pragmatic approach to different (and changing) living environments can be seen as an important characteristic of agricultural communities.

Despite the difference in landscape characteristics and although archaeological reality strongly determines our perception the differences between the inhabitants – the farmers that lived here around the beginning of the era – seem limited. They were closely interrelated and both strongly oriented towards – and even dependent on – the river Meuse. She formed an essential element for the inhabitants of both areas and bridged their local 'small' worlds with the 'big' world beyond. Sand and clay flow seamlessly into one another, together with the inhabitants living *on* the sand and *on* the clay. Maybe people living close to the river were referred to as people from the clay and vise versa but in general they live each within different environments.

Epilogue: a local community in a big world

This *small narrative* is a result of the regional Maaskant-project of which Harry Fokkens was the scientific director for three decades. Such evidence-based narratives about the deep past of local communities form essential 'building blocks' for our *grand narratives* about the prehistoric world that stretched out far beyond the environment in which local late prehistoric and Early Roman Period communities daily lived and worked. We hope that the small world narrated above contributes to our understanding of the big world it was part of. Both aspects are important in Harry's work.

Notes

1 This contribution is based on a series of articles published earlier in a Dutch book about the Maaskant (a.o. Bakels 2014; Jansen 2014b). The text is translated by Sasja van der Vaart-Verschoof.
2 See also the editorial in this book.
3 This is due to the fact that most of the research took place within the framework of the urban expansions of Oss, which are limited to the sandy soils.
4 The Haren-Spaanse Steeg site was investigated in 1962, 1972 and 1999: see Jansen and Jacques 2014; Jacques 2014; Jansen *et al.* 2002.
5 Title of this section after Wink 2009.
6 This section is based on Wink *et al.* 2014.
7 The mapping is based on coring data, lidar images and sedimentological and geomorphological principles, the dating is based on 14C, archaeological sites, historical sources and maps and geological cross-cutting principles.
8 On the map of Van Diepen, the river dunes are indicated as old residential areas. Current villages such as Haren, Teeffelen, Deursen and Dennenburg are situated on such a river dune. Archaeological finds are regularly found in the centres of these villages (Dutch: *dorpen*).
9 This paragraph is an edited translation of an article published earlier in Dutch (Bakels 2014).
10 This paragraph is an edited translation of an article published earlier in Dutch (Jansen 2014b).
11 Among other things, the recognizability of the Late Bronze Pottery plays a role in this, but also the character of the settlements in that period: these left far less clear traces than settlements from the previous Middle Bronze Age (B).
12 It is important to realise that we are dealing with sites whose conservation differs greatly due to tafonomic and (post)depositional processes, which are closely related to the landscape context.

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Metal surprises from an Iron Age cemetery in Nijmegen-Noord

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A large horse-bit from a pit, two neck rings and other ornaments from a cremation burial, as well as iron fittings of a scabbard without a weapon from another burial, are the most appealing metal finds from a cemetery in the expansion area of the municipality of Nijmegen. Among other things, they deserve attention because of the changed insight into the gender of the wearer of the ornaments from the 6th century BC. The empty scabbard from the 5th century BC serves as a metaphor for the character of the communities in the Betuwe compared to those on the higher grounds in the Rijk van Nijmegen.

1 Introduction

The acquisition of land north of the river Waal by the municipality of Nijmegen towards the end of the last decade of the last century (fig. 1), prompted intense archaeological research in this part of the Betuwe region. The prospecting, exploratory trenches and open-plan excavations related to the Waalsprong development project have already brought to light many remarkable features concerning the prehistory of the Nijmegen-Noord district.[1] Among these features is an extensive cemetery from the Early and Middle Iron Age in the northeast of the area that is traditionally known as Zuiderveld. In this paper we draw attention to some special metal finds recovered from this cemetery. Although these finds have already appeared in the reports (Van den Broeke *et al.* 2010; Eimermann and Van den Broeke 2017), they deserve wider and renewed attention. Firstly, because of their special character, viewed from the Northwest European perspective. In the second place, some of the recovered ornaments raise unexpected questions about the sex of the deceased. We start our paper, however, with a horse-bit for the following reasons: the few horse-bits we know of from the Iron Age of the Netherlands come from elite burials, among them that of the 'chieftain' of Oss, and it is Oss with which our honored colleague Harry Fokkens has long had a close relationship, a relationship that the first author of this piece (PWvdB) also shares (see Van der Sanden and Van den Broeke 1987; Van den Broeke 2012). The second author (EE) owes to Oss his choice to study in the Metal Ages on the occasion of the annual Leiden field course in 1998 (Oss-Horzak), and specifically to the inspired guided tour given at the site of the chieftain's grave.

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2 The cemetery

The site was discovered during the course of the nineties of the previous century by augering and fieldwalking (Heunks 2002, findspot 61). The augering produced the first cremation remains. It was only in 2006, when fieldwork was carried out in connection with the construction of a roadside ditch on the west side of the site (fig. 2; project Zv10), that it became clear that this site comprised of diverse struc-

Figure 1 Location of the site within Nijmegen and the Netherlands

tures from several periods (Ball and Daniël 2010a). We learned from more extensive exploratory trenches carried out in 2015 (project Zn3) that the cemetery from the Early and Middle Iron Age is the largest complex in this plot (Eimermann and Van den Broeke 2017). Despite the terrain, which like the rest of the Betuwe area has been formed by fluvial deposits, only a few decimetres of sediment have been deposited since the Iron Age on the burial pits. As a corollary of centuries of agricultural activity at the site, the pits have been disturbed to a greater or lesser degree.

Taken along with some small-scale exploratory trenching on the southeast side of the site, it is now clear that the site had an earliest use phase set in the (Early and) Middle Bronze Age. Some settlement refuse was then deposited, spread over an elongated depression created by fluvial activity, demarcating a zone where the eastern boundary of the cemetery was located in the Middle Iron Age.

Younger settlement traces consist of a cluster of pits from the Late Bronze Age and some smaller features from the Early Iron Age. They have all been found in the western margin of the site. In a relatively narrow trench six burials were discovered as well. Two of them turned out to be inhumation burials (fig. 2, graves no. 1 and 2). The remaining four were cremation burials. During the 2015 exploratory trenching project only cremation burials came to light. Thus far 33 cremation burials and two inhumation burials have been recovered. A single cremation burial – the only one that certainly comprised an urn – has been dated on the basis of two ^{14}C-dates from cremated bone to the 11th/10th century BC, the beginning of the Late Bronze Age (grave no. 27).

The majority of the burials originate from the second half of the Early Iron Age and from the Middle Iron Age (650-250 BC), based on ^{14}C-dates and grave goods. Until the beginning of the Middle Iron Age (500 BC), it was quite common in the Lower Rhine area to put cremated remains in an urn. Instead, in the Nijmegen-Noord micro-region in the 6th century BC possibly only partial pots (especially pot bases) that had been exposed to cremation fire were used as containers for the ashes (Van den Broeke 2008, fig. 11, Van den Broeke *et al.*, 2011, fig. 4.25). Among the cremation burials from the Early Iron Age in the Zuiderveld, neither variant is represented with certainty. Nor has other pottery, burned or unburned, ended up in the graves from that period. On the other hand, in the cremation grave pits from the beginning of the Middle Iron Age (5th century BC), pottery that previously had been placed on or near the pyre during the cremation

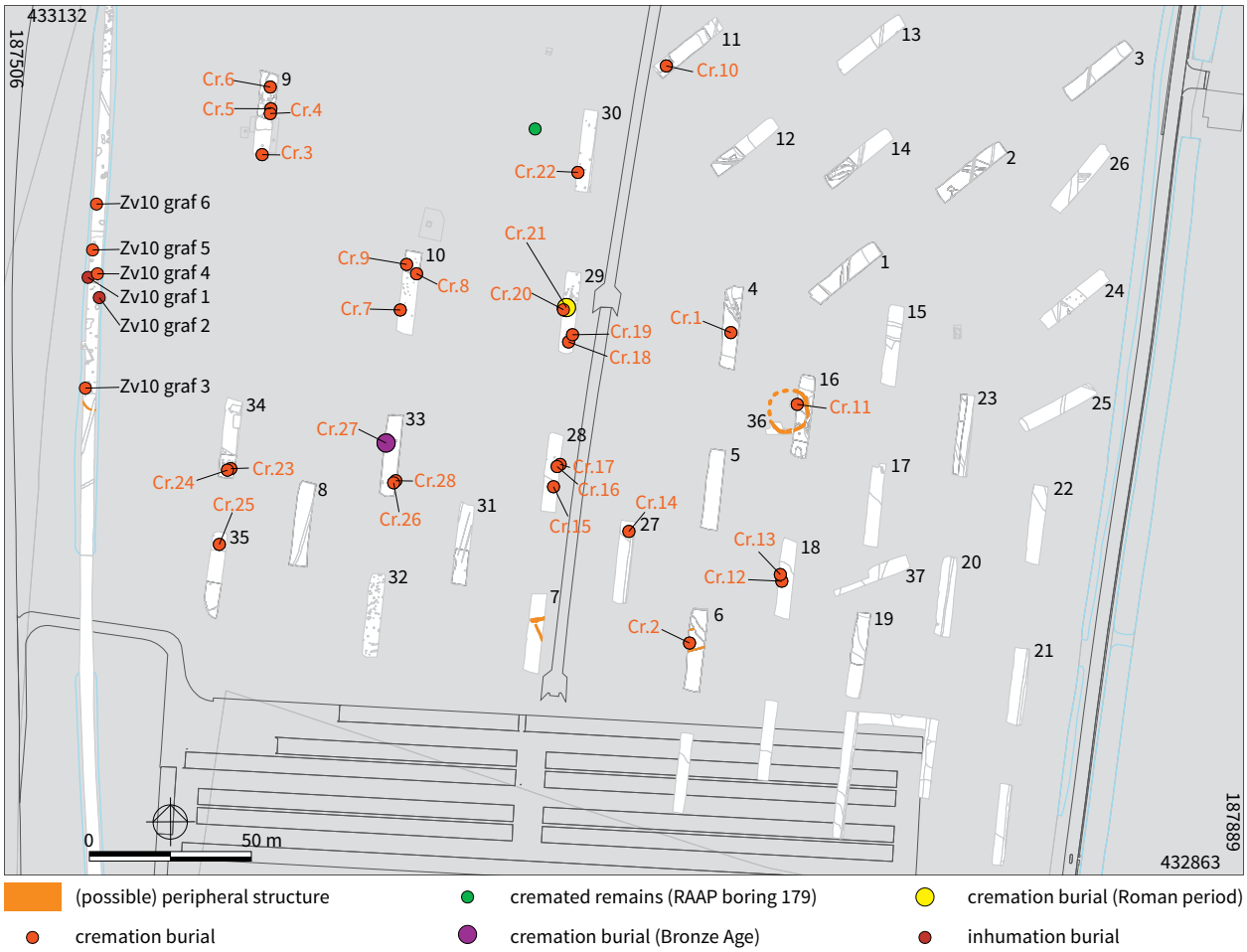

Figure 2 Nijmegen-Zuiderveld. Location and numbering of the burials found in the research area (projects Zn3 and Zv10)

was repeatedly deposited.[2] These graves present the best view of the continuity of use until in the Middle Iron Age, because the pots are mainly recognizable forms of Marne style ware. Grave 22 forms the connecting link with the Early Iron Age, in the shape of a triconical bowl with a date around 500/475-450 BC (fig. 9).

A remarkable number of cemeteries were abandoned to the south of the Rhine in the 5th century BC (Hessing and Kooi 2005, 650). Subsequently new cemeteries developed at other locations, which on average remained much smaller than the earlier cemeteries. In the Zuiderveld cemetery, however, we discern a continuity in the use of the cemetery.

Two cremation burials, each with a fragment of presumably a belt hook, can be regarded as rather late features from both ^{14}C-dating and the finds.[3] One of them, grave no. 11, is the only one with probably a peripheral structure. It is a more or less round ditch, where the placement of grave no. 11 is offset from centre. The fact that only this relatively late grave probably had a peripheral structure fits in with the trend observed for Nijmegen-Noord as a whole: the many burials from the Bronze Age and Iron Age were laid without any peripheral structure, until in the 4th or 3rd century BC (circular) enclosures appear for the first time (Van den Broeke 2006).

With the current data, it appears that the cemetery went out of use before 200 BC. At least four centuries later, in the second half of the 2nd century or the beginning of the 3rd century AD, however, one or more additions had been made. Grave no. 21 contained large

parts of four pieces of burnt Roman pottery, including a *terra sigillata* dish.

One may wonder whether the mourners in the 2nd or 3rd century AD knew that they were not the first here, because it is doubtful whether the graves were still recognizable at that time. Earlier, around the beginning of our era, a settlement had been founded in the western part of the cemetery. This was already apparent during the research in the western margin (Ball and Daniël 2010a). This may indicate that the graves were no longer distinguishable. On the other hand, it is difficult to imagine that there were not even low mounds above the graves.

Because in an area of approximately 60,000 m^2 around 8% has been covered by trenches up to now, we can assume that the 35 burials that have been established represent a cemetery of 350-450 interments, not including supposedly disturbed graves further to the west, in the course of the current main road from Nijmegen to Arnhem (A325). This is the first Iron Age cemetery in the Betuwe that matches the cemeteries (urnfields) with often several hundreds of burials known south and north of this region.[4]

As far as gender and age are concerned, the spectrum of cremation burials looks fairly normal (see Smits 2017, table 5.32). Two burials stand out because of the nature of their grave goods, namely burial no. 8 (par. 4) and burial no. 22 (par. 5). These have been conserved[5] after preparation and sieving.

3 Reflections on a half horse-bit

A special find from the 2006 campaign is a part of a bronze horse-bit, which was the only object in the filling of a small pit (Ball and Daniël 2010a/b). It is half of a single-jointed bit with a bit ring (fig. 3a-b). The ring-shaped ends of the mouthpiece are closed and are at right angles to each other. The one on the joint-side is rather heavily worn, which is evidence of intensive use.[6] Compared to this, the outer ring-shaped end and the bit ring are hardly damaged, contrary to the same parts of two bronze horse-bits from the Early Iron Age wagon-grave of Wijchen (Van der Vaart-Verschoof 2017a, fig. 6.9, 2017b, fig. C35.5). Both parts, the mouthpiece and the bit ring, are cast, and made of leaded bronze (see Van Os in Eimermann and Van den Broeke 2017, 149-150 and appendix 1).

Metal horse-bits in Early Iron Age Europe are made of bronze or iron, but after that period they are only made of iron, like the very similar horse-bit from the elite burial of Overasselt (fig. 4). This bit is dated to La Tène A, *c*. 475/450-400 BC (Swinkels 2011).[7] The bronze bit from the Zuiderveld may be dated in the Early Iron Age, on the basis of its shape, in which the limited size of the bit ring must also be taken into account (*cf*. Kossack 1954, Abb. 16:A1 and 20:B2).

With the Early Iron Age date this bit may be considered to be in the context of the cemetery, since it has been found within it. The pit with the half-bit was at 5 m southwest of (inhumation) burial 2. The skeleton had a ^{14}C-date of 2485 ± 40 BP (GrA-45271). A special feature of this man, aged 45-55, is that he must have come from a region outside the river area, given the strontium isotopic values for his teeth (Kootker *et al.* 2017, fig. 2: Ressen S34).

In the Netherlands, horse-bits are only known from rich burials, with the two specimens from the Wijchen wagon-grave as the sole bronze pieces (Pare 1992, plate 5: 22-23, Van der Vaart-Verschoof 2017a, table 6.2 and fig. 6.9; 2017b, 242). In a wider context, the deposition in a pit is very exceptional. Because it is not a grave, it is not even possible to refer to the custom that existed in the Netherlands and even the greater part of Europe during the Hallstatt period to deposit *pars pro toto* objects in the grave (Bourgeois and Van der Vaart-Verschoof 2017, 312-313; Van der Vaart-Verschoof 2017a, 158-159).[8]

When comparing the Zuiderveld horse-bit with finds from elsewhere, it is striking how unusually wide the entire mouthpiece – and apparently also the horse-mouth – must have been. In his overview of wagons and wagon-graves in central Europe, Pare indicates that the narrow bits of on average *c*. 7 cm from the Late Bronze Age are succeeded by bits that are on average 10 cm in period Ha C1 (Pare 1992, 138). That is also the 'effective' (net) width of the bits from the elite burials of Oss (fig. 3c) and Wijchen.[9] This relates to the width of the bar of the mouthpiece, before it turns into the outer ring-shaped ends, which in principle protrude outside the mouth of the horse. In this respect, there is not so much difference between the sizes of central European bits and those from elite burials in the Low Countries. The largest bits, those of Meerlo, have a net width of 12.5-13 cm (Verwers n.d., figs. on p. 7 and 9). The width of the reconstructed bit from the Zuiderveld is 14 cm after wear and tear. In the original condition it will have been about 13.5 cm.

This discovery presents us with a set of riddles. There is admittedly another single deposition within the confines of the cemetery, dating from the 5th century BC, but it concerns (part of) an unburned triconical miniature pot in Marne style (Eimermann and Van den Broeke 2017, fig. 5.4:4). We suspect that

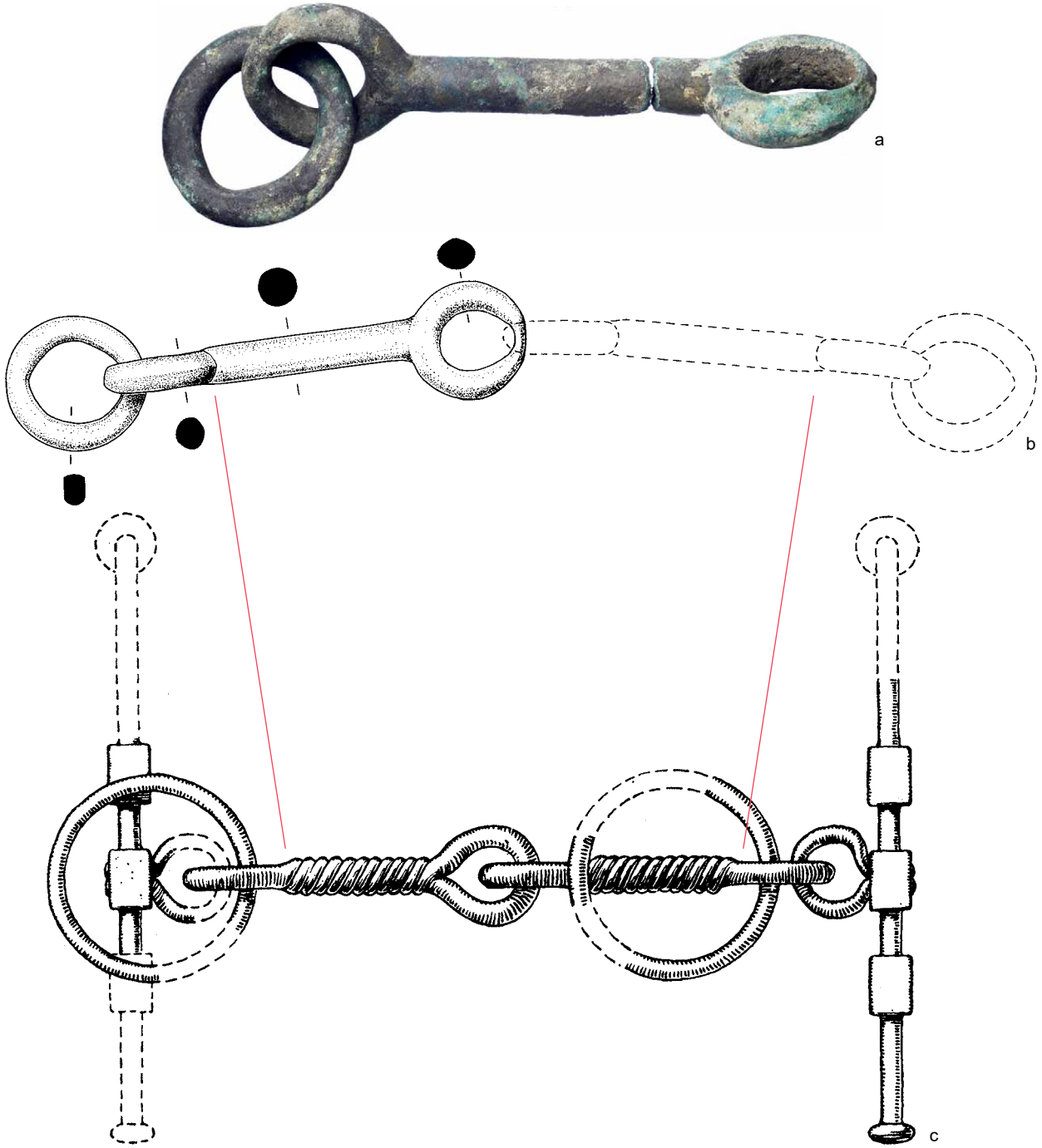

Figure 3 Half bronze horse-bit from Nijmegen-Zuiderveld (a) and reconstruction of the whole bit (b), as well as one of the bits from the elite burial of Oss (c). The red lines indicate the net width of both bits. Scale 1:1 (a) and 2:3 (b-c). Fig. 3c after Modderman 1964

Figure 4 The grave goods of Overasselt after restoration. From Swinkels 2011

its content was an offering, deposited in connection with a burial or a ceremony in memory of a deceased person. With the half bronze bit, originating from a large-sized horse at that time, however, only questions remain, with the most pressing being: is there, or had there been, an elite burial nearby?[10]

4 Men's adornment from the 6th century BC

4.1 Grave 8

The particularly rich gift of ornaments in a simple cremation pit (figs. 5-7) has already led to two publications in which these ornaments from the 6th century BC indicated a female cremation (Van den Broeke and Eimermann 2016; Eimermann and Van den Broeke 2016). When preparing the final report, however, a slightly modified determination of the cremated bone came about and further literature study of all the ornaments revealed that the assignment of the cremation to a woman was not as secure as previously thought. For this reason gender arguments are highlighted here. For a more complete description of the grave and its content, we refer to the final report (Eimermann and Van den Broeke 2017).

Grave 8, of which 17 cm remained under the disturbed topsoil, contained 914 g of cremated remains of an individual aged 20-29, and a rather large amount of charcoal. Based on a very robust *processus mastiodeus* (score +2), a clearly visible relief of muscle attachments on the back of the head (*planum nuchale*, score 0) and a V-shaped notch on the hip bone (*incisura isch. major*, score +1) the remains are attributed to a male individual (Smits 2017, table 5.32).[11]

^{14}C-dating of some cremated bone yielded 2490 ± 30 BP (GrA-67854), resulting in 780-510 BC after calibration (2σ). In combination with the age of the *Wendelring* in particular, it is possible to restrict this date to the 6th century BC, and probably to the second half of it (HEK Ia2, *cf.* Nakoinz 2004, 94; Joachim 2006, 243).

The grave goods consist of eight ornaments, which have been preserved in diverging conditions (figs. 6-7).

1. Bronze *scharflappiger Wendelring* (multiple twisted neck ring). This originally completely circular neck ring, probably with pointed ends (*cf.*

Figure 5 Burial no. 8 after its discovery

Heynowski 2000, table 79:2), has been broken into five pieces, partly melted and also deformed by the heat of the cremation pyre. It seems that the neck ring at that time was around the neck of the deceased, since the second cervical vertebra was attached to the neck ring. It is estimated that more than half of the neck ring has been preserved. Its presumed diameter was at least 15 cm.

The *scharflappiger Wendelring* forms a characteristic attribute of the Hunsrück-Eifel-Kultur at its early stage (HEK I), with a date predominantly in phase IA2 in the Middle Rhine region (around the second half of the 6th century BC), with, in addition, some older examples (Nakoinz 2004, 94). For the known finds further downstream a similar date, predominantly the second half of the 6th century BC, is applicable (see Joachim 2006, 243 (Ha D2)). This may also apply to the Dutch finds (see below), since it is unlikely that this elaborate type of ornament was produced on the spot in this northwestern margin of the distribution area.

2. Bronze twisted neck ring. The single twisted neck ring (*einfach tordierter Halsring*) is broken, but almost complete. It concerns six pieces, two pieces of which fit together. Despite the inflections of the originally circular ornament, a diameter of about 19 cm can be reconstructed. One end has been bent into a hook shape, while the other end is slightly ball-shaped, so that both ends could hook into each other.

The ball-shaped end of this twisted neck ring is an indication of south-eastern contacts and exchange networks. This type of closure is mainly found on twisted neck rings in the Neuwieder Becken (Nakoinz 2004, 93). Partly for this reason, the date can roughly be set at the 6th century BC (HEK I; Nakoinz 2004, 92).

3-5. Bronze rings with resp. square, round and rectangular cross-section.

Small bronze rings such as those of no. 3-4 are known from Nijmegen-Noord as headdresses of women in Early Iron Age inhumation burials (Van den Broeke *et al.* 2011, figs. 4.6-4.7 and 12.3; Van den Broeke 2014a, figs. 107-108 and 110). In addition, a small ring was found in a cremation burial with a fragment of a twisted neck ring, the

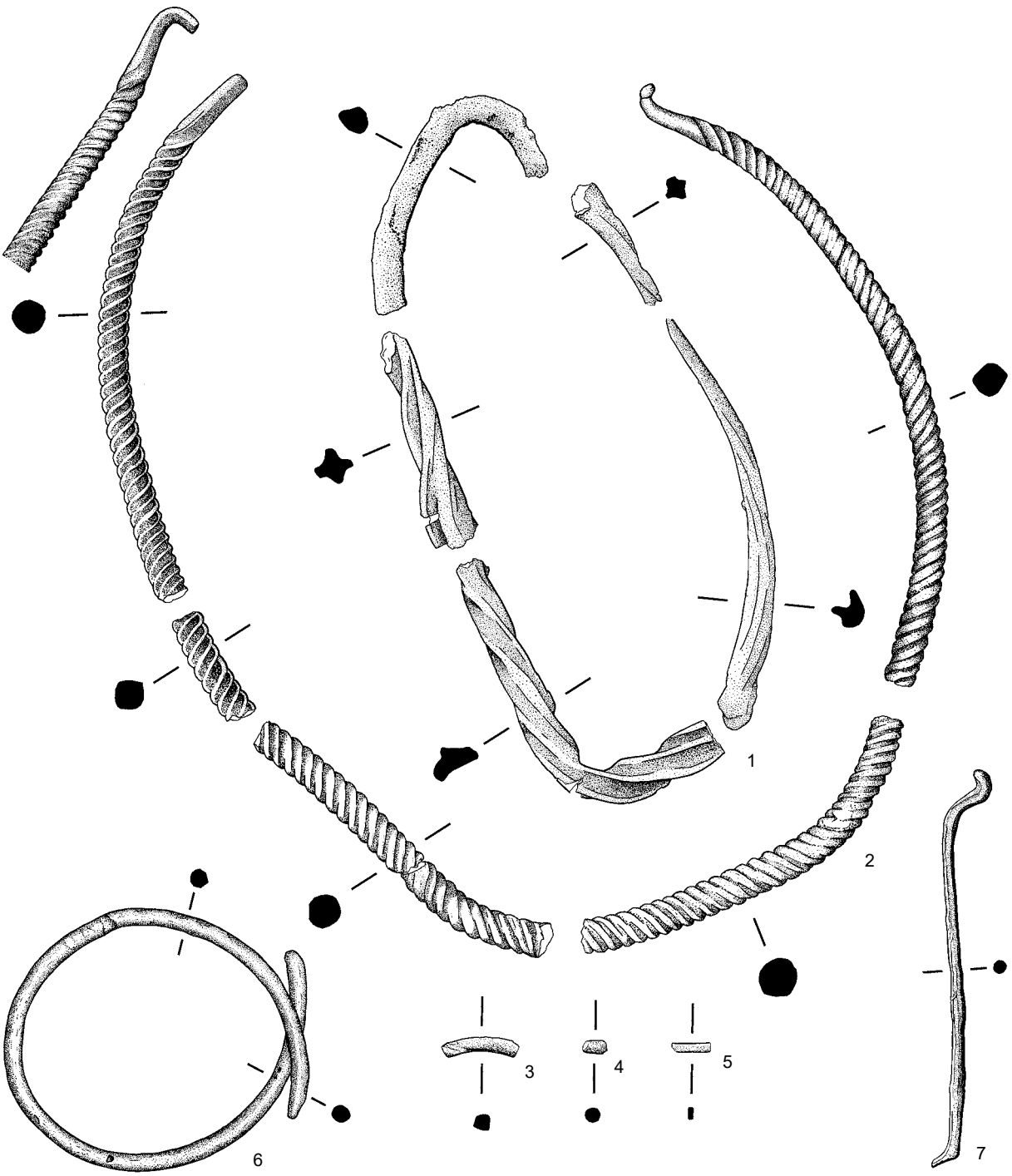

Figure 6 The metal finds from burial no. 8 after conservation; 1-5: bronze; 6-7: iron. Scale 2:3

only other neck ring known from Nijmegen-Noord (Van den Broeke 1999; 2001a, fig. 16). In the latter case, and also in the case of the Zuiderveld burial, such a small ring can be thought of around the twisted neck ring (see Nakoinz 2004, Abb 6.2.92:2; Parzinger 1988, Taf 74:26 and 31, 84:11). The strip fragment (no. 5) may originate from a hair ring, an arm/ankle ring or a plait ring (see for plait rings *e.g.* Van den Broeke *et al.* 2011, fig. 12.4; Van den Broeke 2014a, fig. 114).

6. Iron (arm) ring. Broken into parts, due to corrosion, but complete. The diameter is 5.5-6.3 cm (inside dimensions), its thickness 0.5 cm. The ends are over each other, so that the ring can be bent open.

The iron ornament corresponds strongly with the bronze head ornaments found in inhumation burials elsewhere in Nijmegen-Noord. Once, two specimens were still *in situ* on either side of the skull (*e.g.* Van den Broeke *et al.*, 2011, figs. 12.2-3; Van den Broeke 2014a, figs. 107-108). In another

Figure 7 The metal finds from burial no. 8 after conservation; 1-5: bronze; 6-7: iron. Scale 2:3

cemetery	other ornament(s)	weaponry	horse-gear	sex	age	source
Early Iron Age						
Beegden	-	-	-	?	18-30	Roymans 1999, 73
Haps – Kamps Veld	-	+	-	(m)	-	Verwers 1972, 55-62
Nijmegen-Zuiderveld (grave 8)	+	-	-	m	20-29	Eimermann and Van den Broeke 2017, 59-60
Wijk bij Duurstede – De Horden	-	-	-	?	14-18	Hessing 1989, 318 en 341
Middle Iron Age						
Nijmegen-Zuiderveld (grave 22)	-	?	-	m	19-28	Eimermann and Van den Broeke 2017, 77-79
Overasselt	-	+	+	(m)	-	Swinkels 2011
Wijchen-Holenbergseweg	+	-	-	m?	?	Tuijn and Vissers 2004
Wijchen – Woezik-Noord	+	-	-	?	*c.* 7	Heirbaut 2011, 45-47

Table 1 Dutch cremation burials with a *Kropfnadel*, and some of their other attributes.
(..) = sex determination on the basis of grave gifts

case, two copies had been added as grave goods (among others Van den Broeke 2014a, fig. 109). Spiral-shaped bracelets are known from western Germany that differ in no way from the spiral head rings, but could only be identified as arm bracelets on the basis of their position in inhumation graves (Heynowksi 1992, 58 and 80-83). However, in those cases the jewelry always seems to be of bronze. Iron bracelets in general usually have contiguous rather than overlapping ends or are completely closed (Nakoinz 2004, 116; Heynowski 1992, 58).

Because bracelets – unlike head rings – were often worn on one side, around the forearm or the upper arm, the single iron ring from grave 8 probably is a bracelet, also considering the inner dimensions of 5.5-6.3 cm, with which the ring fits around a slender arm. The diameter and cross-section also fall within the range of iron bracelets from the adjacent German area, with a diameter nearly always between 5.7 and 7.5 cm, with a thickness of 0.4-1.0 cm (Heynowski 1992, 58).

In western Germany the wearing of iron bracelets began early in the Iron Age (Ha C) and certainly continued through to La Tène B, also the end of the Dutch Middle Iron Age. Iron bracelets in the Netherlands, however, are a rarity, in contrast to bronze specimens, which seem to date mainly from the Middle Iron Age as grave gifts. For the specimen found here, the dating of the neck rings can serve as a basis.

7. Iron *Kropfnadel*. The length of the pin is up to 9.5 cm and the thickness 0.3 cm. The tip is slightly bent. At the other end the ornament is broken at the characteristic bend (*Kropf*). The head is missing, so that the – chronologically relevant – shape can only be guessed at. The various subtypes span the period from the 7th to the 3rd century BC. (Heynowski 2014). The present copy will date from about the second half of the 6th century BC (see above).

The finds from the Netherlands mainly come from the area north of the Meuse. They are also known from other cremation burials than those from the Zuiderveld (table 1 and fig. 8). With the 18 (mainly iron) examples of the Houten-Castellum settlement and ritual site it became clear, thanks to good preservation, how widely these clothing pins were in use when, about the 4th century BC, their role was taken over by fibulae (Van Renswoude 2017, 442 ff., 554).

4.2 Neck ring wearers in the Early Iron Age

As mentioned above, the outcome of the physical-anthropological examination of the cremated remains is that it appears to be a male, even though the number of characteristics for the determination of sex is limited. At first glance this is difficult to reconcile with the fact that neck rings from the Hallstatt period in

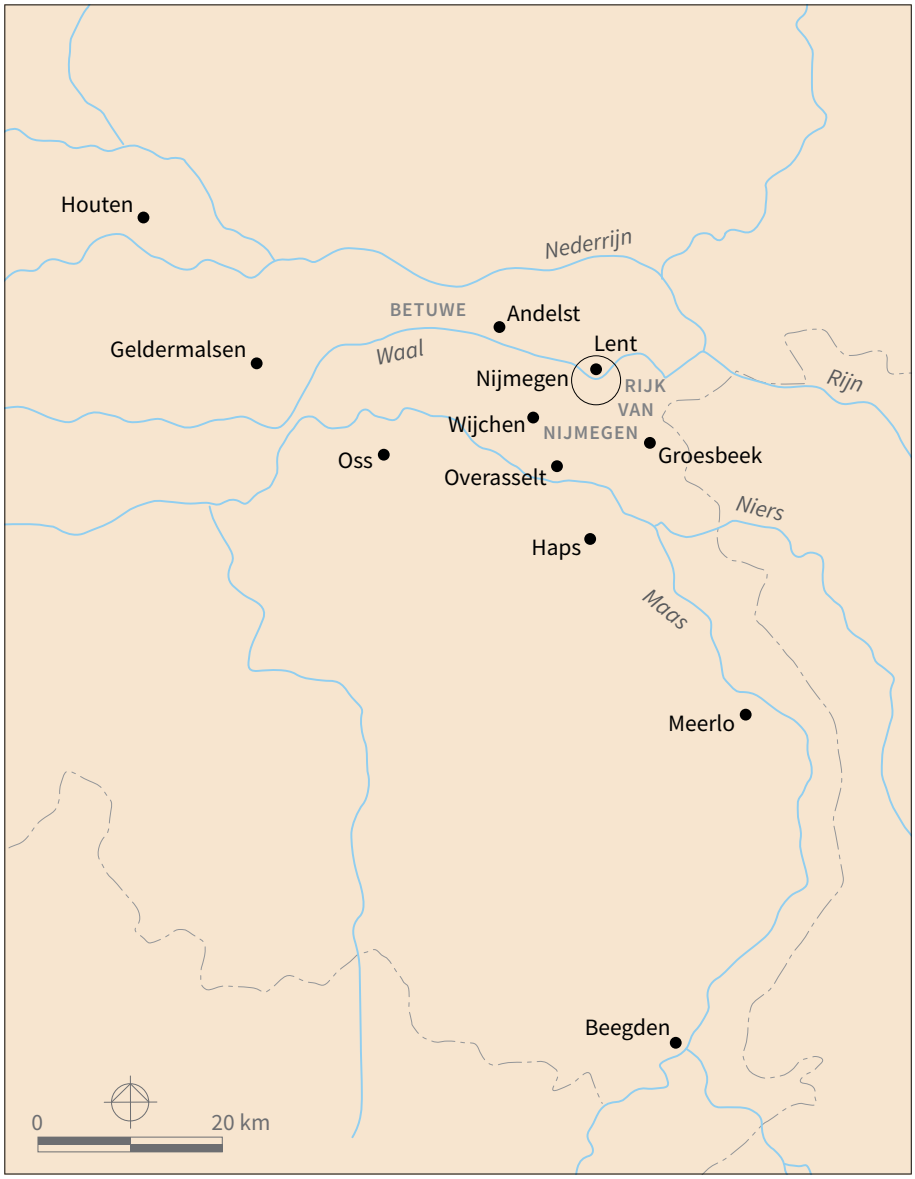

Figure 8 Location of some sites mentioned in the text

the adjacent German area – supposedly the region of origin of the neck rings found in the Lower Rhine area – are systematically assigned to women (*e.g.* Joachim 1985 and 1994; Nortmann 2006, 229-230; see also Heynowski 2000, 214).[12] Hence the designation of the ornament in the richly endowed cremation burial of Warendorf-Milte, near Münster, as being *geslechtsuntypisch* (Cichy *et al.* 2015, 66). Among the jewelry affected by the cremation fire from the period of approx. 550-450 BC were two single (pseudo-)twisted neck rings, with small iron chains and decorative plates attached to one of them. The cremation residues suggest a man rather than a woman, with an age of about 20 years. In this case it has been proposed that it concerned a priest (Gaffrey 2015, citing H. Polenz).

The predominant image of women as the wearers of the neck rings of the Early Iron Age is partly determined by the fact that the number of sex determinations of deceased persons with a neck ring is much smaller than the number of burials with a neck ring, both cremation and inhumation burials. In case of inhumation, the kind of adornment of the deceased can often be determined on the basis of the position of the jewelry in the grave, but the skeleton is often in too bad a condition to be able to register characteristics of the sex (*e.g.* Joachim 1985, 18; Nortmann 2006, Abb.

2). Determining cremation residues has always been a difficult job, because of the distortion and fragmentation that bone undergoes, and has become a regular procedure only a few decades ago.

In the Netherlands only a modest number of burials is known with (parts of) one or a few neck rings from the 6th century BC.[13] Glancing at the wider region, it concerns, first, the already mentioned twisted neck ring from the cemetery of Lent – Laauwikstraat-south (Van den Broeke 1999; 2001a, fig. 16). The context (grave or offering place) of two neck rings discovered in the vicinity of another part of Nijmegen, namely a hollow (*Hohlwulst*) neck ring and a smooth neck ring, is unclear (De Wit 1997/1998, 350). Other parallels concern a (nearly) complete *scharflappiger Wendelring* from the cemetery at Haps (N.Br.). Given the strong oxidation by heating, it is assumed that it was worn during the cremation (Verwers 1972, 54).

No other Dutch burials with neck rings from the Early Iron Age, as far as we know, have an outcome concerning the sex, other than that of grave 8 from the Zuiderveld cemetery. The aforementioned part of a twisted neck ring from the cemetery of Lent-Laauwikstraat-south was found between the cremated remains of a juvenile of 18-24 years old, whose sex could not be specified (L. Smits, documentation BLAN). The same holds for the remains of a individual aged 20-40 in grave no. 81 in the cemetery of Haps – Kamps Veld, with a *scharflappiger Wendelring* (Verwers 1972, 54).[14]

Because of the limited available sex-determinations we may, in the Middle and Lower Rhine area, probably reckon with the same situation as has been outlined for the core area of the Hallstatt culture on the basis of grave inventories: compared with women's burials, neck rings in men's burials are rather scarce. Neck rings in women's graves were always bronze specimens (Spindler 1996, 273), those in men's graves were sometimes made of iron, more often of bronze, while the elite wore gold neck rings (Spindler 1996, 284, see also Hansen 2008, 119 ff.). The earliest stone statue of a male chieftain (Hirschlanden), possibly still dating to the Hallstatt period, is depicted with a neck ring, too (*e.g.* Spindler 1996, Abb. 25). In case of the presumed later chieftain of the Glauberg, the elaborate gold neck ring from the grave is also displayed on its statue (*e.g.* Hansen 2008, 119 ff.). Considering the cultural relations that existed within Europe, neck rings in the Lower Rhine area do not have to be assigned *a priori* to the women's adornment.

In the western Hallstatt culture at least, iron was considered a typical male element. Not only weapons and tools, but also ornaments of iron were common among men, up to and including neck rings (Spindler 1996, 228-229). Therefore the iron ornaments in grave 8 deserve a review. These are:

- The iron (arm) ring (no. 6). From Heynowski's study concerning German inhumation burials the picture emerges that an iron bracelet was usually worn by itself, and then on the right arm. Although according to Heynowski, the wearing of iron bracelets is not generally tied to a specific gender or age (Heynowski 1992, 58), the number of individuals of whom the sex is known is so limited that here reference should rather be made to the study by Spindler concerning the western branch of the Hallstatt culture in the period Hallstatt D, the Hunsrück-Eifel-Kultur I being a variation thereof. Spindler emphasizes that men always wore only a single bracelet, unlike women (Spindler 1996, 284). The same applies to the adornment after 500 BC in the area of the HEK II, where in the case of men's bracelets it predominantly concerns a single bracelet of iron (Nortmann 2006, 230).
- The iron *Kropfnadel* (no. 7). As far as is known, the few Dutch burial finds of *Kropfnadel* are attributable to men. These (cremation) burials are concentrated in the Rhine and Meuse fluvial areas (table 1). Some of them have a special composition, in the sense that they are usually labeled as elite burials. Specifically this concerns two burials: a burial with a dagger and three iron arrowheads from Haps (Verwers 1972, 55-62) and the elite burial from Overasselt, comprising – apart from the attributes mentioned in table 1 – a bronze situla and drinking bowl (fig. 4). The decorative discs are counted as part of the horse gear.

  The *Kropfnadel* from Overasselt resembles the subtype called *Kropfnadel mit Kolbenkopf* (see Heynowski 2014, 101; 7th-6th century BC), even more than the one from the approximately simultaneous burial no. 22 from Nijmegen-Zuiderveld (see par. 5). In both burials from Wijchen the pin is of the *Rollenkopfnadel* type (see Heynowski 2014, 56; 6th-3rd century BC). The type of the other copies is uncertain.[15] But all burial finds are iron specimens. Given the poorer conservation of iron compared to bronze, this may be significant.[16]

The above data seem to be consistent with a custom that had already been assumed on the basis of finds from Germany, namely that iron pins were part of the male adornment and that bronze copies belonged to women (Mansfeld 1971, 105, quoted by Nakoinz 2004, 142).

When found with a burial, it is occasionally suggested that the pin was used to close the pouch or cloth supposedly containing the cremated remains. Now that the Dutch burial finds of iron *Kropnadel* appear to have been included in grave inventories of above-average wealth and that this type of ornament can be provisionally associated with men, the foregoing supposed application becomes unlikely. This thesis can even be extended to pins in general, when we see that other types than the *Kropfnadel* occur repeatedly in the elite burials of the Early Iron Age, which (almost) all date from the first half of the Early Iron Age (Van der Vaart-Verschoof 2017a, fig. 3.5 and table A2.6; see also Fontijn 2003, app. 7.3). The two pins (bronze and iron) from the inhumation burial of Uden-Slabroek give the clearest indication that they were part of the adornment. From the above it can also be inferred that the *Kropfnadel* made its entry only after 650 BC.

The conclusion may be that neck rings from the Early Iron Age in our regions were not only worn by women, but also (in some cases) by men.

In the southern and central Netherlands, the funerary landscape of the 6th century BC no longer shows the rich burials that characterize the preceding phase of the Early Iron Age and indicate significant status differences (see Van der Vaart-Verschoof 2017a, fig. 3.5). In this way burial no. 8, dating from the 6th century BC, is a relative outlier. The neck rings suggest that the deceased had an above-average status in the regional community, even though we do not know to what extent the grave goods are a reliable reflection of the social system.

5 A scabbard with iron fittings from the 5th century BC

5.1 Grave 22

In the remaining 20 cm of cremation burial 22 a small bowl in the Marne style with fine groove decoration (fig. 9) lay at the top. It appears to have been placed on top of the cremated remains, because the layer below contained a much larger concentration of cremated remains than the uppermost layer, as well as some strongly corroded iron objects.

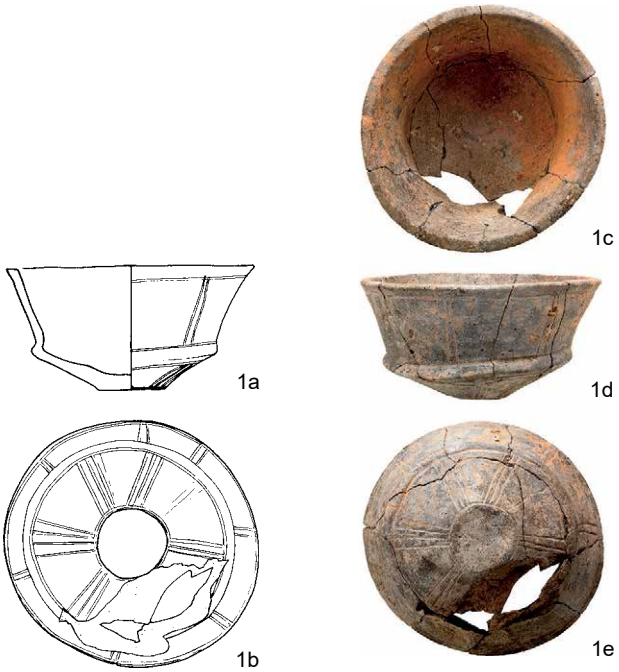

Figure 9 Pottery with groove decoration from burial no. 22. Scale 1:3

The very large amount (2675 g) of cremation residues indicates that they have been accurately collected.[17] They are from an individual with an age of 19-28 years. With six purely masculine characteristics, including *protuberantia occipitalis externa* score +2 and *os ischii* score +2, this was a man who, partly in view of the volume of the cremation residues, was of considerable size.

The ^{14}C-date of some cremated bone residues gave a date of 2360 ± 30 BP (GrA-67857), or 535-385 BC (2σ). Based on the Marne pottery the burial can be dated more precisely, namely to the beginning of the Middle Iron Age, between 500 and 450 BC, most probably between 475 and 450 BC (Eimermann and Van den Broeke 2017, 121). Although in the southern Netherlands triconical Marne forms with decoration are exceptional, neither the decoration nor the fabric gives reason to consider the possibility of imported pottery. The bowl shows secondary firing characteristics, undoubtedly from the fire of the cremation pyre. It has been placed in the grave unfragmented, but not complete, since a large part of the wall has been split off before placement. A white deposit is visible in patches on the inside, as can also be seen on a dish fragment from grave no. 14. This lastmentioned

deposit was found by SEM/EDX analysis to have a higher calcium content than the remaining parts of the vessel (see Joosten in Eimermann and Van den Broeke 2017, 123-126). Possibly the patches are the remains of eggshells. Eggs are well-known – but rarely preserved – burial gifts, which are also observed in elite burials of the Marne culture in northern France (Verger 1995, 377).

The most eye-catching finds, however, are the iron elements that, apart from a single ornament, may all have belonged to a scabbard for a dagger or short sword with accompanying belt set. Because of the high melting temperature of iron, it is not clear whether these grave goods – whether or not attached to the body – also landed on the pyre. The iron finds (figs. 10-11) concern:

1. Iron *Kropfnadel*, broken into three pieces, missing the centerpiece. The tip is slightly bent. The length will originally have been about 9 cm. The head is a bit thicker. Morphologically, it therefore it comes closest to the *Kropfnadel mit Kolbenkopf*, dating from the 7th-6th century BC. (Heynowski 2014, 101). Given the date of the associated Marne pottery in the grave, we may suppose the pin shape developed from this type. A similar pin is known from the elite burial of Overasselt, which also dates to the 5th century BC (fig. 4).
2. Almost cylindrically shaped object, slightly tapered, with a longitudinal opening. The 2.0 cm long tube will certainly have been riveted around an object. Considering the association with a scabbard it could be the final fitting of a belt.
3. Three iron fittings with linear relief decoration. The ends are bent. Given the shape of the fittings, these seem to have been attached to a sword scabbard or possibly a dagger scabbard. It appears that these fittings were attached to leather and

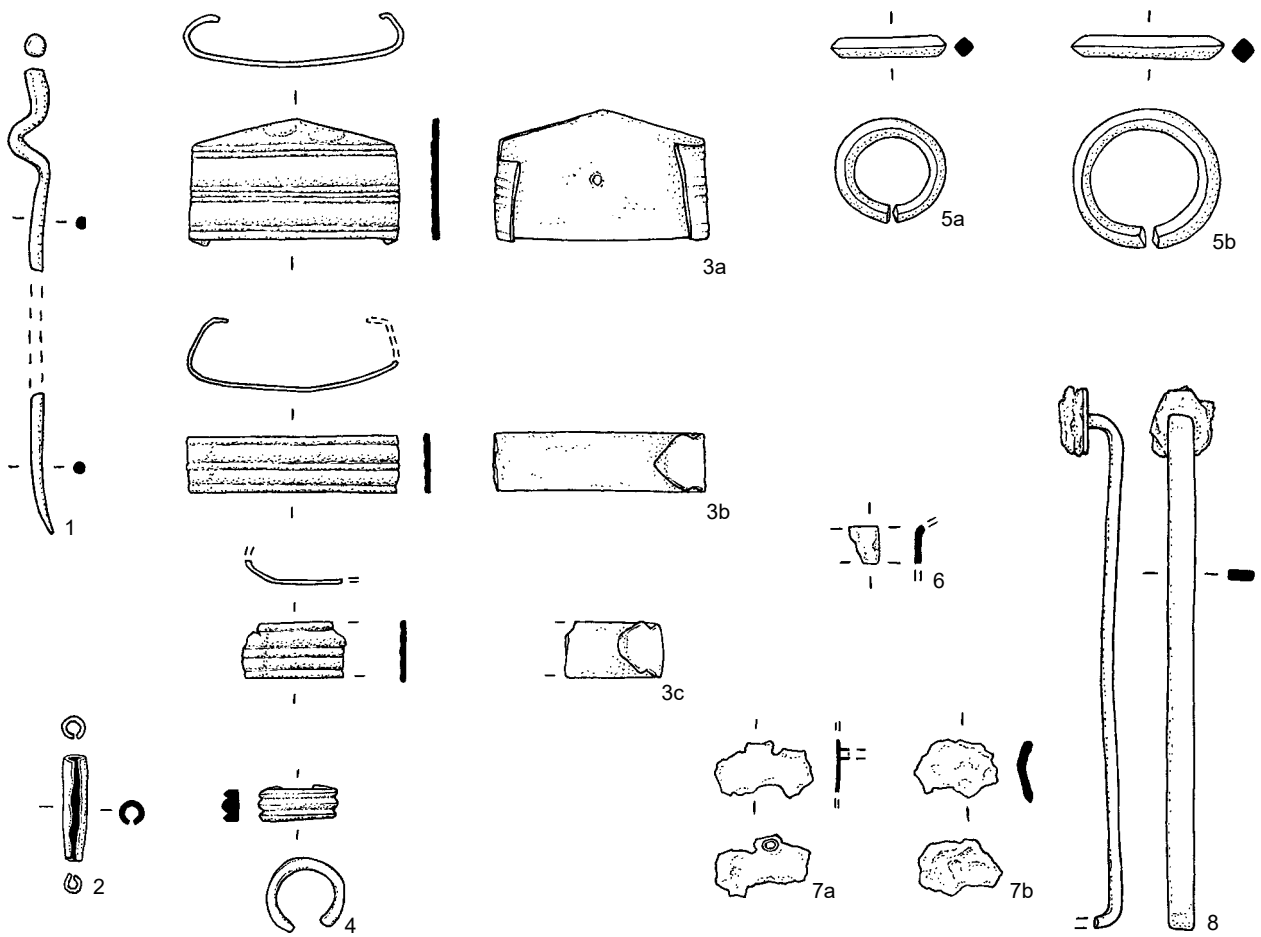

Figure 10 The iron finds from burial no. 22 after conservation. Scale 2:3

probably also wood, which materials formed the actual scabbard.

The widest attachment (3a) probably formed the top part of the scabbard. The width is 4.2 cm. Both sides are bent to be fixed, probably around the leather or wood of the scabbard (see description nos. 3b and 3c). Given the bends at the ends, which still seem almost complete, the thickness of the scabbard on the outside was 0.8 cm here. At the rear, there is an impression of a rivet in the middle, fit for attaching to the scabbard.

One end of the two other fitting pieces (3b and 3c) has been broken off; the largest has a width of 4.1 cm. The slightly arrow-shaped lip of both intact ends is a strong indication that (the outer layer of) the scabbard consisted of leather, because it could hook into a slit in the leather to prevent loosening. The scabbard seems to have been thicker here than with the suspected shoulder piece, considering the measures of 1.3 cm (3b) and 1.1 cm (3c). If this was also the original situation, this could only be explained if an extra layer began only under the shoulder piece, in particular a leather cover on the largest part of a wooden scabbard (*cf.* Trachsel 2005, Abb. 13B).

4. Iron open ring with embossed decoration. The decoration technique resembles that of the definite fittings. The most likely option is that this ring, also in view of the relatively large opening, functioned as a ferrule (point protector), a fitting piece at the lower end of the scabbard.
5. Two smooth iron rings with a small opening. The smallest ring (5a) has an inner diameter of 1.4 cm, the other ring (5b) has an inner diameter of 2.1 cm. These rings may have served to secure the scabbard to the belt, as is often the case with the scabbard of a knife, dagger or sword. However, since object no. 8 must have served to fasten the scabbard directly to the belt ('belt guide'), they must have had a different role.

6-7. Three iron plate pieces with in one case a remnant of an iron nail (7a). Determination is not possible due to the fragmentary state.

Figure 11 The iron finds from burial no. 22 after conservation. Scale 2:3

8. Flat iron bar with a length of 10.1 cm. At one of the bent ends there is a round iron plate, with an adhering non-definable matter (leather?). The suspected counterpart on the other end is broken off. This is undoubtedly the suspension of the scabbard, attached to its backside.

5.2 Reconstruction of the scabbard

Apart from the *Kropfnadel* (no. 1), all iron elements may belong to a scabbard (and belt) for a short sword or dagger. The elongated element no. 8 forms a crucial link in the whole. The date, which has been obtained from the accompanying Marne pottery (500/475-450 BC), is important as well. In the same period in France we see a transition from scabbards of predominantly

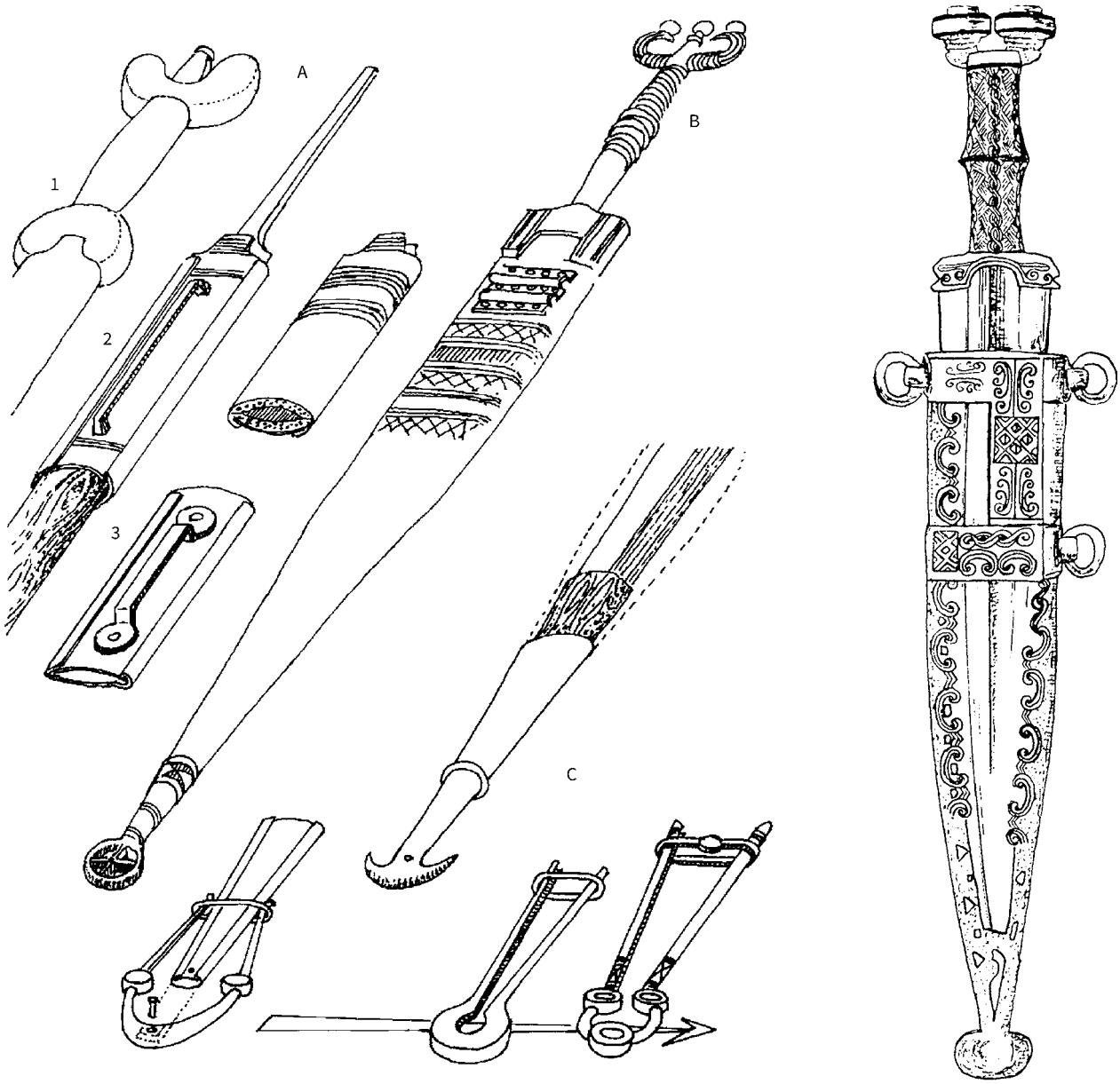

Figure 12 Development of the metal scabbard (A) and point protector (C) in the western branch of the La Tène culture, next to the dagger from the earlier burial of Hochdorf (B); from Rapin 1999. Right: dagger in scabbard from La Osera (period Hallstatt D) with rings for the suspension on the belt; from Jiménez 2006

wood and/or leather to those in which metal fittings occur with a vertically arranged suspension element (fig. 12:2-3; Rapin 1999, 42-46). Element no. 8 is most similar to that of figure 12:3. The fact that the two narrow fitting parts nos. 3b and 3c most propably were hooked in leather as well as the thickness of the unknown material below the small iron disc of no. 8 (0.4 cm), suggests that leather was used here.

Because protrusions on scabbards of European daggers and swords from the Iron Age are basically at the top, the angular side of no. 3a will have been directed upwards. The slightly tapered course, which is particularly visible at the back, suggests a reversed position. However, there are at least two examples of a scabbard with the widest part *below* the scabbard mouth, in the well-known cemetery of Chouilly – Les Jogasses (F.). This relates specifically to the part that was in use in the proto-Marne phase, *i.e.* the Jogassien (Ha Final IIB; 500-475 BC; Hatt and Roualet 1976, pl. 24:969 and pl. 56:1217). There we find the best counterparts for the scabbard fittings from grave 22, not only considering the design, but also the linear ornamentation and other aspects. A ring like no. 4 has been found there in grave 87 as point guard of a dagger (scabbard) (fig. 13:1). A *coupe jogassien* was another grave gift (Hatt and Roualet 1976, pl. 25:975; 1977, pl. II:24). This very much resembles the pottery from grave 22 in the Zuiderveld cemetery.

The tapered shape of object no. 3a may also be related to the construction of the scabbard. The upper fitting may have been attached to wood that formed the actual scabbard (probably composed of two halves). Below that fitting, the scabbard may have been thicker, because there was a leather casing around the wooden scabbard, on which the other fittings were fixed (see above).

The long suspension element no. 8 seems to have enclosed a (wide) belt.[18] Such a direct connection to a wide belt – but designed in a different way (fig. 12:B) – may also be assumed for the slightly earlier dated dagger in the elite burial from Hochdorf, in southern Germany (*cf.* Biel 1985, Abb 119; 550-500 BC, Ha D2). This means, however, that the rings 5a-b cannot simply be assigned a function in the suspension of the scabbard, unlike daggers from the Hallstatt period found in southern France and northern Spain (fig. 12, right).[19] Such rings, sometimes with a square cross-section like nos. 5a-b, in the cemetery of Les Jogasses mainly occur in burials with a dagger or a short sword.[20] It may be noted that they are nearly always depicted separately, and are not fixed (rusted) on the scabbard. That means that they probably have to be ascribed to the belt garments. That conclusion can also be drawn from the only exception to the separate rings. Among the finds from grave 95, including a bent lance point and an iron dagger with wooden scabbard remains (fig. 13:2), there is also a suspension element of the same type as that of figure 10/11:8. Two rings are fixed in such a way that they could only have been parts of the belt (fig. 13:3).[21]

The long swords in the area of La Tène culture are accompanied by various rings or ring-shaped ends of chains, too, but they are never part of the scabbard itself (*e.g.* Lejars 2014; Mathieu 2005; Rapin 1999). We meet this construction only again in Roman daggers and swords (for an early example see Lejars 2014, fig. 20). For the position of the rings of figure 10/11:5a-b we must therefore refrain from a reconstruction.

Considering the date of the scabbard in the decades around 475 BC and the apparently northern French influence we may assume that we are dealing with the scabbard for a short sword or a dagger.[22] These are the only variants among the 12 (stabbing) weapons in the mentioned early part of the Les Jogasses cemetery. There the small fitting width of 4.2 cm (fig. 10/11:3) or even less is almost exclusively found among the short swords. The upper parts of dagger blades and dagger scabbards are usually wider. In addition, the linear decoration only occurs on swords, always on the single decorated attachment at the shaft mouth (fig. 13:6).[23] The only dagger scabbard with a smaller width (about 4.2 cm) has a suspension element of similar type, but of about half length, namely about 5.4 cm (fig. 13:3; Hatt and Roualet 1976, pl. 29:1002b). Partly because of the length of the suspension element, the reconstruction of figure 14 therefore shows the scabbard of a short sword.

Yet there are also elements that cannot be directly identified in these and other French examples. First, there are no counterparts for the triangular top, which presupposes a complementary design of the grip of the missing weapon. A rounded top is standard (see fig. 13:6). Furthermore, separate decorated fittings are also extremely exceptional.

Although the iron objects may have been collected from the pyre remnants, the composition suggests that a scabbard combined with belt a has been deposited in the grave afterwards. It is striking that the weapon itself was not present in the grave, in contrast with the two other scabbards that are known from the Dutch Early and Middle Iron Age. The scabbards from the cremation burials in Haps (prov. of North Brabant) and Darp (prov. of Drenthe) both contained a dagger.[24]

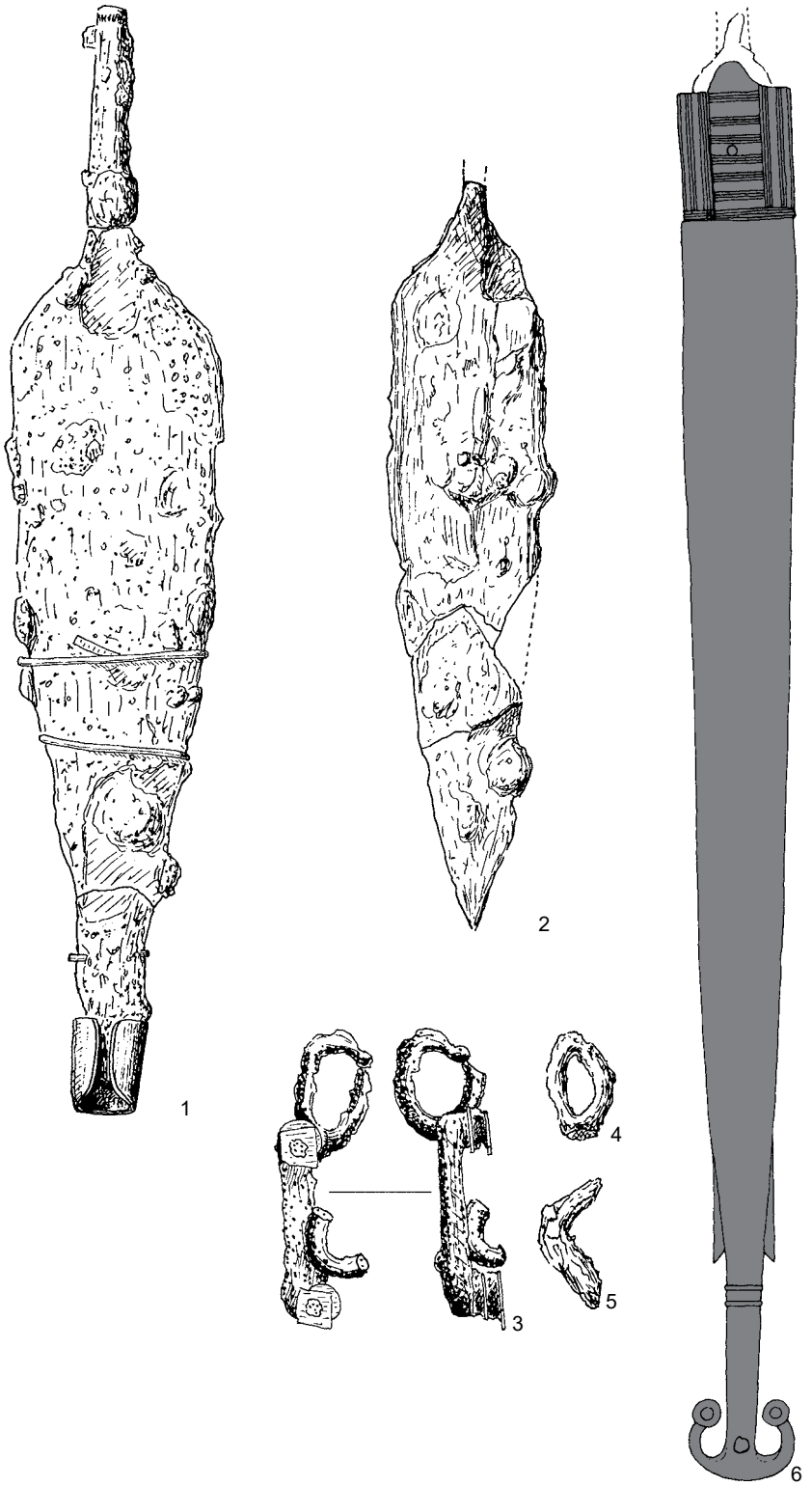

Figure 13 Elements from the burials of Chouilly-Les Jogasses: 1: grave 87; 2-5: grave 95; 6: grave 22. Scale 1: 2. From Hatt and Roualet 1976 (nos. 1-5) and after Charpy and Roualet 1991 (no. 6).

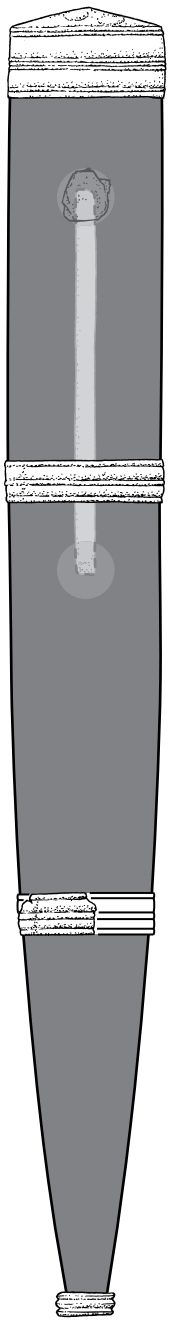

Figure 14 Reconstruction of the scabbard from burial no. 22 in the Zuiderveld cemetery, including the belt guide at the back of the scabbard. Scale 1:2

They date from shortly before and after 500 BC, respectively. Possibly the scabbard (with belt) from grave 22 formed the *pars pro toto* of a complete armor.

5.3 An empty scabbard as a metaphor for a society

The empty scabbard from grave 22 may represent the full armor of an individual, but at the same time illustrates – by chance? – also the nature of the communities in the Betuwe as we perceive them in the burial customs until now. When making comparisons, we may also include the cemeteries in the western part of the Betuwe, dating from (predominantly) the first half of the Middle Iron Age: Geldermalsen-Middengebied and Geldermalsen-Plantage (Hulst 1999; Jezeer and Verniers 2012). From the Early Iron Age hardly any burials are known in the Betuwe outside Nijmegen-Noord.

Even before the discovery of the cemetery in the Zuiderveld, it was noticed that the inventories of Iron Age graves north and south of the Waal[25] differed considerably in character. Directly opposite Nijmegen-Noord, along the steep edge of the ice-pushed area of the Rijk van Nijmegen, ornaments are already rare in Early Iron Age burials (espec. Fontijn 2003, appendix 7.3). Many of the burials from the beginning of the Middle Iron Age include one or more spearheads and/or lanceheads. It concerns two cemeteries, close to the Keizer Traianusplein and at the Kops Plateau (Bloemers 1986 and 2016 (Keizer Traianusplein), Fontijn 1995 and 1996 (both cemeteries)).[26] Moreover, in one of the graves of the former cemetery, parts of a chariot were also present, along with horse-gear for two horses. It is the only chariot known from the Netherlands, possibly belonging to a chieftain(?),[27] similar to the chieftain of Overasselt, whose grave contained five spearheads and horse-gear for two horses (fig. 4). Elsewhere in the Rijk van Nijmegen, in the cemetery of Groesbeek-Hüsenhoff, two graves each with three spearheads were recovered from the transitional period from Early to Middle Iron Age, around 500 BC (Geerts 2014).

To the north of the Waal, burials – both inhumation and cremation burials – are characterized by the repeated presence of ornaments from the final phase of the Early Iron Age and from the first half of the Middle Iron Age. Weapons are missing to date. The scabbard without weapon from grave 22 is a striking find in this respect. However, it can hardly be assumed that the relatives of the man in grave 22 wanted to emphasize the opposition between the communities on the north side and the south side of the river by deliberately omitting the weapon when his remains were given up to the earth. However, this empty scabbard can serve as a metaphor for us to illustrate the assumed socio-economic differences on both sides of the Waal. In the Betuwe we may envision the agricultural communities with which we 'fill up' the Lower Rhine area in general. Until now, a chieftain of the same status as that of Overasselt can only be assumed in Andelst. To him belonged a coral inlaid fibula, as well as some bronze objects that correspond with finds from Overasselt (Swinkels 2011, 141). On the other hand, it is not overbold to state that on the southern Waal bank in Nijmegen around the 5th century BC there are mainly cremation burials of warriors (and their families), a view that has been expressed before (Fontijn 1996, 43-44). Considering, in addition, the chieftain's burial of Overasselt and the weapon burials of Groesbeek-Hüsenhoff, the more martial character of the communities of about the 5th century BC in the Rijk van Nijmegen is in any case undisputed.[28]

6 Conclusion

The metal objects that have been put on the scene here alone make the cemetery of Nijmegen-Zuiderveld a remarkable one. And despite the fact that it was already in use in the Early Iron Age, it cannot be designated as an *urnfield*: urns from the Early and Middle Iron Ages are missing and two inhumation burials have been found. Because up to now less than 10% of the cemetery has been uncovered, many new surprises are surely in store.[29]

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Notes

1 Most fieldwork was carried out by or on behalf of the archaeological department of the municipality of Nijmegen. For overviews see Van den Broeke 2002; 2017; Van den Broeke and Ball 2012.

2 The only inhumation burial that can be dated to this period, containing a woman, had two unburned pots as grave goods. One was a bowl with pierced bottom, perhaps a cheese mould (Ball and Daniël 2010a, fig. 12.9: 1).

3 Grave no. 6 (project Zv10): ^{14}C: GrA-45827 (burned bone), 2235 ± 35 BP (Ball and Daniël 2010a, 139). Grave no. 11 (project Zn3): ^{14}C: GrA-67855 (burned bone), 2250 ± 30 BP (Eimermann and Van den Broeke 2017, 64 and table 4.2). This grave also contained several other metal finds, including a complete bronze bracelet.

4 It is not yet clear where we should look for the settlements from the second half of the Early Iron Age and the Middle Iron Age. What is certain is that Ressen-De Woerdt, located eastward at a distance of 600 m, before the Roman period was inhabited mainly during the Middle Iron Age (Bloemers and Hulst 1983; Van den Broeke 2012, 284, note 30; Haarhuis 2002, 31-41). Since 2010, the Ressen place-name has been abolished within the municipality of Nijmegen. The Zuiderveld, too, has been included in the built-up area of Nijmegen.

5 This meticulous work was done by F. Reijnen (BLAN).

6 The fracture in the bar only occurred after the salvage, at the location of a crack (see Ball and Daniël 2010a, fig. 12.6a).

7 The authors see no reason to stick to the starting date of La Tène A around 525 BC and the early beginnings of Ha D1-3 that Van der Vaart-Verschoof uses, following Trachsel, in a recent overview of elite burials (Van der Vaart-Verschoof 2017a, fig. 3.5).

8 The authors thank Arjan Louwen (Faculty of Archeology at Leiden University) for his information about depositions in cemeteries, outside graves.

9 This also seems to be the measure used by Kossack (1954) and Pare (1992), unlike the opinion expressed in Van der Vaart-Verschoof 2017a, 138. We therefore do not follow the method of measurement depicted in fig. 6.9 of this latter publication.

10 The half bit was found in an excavation trench right next to highway A325. The digging for this road was carried out in the 1930s.

11 At a first determination, the outcome that this was a man was less certain, because no score of the *incisura* was known yet. In addition, a somewhat wider age range, between 23 and 40 years, was set, based primarily on closed epiphyses and open cranial sutures (see Eimermann and Van den Broeke 2016, 35).

12 On the other hand neck rings in the (Late) La Tène period in Europe are known mainly as male attributes (Green 2005, 58-59, Hansen 2008, 119).

13 This apart from a remarkable number (both *scharflappige Wendelringe*, twisted neck rings and *Hohlwulstringe*) from an unknown number of graves in the cemetery of Ermelo – Groevenbeekse Heide (Verlinde and Hulst 2010, 70 and fig. 26A/B). In addition, it may be recalled that this type of ornament was also used in votive deposits (Van den Broeke 2001b, table 1).

14 L. Smits was so kind as to analyse the cremated remains for the purpose of this article. Most of the remains (923 g) were <1 cm. Masculine traits: g*labella* 0 to +1 and a*ngulus mandibula* +1. Feminine traits: m*argo orbita* -1 and rather gracile remains (*neurocranium, diaphyses, epiphyses*). It may be mentioned here that the accompanying pottery in the grave, being a small bowl with a set of perforations close to the rim, according to Drenth (2017) is a men's attribute.

15 From a cremation burial of the Kops Plateau in Nijmegen an iron pin from the Early or Middle Iron Age is known that may have been a *Kropfnadel*, found together with an iron spearhead and ferrule (Fontijn 2003, app. 7.3, grave 81). Apparently this reflects a male burial.

16 Illustrative in this respect is the fact that from the settlement site P9/57 in Nijmegen-Lent, which was in use not earlier than the second half of the Early Iron Age, only two bronze specimens are known. They belong to the so-called *gekröpfte Rollenkopfnadel* subtype (Van Hemert 2016, 677-678). But generally spoken, most settlement finds are made of iron (Groenewoudt 1984, 61; Van Renswoude 2017, 442-444).

17 The fact that concentrations of ashes in cremation burials have often been deposited without or with little charcoal, may signify that the fragments have been carefully collected from the pyre. Because, however, many small fragments usually also form part of the recovered remains, it is at least as likely that the collection was done after flotation: if the remains were deposited in a container filled with water, the ashes could settle and the floating charcoal could be poured with the water. This option is also

more plausible than the presumed washing of bone fragments that had been picked from the pyre remains.

18 If tube no. 2 has been the final belt fitting, the end of the belt will have had a tapered shape.

19 Jiménez 2006, spec. figs. 14:15 and 27:4. With thanks to S. Arnoldussen (Groningen Institute of Archaeology) for making the article available. We also thank J. Langelaar (ADC) for his information on the finds from grave 22.

20 Hatt and Roualet 1976, pl. 8: grave 28 (1x), pl. 24: grave 82 (2x), pl. 29: grave 95 (3x), pl. 30: grave 100 (3x), pl. 56: grave 191 (6x) and grave 192 (1x).

21 The iron element of figure 13:5, on the other hand, is said to have been on the side of the dagger (scabbard), while this is also indicated as a possibility for the ring of figure 13:4 (Hatt and Roualet 1976, 437).

22 The boundary between dagger and sword is laid by Spindler (1996, 287) with a total length of 40 cm.

23 Charpy and Roualet 1991, no. 33. The scabbard consists of bronze, iron and wood. For other examples of sword scabbards with this decoration, see *e.g.* Charpy and Roualet 1991, fig. 11a. The same decoration does, however, occur on some daggers elsewhere from the Marne region (*e.g.* Charpy and Roualet 1991, fig. 11b:4; Schönfelder 2003/'04, figs. 2 en 3). The dagger of Darp also has this decoration (De Wit 1997/1998, 341, fig. 7).

24 Verwers 1972, 55-62 (Haps). The dagger of Darp was not assigned to this grave by Kooi (1983), but De Wit did (De Wit 1997/1998, 335-342). That the scabbard of Darp would be of bronze on one side and of leather on the other side, however, is incorrect: both sides are made of bronze (personal communication W.A.B. van der Sanden, Province of Drenthe). Additionally, it may be mentioned that the cremated remains of a man aged 23-40 in the urnfield of Someren-Waterdael were accompanied by decorated pieces of antler with an iron pin. They may stem from the antennae hilt of a (Ha D) dagger (Kortlang 1999, 158 and fig. 12).

25 The course of (the predecessor of) the Waal in the Early and Middle Iron Age we have to perceive somewhat different than today's course (Heunks and Van Hemmen 2016, especially fig. 5.14 middle right).

26 In a later publication, Fontijn has a somewhat broader date for the graves of the Kops Plateau, namely Early/Middle Iron Age (Fontijn 2003, app 7.3). See Van den Broeke 2014b for the location and for the prehistoric finds of the Kops Plateau in general.

27 The cremation residues offered little support for determining the sex, but they point more in the direction of a woman than of a man; the statement that it concerns a woman (Bloemers 2016, 29) is therefore too absolute (personal communication L. Smits). In northern France, the Belgian Ardennes and the Hunsrück-Eifel region, where the origin of (the concept of) the chariot may be sought, women repeatedly are represented in graves with a two-wheeled chariot, but apparently never with weapons (see Cahen-Delhaye 2013, 45; Verger 1995). The fact that sex determination often has to be done on the basis of grave goods can, however, lead to circular reasoning. On the other hand it must be noticed that the combination of distinctive feminine ornaments and weapons does not seem to occur.

28 Only the character of the grave goods in (a part of) the 32 cremation burials from the first half of the Middle Iron Age of Wijchen – Woezik-Noord (Heirbaut 2011) corresponds with that of the Betuwe burials.

29 It is however, still unclear how many burials will be available for research in the short term, despite the expectation that the site will be developed in the context of the Waalsprong. With the perspective of mitigating measures, preservation *in situ* for a part of the cemetery is a possible outcome.

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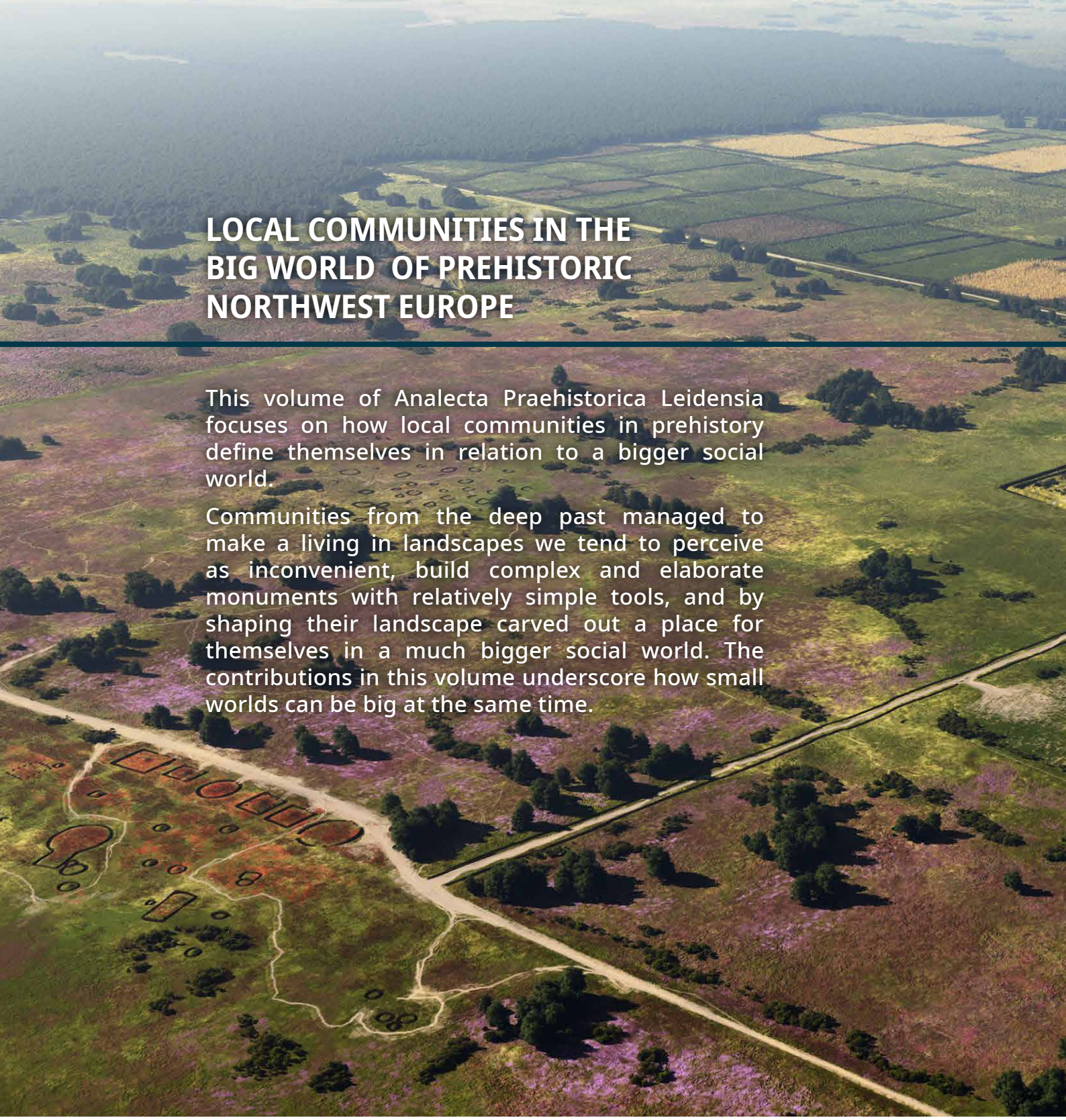

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This volume of Analecta Praehistorica Leidensia focuses on how local communities in prehistory define themselves in relation to a bigger social world.

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