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Monuments on the horizon : the formation of the barrow landscape throughout the 3rd and the 2nd millennium BCE

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MAP FORMATION PROCESSES AND THE DATASET: ASSESSING WHAT IS LEFT OF THE BARROW LANDSCAPE

4.1 Introduction

The barrow landscape as we can study it now is a palimpsest of five millennia of distorting and damaging factors. In the previous Chapter I established that barrows were constructed for at least three thousand years, and constant additions have since created an intricate and complex palimpsest of barrows.

Yet soon after the first barrows were constructed, erosive processes will also have started to destroy some of them. The barrows that survived through these five millennia underwent significant changes in land-use, vegetation was entirely different, rivers changed course, etc. Such processes have all contributed to the formation of the map (Fokkens 1998, 54-60).

In this Chapter I will examine the processes affecting barrows from the moment the first mounds were constructed. I will first try to establish what the total corpus of barrows must have been. Then I will evaluate all processes affecting the formation of the map, followed by an appraisal of specific research areas.

4.2 Putting barrows into perspective: the representativity of the dataset

The barrow landscape as we can study it today has only been partially preserved and has been subject to thousands of years of modifications and destructive processes. It is therefore imperative to understand the processes that contributed to the formation of the archaeological record (*e.g.* Schiffer 1976; Fokkens 1998).

An overview of all known barrows in the Low Countries displays a disparity in regions where burial monuments have been preserved (see Fig. 1.4). Large concentrations of burial monuments can be observed in Drenthe, on the *Veluwe* and *Utrechtse Heuvelrug*, in the *Kempen* and in sandy Flanders. In contrast the central river area, the sandy soils of western Noord-Brabant and Friesland are notably empty.

The differences between how the barrows of the Netherlands and Flanders have been recorded already demonstrates the discrepancy between the survival of barrows in certain areas. The Flemish barrows are almost invariably discovered through aerial photography (De Reu, *et al.* 2011b, 493), while the majority of the Dutch barrows are mounds that have physically survived into the 19th and 20th Century (or at least long enough to have been recorded).

It is very difficult to estimate how representative the distribution of known barrows is in comparison with the total number of barrows that were once built. There are approximately 4000 barrows recorded in the Low Countries (3058 barrows for the Netherlands, recorded in ARCHIS⁷ and approximately 1000 in

7 As recorded on 07 May 2012.

Flanders, mostly recorded from aerial photographs; De Reu, *et al.* 2011, 493). Yet the recorded barrows are only those barrows that have survived in order to be included in the national database.

To put these numbers into perspective we can attempt to estimate how many barrows in total may have been constructed. Such estimates have been previously made for Danish megaliths. There are 2364 megaliths surviving out of 7287 recorded in Denmark (Midgley 2008, 31). It has been estimated that the preserved megaliths represent approximately 10% and the recorded megaliths approximately 30% of the 25.000 original monuments in Denmark (Ebbensen 1985 quoted in Scarre 2010, 180). Using these figures for an educated guess, Midgley estimates that 40.000 megaliths were built in northern Europe (Midgley 2008, 31).

If, for the sake of argument we assume barrows have the same survival rate into the archaeological record (roughly speaking 30%), we can estimate the total number of barrows constructed. There are at least 86.000 barrows recorded for Denmark (Johansen, *et al.* 2004, 34), with approximately 22.000 of them surviving in the present day landscape. A rough guesstimate of 200.000 barrows are then assumed to have been constructed in Denmark (M.Holst pers.comm.). Parker Pearson notes that for Britain 30.000 barrows are recorded (Parker Pearson 2005, 81), which equally suggests that hundreds of thousands of these mounds must have been constructed there in the past.

If we assume the same survival rate into the modern record for the Low Countries (thus 30%, without taking into account the significant differences in population density, agricultural intensity or urbanization between Denmark and the Low Countries!), we can calculate that the 4000 recorded barrows represent a minimum of 12.500 to 15.000 barrows.

Now I do not presume these numbers to be correct, but rather an indication of how many barrows we are actually missing (I am even of the conviction that less than 30% of the barrows ended up in the archaeological record). If anything, we can say that barrow construction was so ubiquitous that we should not wonder that these monuments have survived at all, but rather that *so many* of them have survived (Holtorf 1998, 27)!

The barrow landscape and its disparate distribution is first and foremost affected by the rate of survival of barrows and the different processes influencing and affecting them. Understanding these processes is therefore a prerequisite for any further research.

4.3 Map formation processes

The formation of the present day barrow landscape was subject to many influences both anthropogenic and natural (Schiffer 1976). These influences were usually detrimental to the preservation of barrows (Theunissen 1999, 48-54). If the estimates presented above are anywhere near the actual number of barrows constructed, we are missing thousands of barrows. Before we go any further we need to assess which processes had an effect on the formation of the map (Fokkens 1998, 54-60). Only then can we establish which part of the barrow landscape is suitable for research.

The description of these processes will focus on those affecting the Central and Southern Netherlands and only the effects influencing the preservation of burial mounds have been considered. Following Fokkens, three categories of formation processes are considered. Natural, anthropogenic and research factors all had their own particular influence on the way in which the barrow landscape has been preserved (for an extensive discussion of each of these factors see Fokkens 1998, 66-80).

4.3.1 Natural processes

The large scale geological processes affecting barrows can be subdivided into erosion and sedimentation caused by water on the one hand and wind on the other. Both have had a significant impact on the barrow landscapes, rivers have changed course and floodings have covered huge tracts of land with clay, silt and sand (Arnoldussen 2008, 29-63). At the same time the deposition and erosion of wind-blown sand has significantly impacted vast areas (*e.g.* Berendsen 2000b, 45-46).

The influence of water can, in some areas, be considered as small, while in others as significant. On the Pleistocene soils of sandy Brabant and on the ice-pushed ridges of the Veluwe and Utrechtse Heuvelrug, the influence was relatively small, while on the other hand the dynamic nature of the Rhine and Meuse basin fundamentally transformed the landscape through time (Berendsen and Southamer 2001; Arnoldussen 2008, 29-63).

The small streams running off the Veluwe in the Central Netherlands have had only a minimal and very local impact. Erosion and sedimentation caused by them has been minimal (*e.g.* STIBOKA 1973, 38). Most of the valleys were created during the previous ice-ages when the ice-cap covering the area melted away and the meltwater eroded the stream valleys. Solifluction of the top-soil further added to the erosion of the valleys (Berendsen 2000b, 44). It can be summarised that the present form of such valleys developed during the last ice-age, and that in the Holocene little or no large scale erosion took place in them. At the very most, not more than a couple of metres eroded from the edge of the stream banks.

As with the streams on the Veluwe, the stream valleys in the Southern Netherlands attained their present day form in the Weichselian. Erosion within these valleys is relatively limited, but the presence of long cover-sand ridges deposited during the Weichselian has influenced the course of these streams. They often shifted course at acute angles to the cover sand ridges until they could break through them. Additionally these ridges blocked the drainage in these valleys which enabled the formation of small lakes and fens (Berendsen 2000b, 30).

The large river systems of the Rhine and Meuse on the contrary have had a significant impact on the landscape. The Rhine for example eroded parts of the ice-pushed ridges of the Veluwe and is continuing to do so (STIBOKA 1973, 47; Berendsen 2000a, 43).

That this happened even after barrows were built, is evidenced by the erosion of a barrow just on the edge of the ice-pushed ridges (barrow 4535; see Chapter 5). Only a third of the barrow still remains, while the other two thirds of the barrow have eroded down a steep slope cut out by the Rhine. It is impossible to say how many barrows were destroyed in this way.

The dynamic nature and constant sedimentation and erosion in the central river area, means we know little of the barrows constructed there. From excavations in the Rhine-Meuse river area we know that people lived there during the Late Neolithic and the Bronze Age and that they constructed barrows (Arnoldussen 2008, 437-441; *e.g.* Meijlink and Kranendonk 2002; Bourgeois and Fontijn 2008, 51-54; Jongste and Van Wijngaarden 2002). Yet barrows are only infrequently encountered here. The distribution of barrows in these areas reflects the distribution of sporadic archaeological excavations and chance finds rather than the actual distribution of barrows.

Erosion and subsequent sedimentation of wind-blown sand can be considered relatively local but its impact on any barrows present in such areas severe. Many of the sand-dunes in the Central and Southern Netherlands are of Weichselian age (or at least pre-date the barrows as several are built on top of them, see Chapter 5; Berendsen 2000b, 44).

Yet drift-sand also occurred throughout later prehistoric times (Koster 2009, 100). During the excavations at the Zevenbergen near Oss, layers of drift-sand were recorded underneath and on top of Bronze Age mounds. Several of these layers were, on palynological grounds, dated to the Bronze Age (Fokkens, *et al.* 2009, 51).

Some of these drift-sands may well have been the result of the cutting of sods in the vicinity of the mounds (Bakels in prep.). Certainly these areas of drift-sand will have affected and destroyed barrows (they are, after all, made of sand as well). These drift-sands were usually rather local in nature and probably did not devastate entire areas, although there is a case to be made that the impact of these drift-sands increased in the Iron Age (Van Gijn and Waterbolk 1984).

Nevertheless, the majority of the large-scale drift sands probably originate in the late mediaeval period (Koster 2009, 100-103) and in some cases they impacted vast areas. The *Kootwijkerzand* on the Veluwe is such an example, until recently covering several square kilometres (Heidinga 1987; Koster 2009). Especially the large scale drift-sands of the latter areas have been detrimental to the barrow landscape. Partly through the erosion of these mounds and partly through the covering of them with sand dunes. In these rough sandy areas, very few barrows are recorded. Indeed, it can be said that the distribution of barrows is negatively correlated with the presence of Late Holocene drift sand (Fig. 4.1).

The area to the northwest of Ermelo, called the *Beekhuizer zand* is a case in point. Here an area of more than 10 km² is covered by drift-sand. Not a single barrow is known from this area, while just one kilometre to the south, on the *Ermelose heide*, dozens of barrows can be found. Several surface finds from the drift-sand area point to occupation from the Middle Neolithic up to the Middle Ages (Deeben 1989, 31-42), yet all traces of possible mounds will have been destroyed by the drift-sand.

A third factor influencing the archaeological record are geochemical processes. Most of the preserved barrows are located on relative acidic soils. While not necessarily detrimental to the burial mound itself, skeletal remains within them have almost invariably deteriorated to the point where only a discolouration in the soil remains visible (a so-called *lijksilhouet* in Dutch). Only in some rare cases have the remains been preserved to such an extent that any form of analysis such as sexing the individuals was possible (*e.g.* Bourgeois, *et al.* 2009).

Similarly, bioturbation and soil-formation processes have influenced the visibility of archaeological features. In most cases features were no longer visible and were homogenised to such an extent that they were indistinguishable from their matrix (Bourgeois and Fontijn 2010, 38; Fig. 4.2). These processes have influenced the archaeological record in two ways. Firstly, barrows significantly affected by these processes will be hard to interpret and many features will remain undetected. Secondly, unexcavated mounds, when inspected through corings, will be very hard to distinguish from non-anthropogenic sand dunes. Indeed, in several instances, a barrow was no longer considered a barrow at all but rather a natural dune on the basis of corings or a small trial trench. Yet in some cases, upon a second inspection, excavations produced cremated remains and charcoal (*e.g.* barrow 4541).

To summarize, the extent of the barrow distribution on the Pleistocene soils of the Central and Southern Netherlands is significantly influenced by natural processes. It can be concluded that the main natural erosive processes pertaining to barrows are essentially limited to drift-sand areas and the Rhine-Meuse delta.

Fig. 4.1: The distribution of all known barrows on the Veluwe offset against Late Holocene drift sand and urbanized areas. There is an almost complete absence of recorded barrows within areas of drift sand (the extent of Late Holocene drift sand after Koster 2009, fig. 2a).

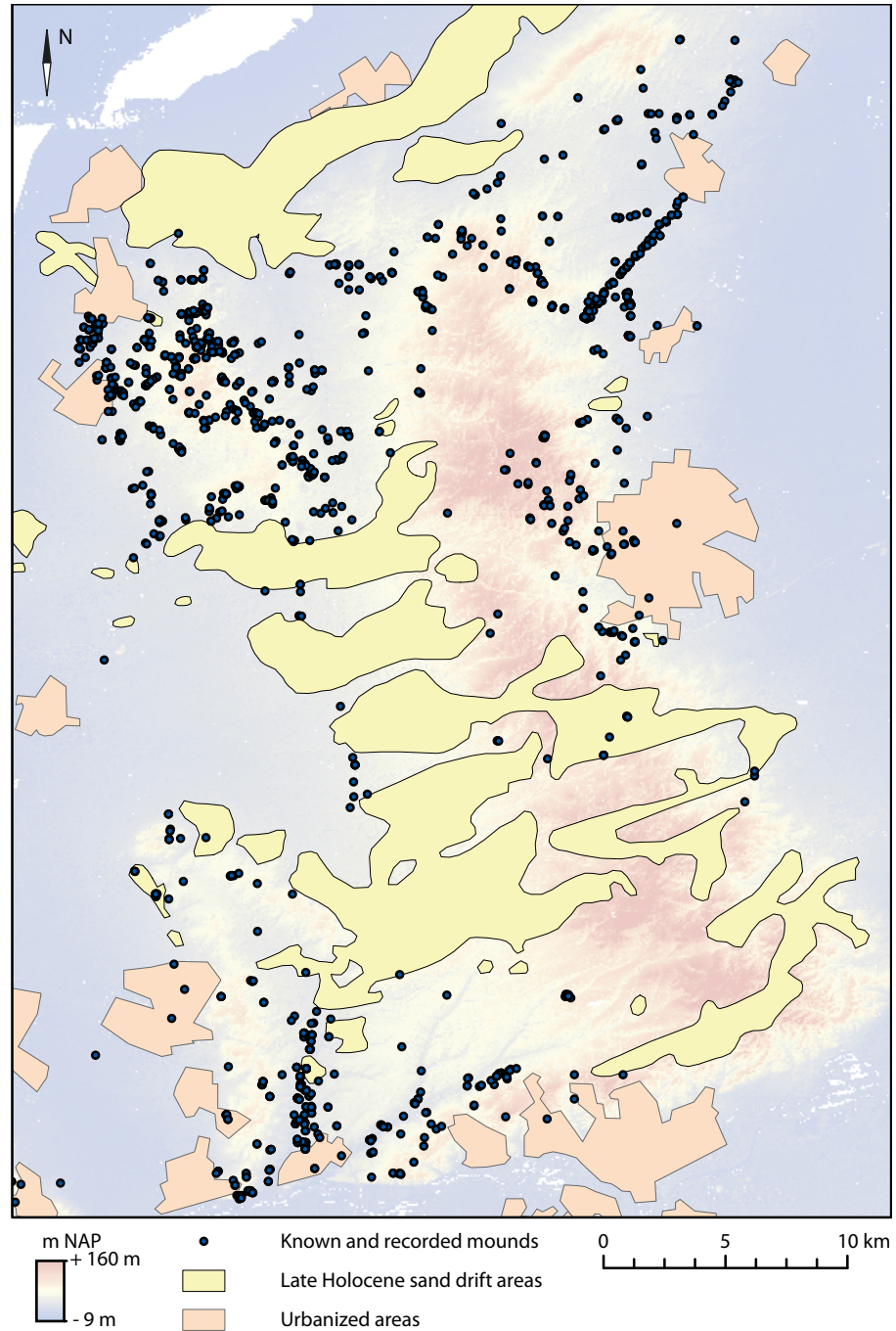


Fig. 4.2: Photograph of a profile through Mound 2 (centre of the mound is to the left) at the Wiesselse Weg, municipality of Apeldoorn. Just to the right of the centre of the photograph, a slightly greyish discolouration denotes the primary cremation burial. Any other features such as sods or secondary burials were invisible within the body of the mound itself. Even the level of the old surface cannot be recognised. Such a profile is typical for many barrows on the ice-pushed ridges of the Veluwe and the Utrechtse Heuvelrug (photograph by Q. Bourgeois, composition by J. van Donkersgoed).



4.3.2 Anthropogenic processes

While natural processes certainly influenced the preservation of barrows, human impact in the Low Countries is arguably as big, if not bigger. Agricultural activities, urbanization, afforestation programmes and heath-management have all had a profound impact on the visibility of the archaeological record.

The human influence on the barrow landscape can be divided into pre-19th Century and modern activities.

The majority of pre-19th Century agricultural activities are in evidence through the presence of *essen* or *plaggen* soils (Gerritsen 2003, 19-22). These soils are the consequence of a Late Mediaeval agricultural practice carried out over several centuries. This practice involved the cutting of sods from the surrounding lands, which were then placed in a byre. When they were soaked through with manure they were carried out into the fields. As a result of these practices the agricultural fields were gradually raised with layers of sods on top of the old prehistoric surface, in some cases more than a metre in thickness (Fokkens 1998, 59).

Prior to the establishment of the *essen*, all above-ground features were levelled (Gerritsen 2003, 21) meaning that any burial mounds underneath will now have disappeared. Extensive *essen* complexes surround many towns and hamlets, effectively blanketing any barrows underneath them. Only excavations in these *essen* complexes will reveal the sub-surface features of the barrows (*e.g.* Roymans and Tol 1993). There are no written records concerning barrows prior to the creation of these *essen* and all information on barrows underneath them is based solely upon excavations.

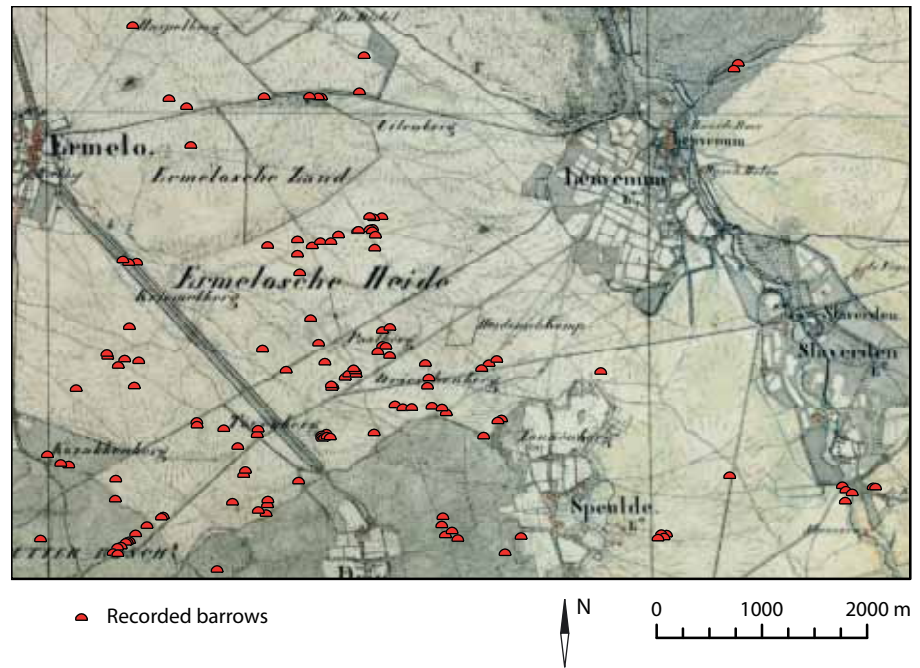
Outside of these *essen* complexes, extensive tracks of heathland were present until the 19th Century. The heathlands and the *essen* were part of the same agricultural system. The sods, used in the byres were collected from these heathlands (Gerritsen 2003, 19-23). This practice was recorded by one of the earliest chroniclers of prehistoric monuments in the Low Countries. In the 17th Century Johan Picardt noted how the cutting of sods was detrimental to burial monuments:

't Is apparentlijck datse voortijts eens soo groot geweest zijn als ze nu zijn vermiths haer alle jaren De huydt af-gevilt wert met plaggen mayen.' [It is apparent that [the barrows] were bigger in the past than they are now as every year their skin is flayed by the cutting of sods.] (Picardt 1660, 44).

While parts of the heathlands were kept as heath through the practice of sod-cutting, in mediaeval times large parts of the heathland were probably also maintained by flocks of grazing sheep (Modderman 1982, 7-8). It is in these heath-fields that many overground features were still visible and that the most significant concentrations of barrows have been preserved. In some cases barrows have even been indicated on Topographic Military Maps from the 19th Century (see Fig. 5.4).

As far as we can reconstruct from the distribution maps, most of the barrows in the Netherlands were located on pre-19th Century heathland. And although shepherders frequently dug pits in the top of barrows in order to shelter them from bad weather (*e.g.* Goekoop-De Jongh 1912, 24), most of the barrows were relatively well preserved here. Such digging activities will often not have reached the primary grave, and the continuous human activity in the heathlands was on average much less destructive than on for example arable land. This does mean however, that in many cases the information on secondary burials is limited by the extent of the damage to the top of the mound.

Fig. 4.3: A Topographic Military Map, drawn in 1848. All known barrows within the area are located in heathland or in forested areas. Note how no barrows can be found in proximity of hamlets and towns in the area. Even around the smallest hamlets (e.g. Speulde), a zone of at least a kilometre is devoid of barrows.



While agricultural activity had arguably the most significant influence on the formation of the map, the influence of settlements should not be forgotten either. The earliest examples date back as far as the Late Iron Age (Verwers and Van den Broeke 1985). As a slightly later example, dozens of barrows were levelled with the construction of the Roman fort at Nijmegen. They were only rediscovered during the excavation of the fort (Louwe Kooijmans 1973; Fontijn and Cuijpers 1999; 2002). As the discovery of such sites is dependent upon chance finds, it is difficult to quantify the extent of prehistoric and pre-modern occupation and the damage it may have caused to burial monuments.

To summarize, pre-19th Century human influence on the map formation processes can be considered significant. Essentially, mounds are only known from the heathlands outside of late mediaeval settlements and the arable lands surrounding them. Areas on 19th Century maps, indicated as arable land, pasture or as built-up area must be considered blind spots. Barrows within these areas can only be uncovered through excavations. Burial mounds were almost exclusively preserved in areas indicated as either forest or heath on those maps (Fig. 4.3).

Human influence on the landscape increased significantly from the 19th Century onwards. While the majority of the landscape still consisted of heathland around 1830, today only small fragments remain. The vast heathland still visible on the earliest maps, was quickly converted into either arable land or forest throughout the late 19th and early 20th Century (Gerritsen 2003, 23).

Where they were converted into agricultural fields, almost invariably barrows would have been levelled. This process was in full swing when Glasbergen started to excavate at the Toterfout Halve Mijl barrow group in 1948 (see Chapter 5), and indeed most of the barrows he excavated had already been levelled or were in danger of being levelled prior to the excavation (Glasbergen 1954a, 14-22). If not for the work of Glasbergen and his predecessors, many of the barrows now in the archaeological record would have silently vanished. It is however still the case that in modern agricultural fields mounds rarely survive. And if records exist, they invariably date from excavations before the 1960's.

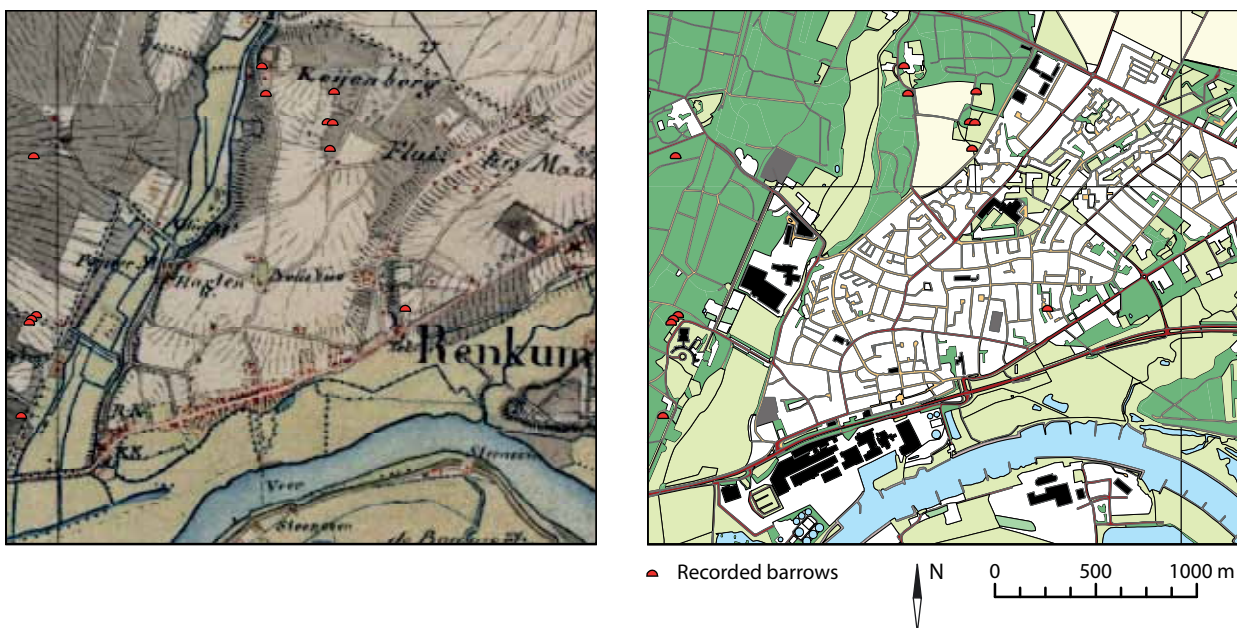
Large tracts of heathland were also turned into forests. These afforestation practices are usually a blessing for barrows but sometimes a curse. In some cases large steamploughs were used (notably on the Crown Estates on the Veluwe; Bleumink and Neefjes 2010, 78-86) which caused great devastation (Fontijn and Louwen in prep.).

Generally speaking however, the planting of trees only obscured the monuments and did not necessarily destroy them. 72% of all recorded barrows on the ice-pushed ridges of Ede-Wageningen and Renkum (see Chapter 5) are located in forested areas, while only 28% are found in other types of terrain. Especially in the last decades many new barrows have been discovered in forests on the Veluwe. And with the availability of increasingly detailed Lidar-data it is only a matter of time until more will be uncovered (e.g. De Boer 2004; Fontijn and Louwen in prep.).

A last and significant anthropogenic process affecting the barrow landscape is modern urbanization. As an example, we can consider the town of Renkum on the Veluwe and its expansion most notably after World War II. The historic centre of Renkum was located on the southern tip of the ice-pushed ridges overlooking the Rhine. Gradually throughout the 19th and 20th Century the town expanded to the north and north-east. From its historic centre, which covered an area of only ± 0.15 km², it grew to approximately 3.5 km² in 2010 (Fig. 4.4). That this expansion must have destroyed many a barrow is evidenced by the rescue excavation of a barrow conducted by Van Giffen in 1958 in the town of Renkum (Van Giffen 1958, *66). Today the barrow would have been located in the centre of modern-day Renkum, but in 1958 it was located at the edge of the town. How many barrows were destroyed in the expansion of the town before and after this date is unknown. The barrow excavated by Van Giffen can be taken to represent several destroyed barrows. It is equally striking that to the north an alignment of barrows stops right at the edge of the modern town (see Chapter 5).

Modern human activities can certainly be considered as detrimental to the map formation processes. There is a significant difference to pre-19th Century activities however. From that period onward, barrows were excavated and described by many archaeologists, both amateur and professional. Whereas the pre-19th Century activities represent blind-spots on the map, modern activities distort rather than destroy the pattern. Barrows may be known from these areas, but it will often be difficult to estimate how many of them have effectively been destroyed.

Fig. 4.4: A comparison between the Topographic Military Map on the left (drawn in 1845), and the modern topographical map (created in 2010). The heathland surrounding the small hamlet in 1845 (light brown area) is now fully urbanized (black and white areas). The distribution of recorded barrows stops at the edge of the modern town.



It can be safely concluded that there are few areas in the Low Countries where the human impact has not been detrimental to the preservation of burial monuments. The best chances for survival can be found in heathland and forested areas. Other regions are so extensively damaged by human activity that little to no barrows are known from them. In essence we are thus researching the *least damaged* remnants of the barrow landscape. It is therefore important to realize that we, out of necessity, can only study the barrow landscape in specific areas, such as nature reserves and large estates.

4.3.3 Research factors

A third and last major factor affecting the map formation process is the intensity of research for any given area. Both amateur and professional archaeologists will have certain interest areas where they dedicate most of their time and resources. This in turn is then reflected by varying densities of archaeological finds (Fokkens 1998, 59-60).

The high density of recorded barrows on the *Utrechtse Heuvelrug* for example, is due in major part to the never-remitting work of Ms Delfin-Van Mourik Broekman (Fontijn 2010, 19; Van Ginkel and Van Koeveringe 2010, 21). Similarly, Beex has been responsible for identifying the majority of barrows in the *Kempen* area of North-Brabant. In many cases he recorded barrows just as they were being destroyed by reclamation efforts (see Chapter 5).

At the same time, excavations by both amateur and professional archaeologists have also contributed to the formation of the map (Fokkens 1998, 59-60). The many finds uncovered by Captain Bellen on the *Ginkelse Heide* and close to the town of Renkum on the Veluwe have proved invaluable to the present research but also reflect his limited action radius and his focus on artefacts (see Chapter 5).

Professional archaeologists have also contributed to the map in a particular fashion. Successive generations of curators at the National Museum of Antiquities for example were especially active on the Veluwe. Through the work of Holwerda, Remouchamps and Bursch we can reconstruct and date parts of the barrow landscape with quite a lot of precision as they excavated more than 75 barrows on the Veluwe alone.⁸ Van Giffen, while sporadically active in the Central (*e.g.* Van Giffen, *et al.* 1971) and Southern Netherlands (*e.g.* Van Giffen 1937a) was directly involved in the excavation of more than half of the known barrows in the Northern Netherlands. For the Southern Netherlands we can rely on the work of Glasbergen (Glasbergen 1954a; b) without forgetting to mention the considerable work of – at that time provincial archaeologist – Beex (Beex 1952a; b; 1954; 1957; 1958; Beex and Roosens 1962).

The differences between who excavated where and at what time has had a profound influence on the quality of the data available. For example, Holwerda and his successors rarely if ever distinguished multiple activity phases in burial mounds. The difference in secondary graves discovered by Modderman and Remouchamps is staggering. Modderman recorded no less than 77 secondary graves in 31 severely damaged barrows (Modderman 1954; see Table 5.4) while Remouchamps recorded none in his excavations of at least nine well-preserved barrows on the same heath (Remouchamps 1923).⁹

8 These are the excavations that we know of, usually the less ‘interesting’ barrows were not or only sparsely published. Bursch for example published his excavations of barrows 1, 7, 8 and 9 on the *Houtdorperveld* located near the hamlet of Speuld (Bursch 1933a, 45-50). The excavation plans of barrows 2 to 6 are present in the Archives of the National Museum of Antiquities, indicating that while he did excavate them he did not publish the plans.

9 Or at least he did not recognise them as such. Barrow 1b especially may contain more than one secondary grave (*cf.* Remouchamps 1923, 6; see Chapter 5).



Fig. 4.5: The selected case studies: a) Epe-Niersen; b) Renkum; c) Ermelo; d) Toterfout.

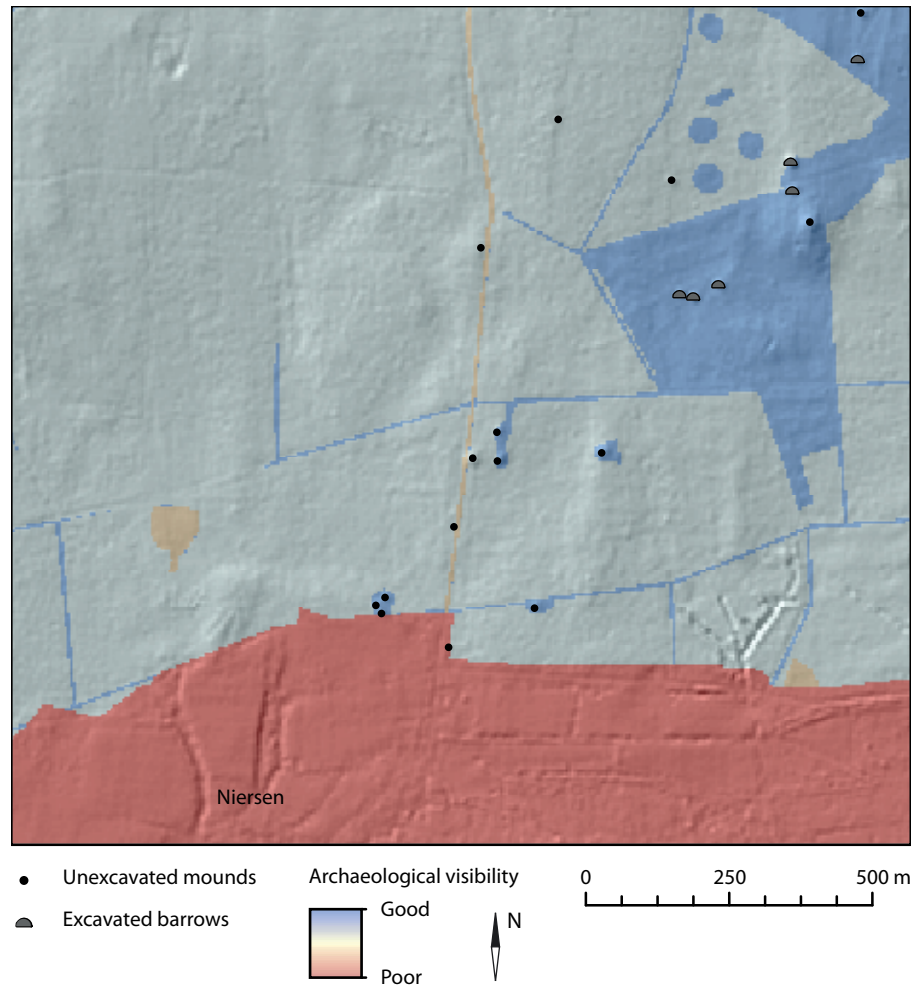
Such significant variations in the quality of the dataset mean that not all are suited for every type of research. Information on the reuse of barrow landscapes is very difficult to quantify in the older excavations. On the other hand, they are ideally suited to understand the genesis of barrow landscapes as they frequently provide information on the primary graves.

4.4 Selecting and assessing the Research Areas

There is no such thing as a perfectly preserved barrow landscape, they are all modified and deformed to a certain degree. As the processes affecting them vary from region to region, it follows that not every area is suited for a specific question. The selection of a specific research area is therefore dependent on weighing and evaluating all possible map formation processes and their effect on the data available.

Some regions are entirely unsuited to the research of barrow landscapes as they have been extensively modified by both natural and anthropogenic processes. Large scale sedimentation and erosion in the central river area has probably obscured hundreds of burial mounds. These can only be uncovered during excavations. As these are usually limited in scale, they will only unveil a small fragment of the barrow landscape.

Fig. 4.6: An assessment of the map formation processes and their effect on archaeological visibility. Red colours indicate poor visibility, while blue colours indicate good visibility (see Fig. 5.3). Note how the distribution of barrows stops just on the edge of the essen complex surrounding the hamlet of Niersen.



The limited number of recorded barrows in western North-Brabant for example probably does not reflect their absence. 19th Century maps of the region, indicate that the landscape was much more intensively worked than in eastern North-Brabant, thus lessening the chance of barrows surviving to be recorded. Recent excavations have revealed several mounds there (Kranendonk, *et al.* 2006), yet the overall distribution is poorly known.

At the same time regions with large numbers of barrows may not be ideal either due to research processes. While dense concentrations of barrows are known from the Eastern Netherlands (notably on the ice-pushed ridges of Ootmarsum and Rijssen-Markelo), the research intensity here is extremely low (Van Beek 2009, 65). The same applies to the *Utrechtse Heuvelrug*: here approximately 150 barrows are known, yet only a handful have been excavated (Fontijn 2010, 15-16).

Conversely, areas with a high research intensity may be equally unsuited due to the nature of the research. As mentioned above, research on the reuse of barrow landscapes in places where Holwerda, Remouchamps or Bursch were particularly active will be difficult. Areas mainly inventoried by amateur archaeologists have similar limitations.

In order to answer the questions central to this research – understanding the genesis and development of barrow landscapes – four representative research areas were selected. Three on the Veluwe and one in the Southern Netherlands (Fig. 4.5). Each of these regions conforms to three selection criteria. Firstly a high

Land-use and soil types	Archaeological visibility
<i>Essen</i>	--
Open water	--
Swamps and marches	--
19 th Century urban area	--
Modern sand erosion	-
Roads	-
21 st Century urban area	-
Arable land	-
Pasture	-
Forest	+
Heathland	++

Table 4.1: A qualitative assessment of land-use and its effect on the barrow landscape. A negative score indicates the land-use is detrimental to the preservation of barrows, while a positive score indicates it is beneficial.

density of recorded barrows within a given area. Secondly a high (quality of) research intensity (where at least a third of the known barrows have been excavated). Thirdly a limited impact of both natural and anthropogenic processes.

The distribution of barrows was determined on the basis of known and recorded barrows. The national database of archaeological sites (ARCHIS) was used as a basis for all recorded barrows.

For each individual research area the map formation processes were weighed in order to assess what part of the barrow landscape was well preserved (Fig. 4.6). Each individual process that could be mapped was qualitatively evaluated, mainly on the basis of historical maps (notably the *Topografische Militaire Kaarten* or TMK) and modern-day land use. Each individual land-unit was given either a positive or negative score (e.g. modern-day heathland already present in the 19th Century received a ++ score, while *essen* surrounding a town received a -- score; see Table 4.1).

As a cautionary note, it is important to realise that the human impact on these areas is certainly significant. Even these research areas with their high densities of burial monuments consistently demonstrate that here too many barrows have disappeared over the centuries.

4.5 Conclusion

I have argued that the 4000 barrows in the Low Countries are only a fraction of the barrows that were once built and that several map formation processes significantly reduced the number of recorded barrows. The most significant of these is arguably the human impact and especially the pre-19th Century influence has been considerable. Agriculture and the construction of towns has destroyed thousands of barrows.

I have argued that the barrow distribution can only be reliably reconstructed in areas that were outside of the influence zones and *essen* complexes of Late Mediaeval hamlets and towns. Indeed, the majority of barrows are now only found in areas which, in the 19th Century were heathland or forests.

And even afterwards the human impact continued to reduce the barrow distribution to a large extent. Extensive barrow distributions are now only known from large estates such as the Crown Estates and landowners such as *Staatsbosbeheer*. Outside of these estates, we are dependent upon whether or not they survived long enough to be recorded by professional and amateur archaeologists. Fortunately such areas do exist, and it is to these that I will now turn in the next Chapter.