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New archaeological issues in the former Bourtanger Moor (The Netherlands)

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Zusammenfassung: Die einst so ausgedehnte, grenzüberschreitende Landschaft des Bourtanger Moores ist heute vollständig urbar gemacht und wird seither landwirtschaftlich genutzt. In dem niederländischen Teil zwang eine umfangreiche Flurbereinigung zu einer Inventarisation sämtlicher archäologischen Überreste in der nunmehr moorlosen Landschaft. Während der Landesaufnahme in der Provinz Groningen, zwischen 1982 und 1999, wuchs die Einsicht, dass vom Restmoor mehrererorts Teile erhalten geblieben waren, sei es an der Erdoberfläche oder unter jüngeren Ablagerungen. Dieser Umstand führte dazu, dass wir noch reichlich über Information über die Vernässungsphase der frühholozänen Landschaft und seiner Bewohner verfügen. Zwei Beispiele befassen sich mit vorgeschichtlicher Landnutzung: die mesolithische Besiedlung der Flugsandlandschaft, welche dem Moorwachstum im westlichen Arm des Bourtanger Moores voranging, sowie die Feuchtlandschaftsnutzung im östlichen Arm des Bourtanger Moores, einem von kleinen Bächen durchflossenen Gebiet in der Übergangsphase zur Vermoorung, zwischen Neolithikum und Eisenzeit. Ein drittes Beispiel behandelt das nördliche Bourtanger Moor, wo mittelalterliche Bauern ein leicht ausgetrocknetes Hochmoor kolonisierten. Ihre Hinterlassenschaften wurden von spätmittelalterlichen Meeresüberschwemmungen versiegelt. Diese Beispiele mögen einige Lösungen zur archäologischen Denkmalschutzstrategie in abgetorften Moorlandschaften zeigen. Es wird der Versuch gemacht, die Aufmerksamkeit von einzelnen archäologischen Fundstellen auf ganze Landschaftsarchive zu lenken.

Abstract: The once extensive Bourtanger Moor, stretching across the state border between Germany and the Netherlands, has been reclaimed completely and arable land has taken its place. On the Groningen side, a reconstruction program necessitated the inventarisation of archaeological remains in a landscape deprived of its peat cover. A research project was carried out between 1982 and 1999. In this period it became apparent that several peat pockets had been left, some near the surface, others under younger sediment, and that they provided good quality information on the drowning Early Holocene landscape and its inhabitants. Two examples deal with prehistoric land use: the Mesolithic occupation of the cover sand landscape preceding the peat growth in the western lobe of the Bourtanger Moor and the exploitation of a wetland in the eastern lobe of the Bourtanger Moor, intersected by streams, in its transition phase to a waterlogged area from the Neolithic to the Iron Age. A third example deals with the northern Bourtanger Moor, where medieval peasants, whose activities were sealed by late-medieval marine transgressions, colonised a partly dried out bog. These examples are chosen to present some solutions to archaeological heritage management in reclaimed bog areas. An attempt is made to shift official attention from individual archaeological sites to complete landscape archives.

Keywords: Bourtanger Moor; reconstruction program; peat pockets; "Mesolithic" landscape; fossil Ems branch; burial mounds; medieval farmers; heritage management

At the end of the Middle Ages the Dutch-German Bourtanger Moor was probably the largest closed peat area in Europe. The raised bog must have measured some 1,600 km² before systematic reclamation started in the late 1590s on the Dutch side. Before this, monasteries had already nibbled at the edges, but now private companies started peat cutting in a more commercial way. This early reclamation brought into existence the so-called peat colonies, strictly geometrical townscapes with wide horizons, now considered fine examples of a man-made landscape. The elongated plots, bordered by ditches and canals which were meant for drainage, the transport of the peat and the shipping of the crops, caused a pattern that determines town and country planning up to the present day. The early reclamation, however, prevented the bog from becoming the subject of a comprehensive study. Scientific interest in bog landscapes was totally absent in the 16th and 17th centuries (Fig. 1).

For the Bourtanger Moor, until the end of the 18th century, treatises on peat and peat growth struggled with biblical references to the Great Flood, e.g. in an attempt to explain numerous trees lying all in one direction, found at the base of the fen peat. The earliest scientific interest focussed on the botanical composition and on peat stratigraphy. Only the second half of the 19th century saw the recognition of the effect of climate on peat growth. Between 1910 and 1920 there was an increase in scientific publications in the Netherlands; yet this did not lead to a tradition of peat research, as was the case in Germany and Sweden. Dutch scholars such as Visscher (1931), who had the opportunity to see peat cutting in the Bourtanger Moor in full swing, worked largely in the German-Scandinavian morphological tradition.

In the 1960's the biologist Casparie decided to work from an archaeological point of view, considering the rapid decrease of raised bog and the number of trackways that had been discovered

Fig. 1 Raised bogs (1) and fen mires (2) in the Netherlands and adjacent NW-Germany before reclamation; the Bourtanger Moor at the state border (Casparie & Streefkerk 1992)

during peat cutting activities. He described about 10 km of vertical peat faces in the southern province of Drenthe, the very last remnants of the Dutch Bourtanger Moor. In his thesis he made peat formation processes better understood and was able to reconstruct prehistoric man's solutions to building trackways in this specific environment (Casparie 1972). There and in his later publications the hydrology of the raised bog and not so much climatic factors became the leading principle (Casparie & Streefkerk 1992). Hydrological measures were necessary both to preserve the last trackway left in the Bourtanger Moor, trackway XXI (Bou) of Nieuw Dordrecht (Casparie 1987) and the only real Bourtanger Moor fragment left, the 2000 hectare bog reserve of the Bargerveen (Fig. 2). This isolated reserve, surrounded by arable fields, needed rigorous hydrological measures to revitalise the severely desiccated bog. In fact it has needed three

Fig. 2 The Bargerveen reserve has a sophisticated water management, rejoicing in a growing interest (photo A. van Schaïk)

decades of assessment, before the State Forestry Department could call the project a success and boast of a living raised bog again. The present management is a water management and the historical issue has receded into the background.

Here the history of the Bourtanger Moor could end. The "brown gold" has been mined and arable land has taken its place. The transformation of the region, occurring between roughly 1600 and 1950, was an immense success in terms of revenues for the peat cutting companies and the tax-imposing city of Groningen, as well as for the development of heavy industry in the old county of Holland, for agricultural progress and the supply of food for a young, expanding nation. Some historians claim that the Dutch Golden Age is founded on peat cutting activities in the Bourtanger Moor. Be that as it may, after about 1950 the bottom fell out of the market and the once so prosperous peat colonies (Dutch: "Veenkoloniën") turned into a source of anxiety for local and national authorities. To take a turn for the better, in 1979 a huge reconstruction program was launched to revitalise an area of no less than 130 km², including the greater part of the Bourtanger Moor. Archaeologists were suddenly forced to make up their minds. Hardly any scientific research had been done in the sandy subsoil of the peat colonies on the Groningen part. There was a vague notion of Mesolithic occupation on top of cover sand dunes, but the nature and condition of these sites were unknown. Surveying still had to be organised. The definition of the question at hand was to investigate if the reconstruction program would eventually damage archaeological interests and if so, how to tackle this problem. The necessity of running on schedule accelerated the mental leap to get down to the root of the matter. New issues had to be chosen, in itself a product of the time: the scarceness of sources and the absence of an archaeological tradition in this area forced concentration on the idiosyncrasies of a landscape deprived of its peat cover. It automatically introduced the quest for peat pockets and the inquiry into the drowning process of the Atlantic landscape. The examples presented here include (Fig. 3):

- Mesolithic occupation on the Early Holocene cover sands in the western lobe of the Bourtanger Moor
- Use of a wetland from the Neolithic to the Iron Age in the catchment basin of a fossil Ems branch
- Medieval occupation on the raised bog under marine deposits in the northernmost Bourtanger Moor

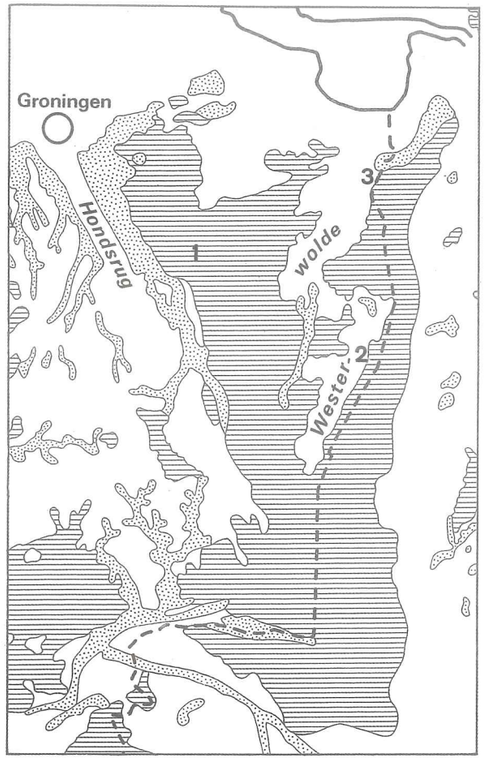

Fig. 3 The Bourtanger Moor and the research areas in (1) its western lobe, (2) the Westerwolde interruption and (3) its eastern lobe (after Casparie & Streefkerk 1992)

At the start of the inventarisation the first question to arise was if all peat had actually vanished. It appeared that especially the peat cutters of the 17th and 18th century had left mire and bog pockets in the undulating cover sand subsoil. This is especially the case in the older peat colonies. Many blow-outs have not been mined down to the very base, because of a high water table and bad peat quality (Fig. 4). Later peat cutting, including unorganised peat cutting during WW II, led to a more thorough reclamation and a mixing of the top soil with the sandy subsoil. The peat pockets left have been seized to study the environment in a phase preceding the drowning of the cover sand landscape.

Slightly different was the start in the "Siedlungskammer Westerwolde", an isolated complex of river dunes never covered with bog peat and dividing the Bourtanger Moor into a western and an eastern lobe. Here in the first half of the 20th century much dry-context archaeology had been conducted. The environmental information now had to be collected from the peat left in fossil drainage systems. The supposed contrast between Veenkoloniën and Westerwolde both in an environmental

Fig. 4 In the older Peat Colonies much peat was left in cover sand depressions (dark spots). Situation west of Veendam in the 1960's (De Smet 1969)

and a socio-economical way formed the basis of a study in the course of the reconstruction program (Groenendijk 1997).

Finally, in what can be called the northernmost part of the Bourtanger Moor, bordering the sand island of Westerwolde, a bog peat more or less undamaged appeared to be buried under marine clay. Here man's attempts to reclaim the raised bog in the Late Middle Ages were studied (Casparie & Molema 1990; Groenendijk & Schwarz 1991; Bärenfänger & Groenendijk 1999).

Mesolithic occupation

This example from the central Bourtanger Moor focusses on the early Holocene cover sand landscape which is now lying at the surface. Its geomorphology shows an endless repetition of inland dunes and shallow depressions. In the Boreal the old surface stopped drifting and was fixated by vegetation. Peat remains are present in blow-outs (raised bog) and Late-Glacial pingos (gyttja, fen mire and raised bog). The latter may reach depths of several metres and contain a sequence from birch taiga to the Atlantic spurt in peat growth.

The upper 50 cms of the podsolised cover sand blanket resembled an archaeological archive; Mesolithic sites seem omnipresent. There is no contamination by occupation after 5000 BC, the start of regional peat growth. Hunter-gatherer groups frequented the area between 8000 and 6500 BC, occupying the drier dunes to put up their camps. All sites are situated on sand elevations, but not on any dune but exclusively on those in the neighbourhood of shallow, loamy depressions (Fig. 5). These provided wet biotopes with an attractive flora and fauna. Charred plant and wood remains indeed refer to plant foraging and cooking or roasting techniques (Perry 1999). Hearth-pits, rich in charcoal, proved a very specific and uncontaminated source of information on gathering fuel and so might reflect (part of) the Boreal and Atlantic vegetation. We think that the attractiveness of the physical environment was based on the balance between both drier grounds and wet biotopes at short distances – a situation liable to change if the ground water table were to rise. Yet it was not the extending bog that chased people away. As soon as the Atlantic climax forest settled, the hunter-gatherers shifted to the brook valleys, some 1500 years before the regional peat growth started. The dense forest must have been unattractive for them.

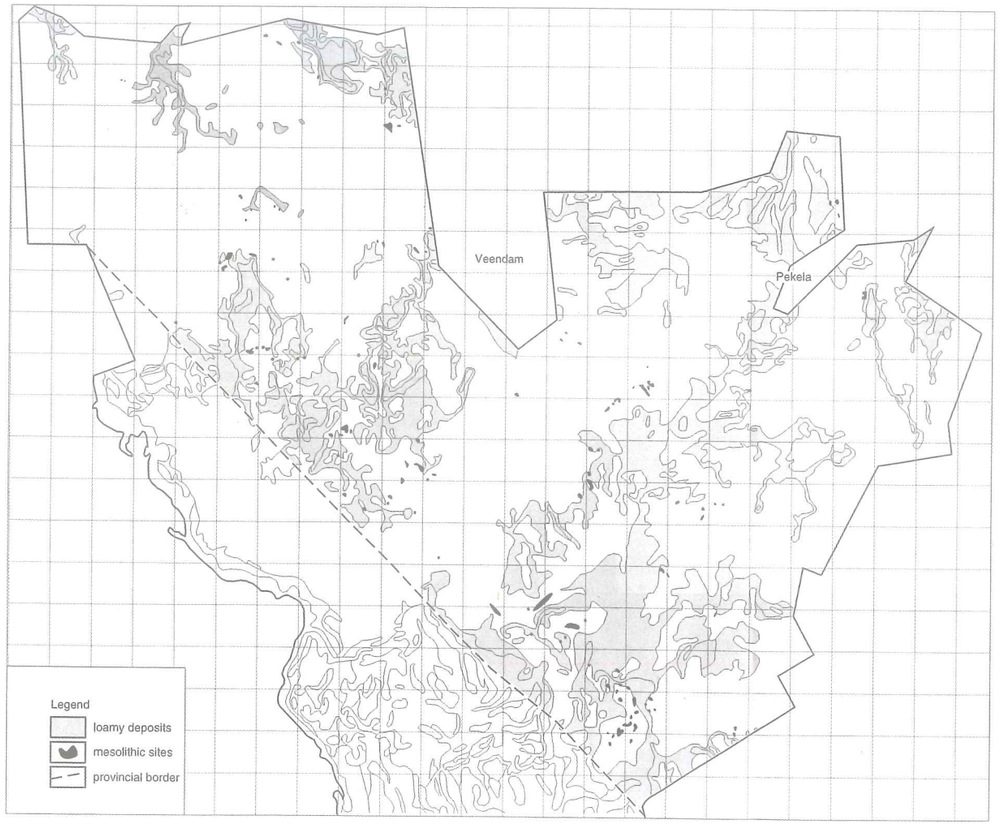

Fig. 5 Distribution of Mesolithic sites and loamy deposits in the Groningen Peat Colonies (GROENENDIJK 1997)

In research terms the cover sand find horizon is easily accessible. But in heritage management terms the find horizon is most vulnerable to agricultural damage. The top of the early Holocene landscape is in a process of being absorbed into the plough horizon. Archaeologists are in a hurry to develop site selection criteria and accelerate excavation programs, for in ten years no landscape archive will be left here. The advantage of the accessibility of the early Holocene find horizon, brought to light in the course of four centuries, has finally become an enormous threat to the soil archive.

Fossil Ems branch

In the German part of the Bourtanger Moor, in the Landkreis Emsland, the situation is not very hopeful in terms of heritage management. What happened here about fifty years ago is best demonstrated by an aerial photograph taken at the state border in the eastern lobe of the Bourtanger Moor (Fig. 6). Here we see the fields on the Dutch side, reclaimed in the 1920's and 1930's. East of the state border we see how the Emsland GmbH has just ploughed the raised bog with the impressive but notorious Otto Meyer Dampfpflug, erasing all peat left and bringing the sandy subsoil to the surface. No archaeological information can be expected in situ. Yet the photo shows a striking pattern in the shape of dark, winding strips: this is a fossil drainage system at the base of the Bourtanger Moor. The pattern appears to link up exactly with the gullies visible on the Dutch soil map from the 1970's (Fig. 7). The fossil drainage system was recognized as a Late Glacial branch of the river Ems, connecting the Ems at Oberlangen (D) with the Ruiten Aa river at Sellingen (NL) over a length of about 15 kms (GROENENDIJK & WATERBOLK 1997). The gullies of this Ems branch were silted up and eventually covered by young Sphagnum peat in the Subatlantic.

On an aerial photo from 1989, Alf Metzler from the Niedersächsisches Landesamt für Denkmalpflege (Hannover) saw a series of pale dots, probably burial mounds, on a dune flanking the Ems branch just on the Dutch side of the border. Field surveying located the soil marks on the west bank

Fig. 6 Reclamation progress off the state border in 1952, Germany at the right (photo-archive Province of Groningen)

of the river and some twenty burial mounds were counted, their summits just peeping through the remaining peat. Unhappily an adjacent celtic field meanwhile had been ploughed out, but the burial mounds were undamaged. Burial ground, celtic field and the adjacent brook with its organic fill constitute a unique ensemble (Fig. 8).

To test the state of preservation, one of the burial mounds was opened in 1998. It proved to be an intact pyre mound or "Brandhügel", built up from sods covering a funeral pyre with the cremated individual lying on a bed of oak and heather charcoal. The event of the cremation, radiocarbon dated to between 400 and 200 BC (GrN-24681; GrA-13375) was preserved under the peat blanket. By the 5th century AD the raised bog must already have covered the barrows' tops. Preserving conditions have been very favourable, for even podsol processes, which normally fade out features in both the leach and infiltration zone, had not yet fully developed. Thus paleobotanic information could be extracted from the sods that constituted the barrow, from the pyre mound itself, and from the old surface under and around the barrow.

The discovery of an intact group of burial mounds was the more surprising, as the grand old man of Dutch archaeology, A.E. van Giffen, had excavated the Laudermarke urnfield in 1922 and 1932 some 800 meters west of this location. He carried out an emphatically dry-context excavation, missing the opportunity of environmental research. The excavation focussed on the great variety of burial monuments, from Late Bronze Age to Late Iron Age, which made the Laudermarke urnfield internationally renown. At that time, the Westerwolde sand ridges were leveled and the sand was transported to lower lying peat areas to improve their cultivation potential. In our case the sand was not mixed with the peaty subsoil, but only covered the bog near the fossil Ems branch. The sand overlay slowed down the peat

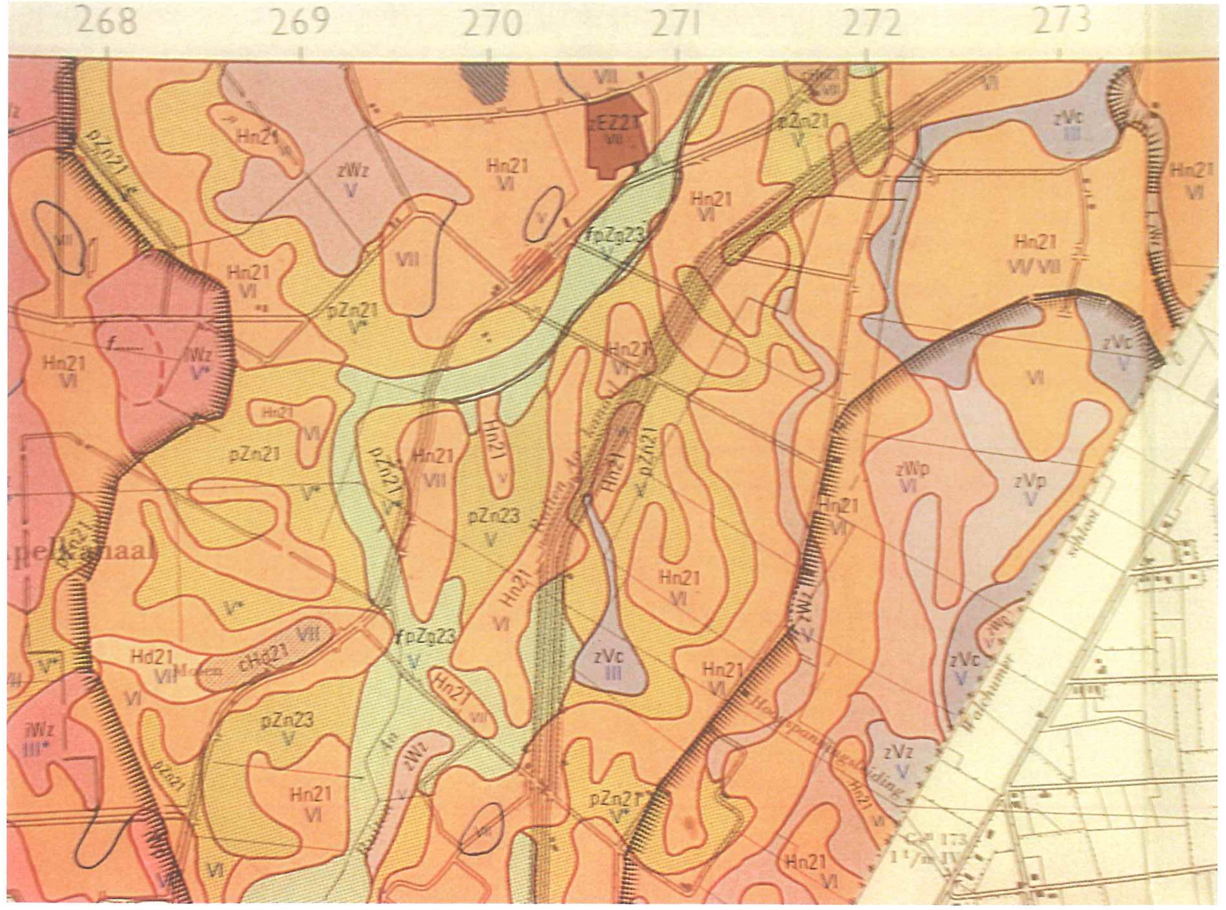

Fig. 7 Dutch soil map of the same area as previous figure. The fossil meander is recognised as a winding peat strip, touching the state border (Bodemkaart van Nederland 1:50.000, sheet 18, STIBOKA 1980)

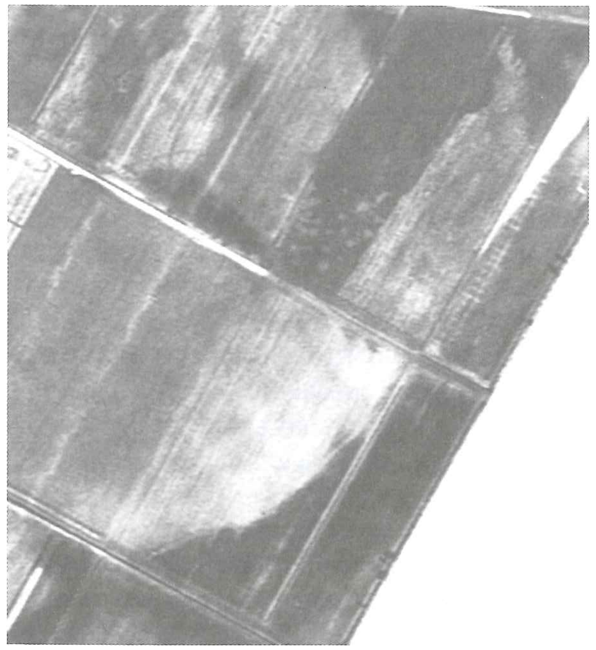

Fig. 8 Aerial photo of the fossil Ems branch (dark) and its sandy bank with a celtic field and a swarm of burial mounds (detail from previous figure; Foto-atlas Groningen, Robas/Topografische Dienst 1990)

deterioration process to an extent that leaves us still with a group of intact barrows.

Parallel to the meandering Ems branch and the present Ruiten Aa/Westerwoldsche Aa river, runs a whole set of more-or-less straight gullies. This drainage system, shaped under other glacial conditions, barely meanders and lacks the flanking river dunes of the fossil Ems branch. No settlements are found here, but instead isolated finds are made frequently, such as stone or bronze axes. Here, modern archaeological research has to concentrate on the wet component, as the dry component is lacking. From one of these gullies we have reports of trackway crossings found in the years 1924 and 1962. A test pit in 1994 brought to light a crossing made from wooden beams and branches, the youngest embedded in young Sphagnum peat. Radiocarbon dates revealed a Carolingean and an Ottonian phase to man's endeavour to cross this gully, at that time not more than a wet depression (Fig. 9). The aim was probably to reach an isolated boulder clay hill called the Hasseberg. Settlement traces were not found on the Hasseberg and the outstanding hill is now thought to have functioned as a stepping stone along a route with a more remote destination.

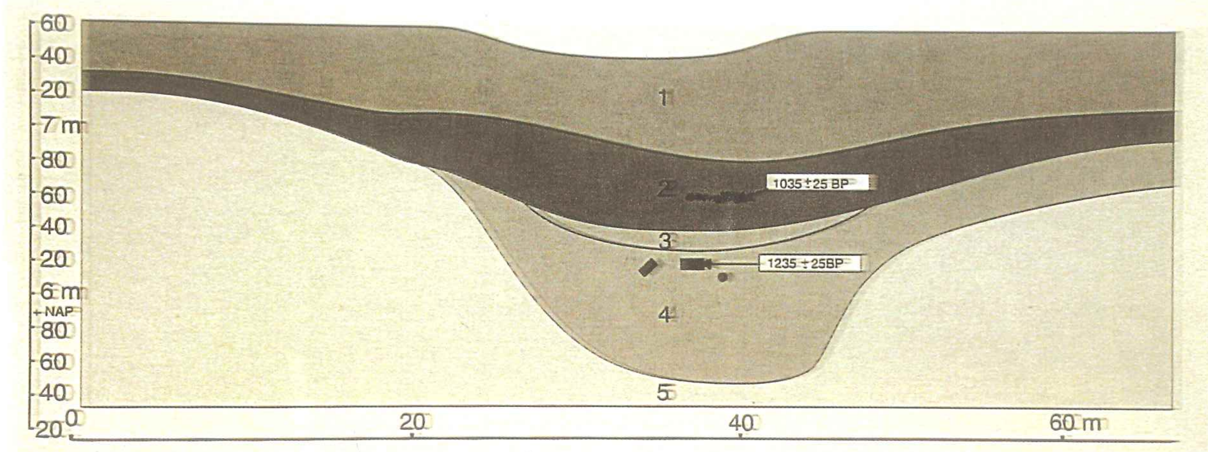

Fig. 9 Section of a peat-filled gully at the foot of the Hasseberg, with two subsequent crossings made of beams and brushwood and their ^{14}C datings (GROENENDIJK 1997)

Organic brook sediments in the former eastern Bourtanger Moor help to reconstruct man's behaviour in a wetland, or rather, in a drowning landscape where overland connections between the Westerwolde area and the left bank of the Ems seem necessary and were maintained up to the Middle Ages.

Present heritage management tries to develop instruments to preserve archaeological information in its original context. Mapping zones with a risk of encountering artefacts, is a first step. Estimating the actual value of these zones comes next. Fig. 10 is an attempt to combine the values from both dry and wet contexts in the Westerwolde region, in several levels of importance. The example shows the present river Ruiten Aa, a northern continuation of the fossil Ems branch. Most endangered are the dunes flanking the brook; here we find the settlements, fields and burials under a thin plaggen soil. Best preserved are the lowest zones, providing information on the brook regime, on the bordering vegetation, and on the use as a hoard and exploitation zone in prehistory. The permanent high ground water table in the valley secures the preservation of macro-rests and pollen sediments. This type of mapping goes beyond the recording of single events such as a stone axe hoard. It combines elements that together create a "landscape archive", rather than merely a set of archaeological find spots.

Medieval exploitation

The third example is from the northernmost part of the Bourtanger Moor, not far from the Dollard estuary. At the end of the Middle Ages the raised bog was sealed here by marine clay. When removed, we encounter on top of the peat a well-preserved late medieval peasant landscape. These are settlements of the Aufstreck type, resulting in long strips of land which acted as a straightjacket once the reclamation was well under way. Detailed profile study led to the conclusion that the settlers were not caught by surprise by the marine floods, but were already in the process of dismantling and shifting their villages as transgressions increased in the course of the 14th century (GROENENDIJK & SCHWARZ 1991). The historically known but completely vanished settlement of Houwingaham was actually rediscovered in1933 by a landowner laying drain pipes; the final recognition came in 1998 when part of the settlement area was excavated. Houwingaham was found to extend on either side of the state border during an investigation by a German-Dutch team of archaeologists (BÄRENFÄNGER & GROENENDIJK 1999). The pioneer farmers had colonised the raised bog, creating meadows near the brook valley and fields more distant. Several moated sites with stone keeps proved that Houwingaham was a reasonably prosperous village. However, soon after colonisation the deterioration of the bog must have set in, leading to a loss in height and quality with as a consequence very bad drainage. The present bog surface, additionally compacted by the load of two metres of clay, must have differed immensely from the bog the pioneers found. Farming on top of the moor without adequate measures to diminish the deterioration, was creating misfortune – rather than being the consequence of climatic factors as was always thought. Unfortunately the people of Houwingaham had not, like other settlers on the moor further south, the opportunity to shift their farmsteads to higher grounds. Within the rigid field system there was no pleistocene sand ridge available and the farmers could not but leave. The village was drowned and forgotten for five centuries (Fig. 11).

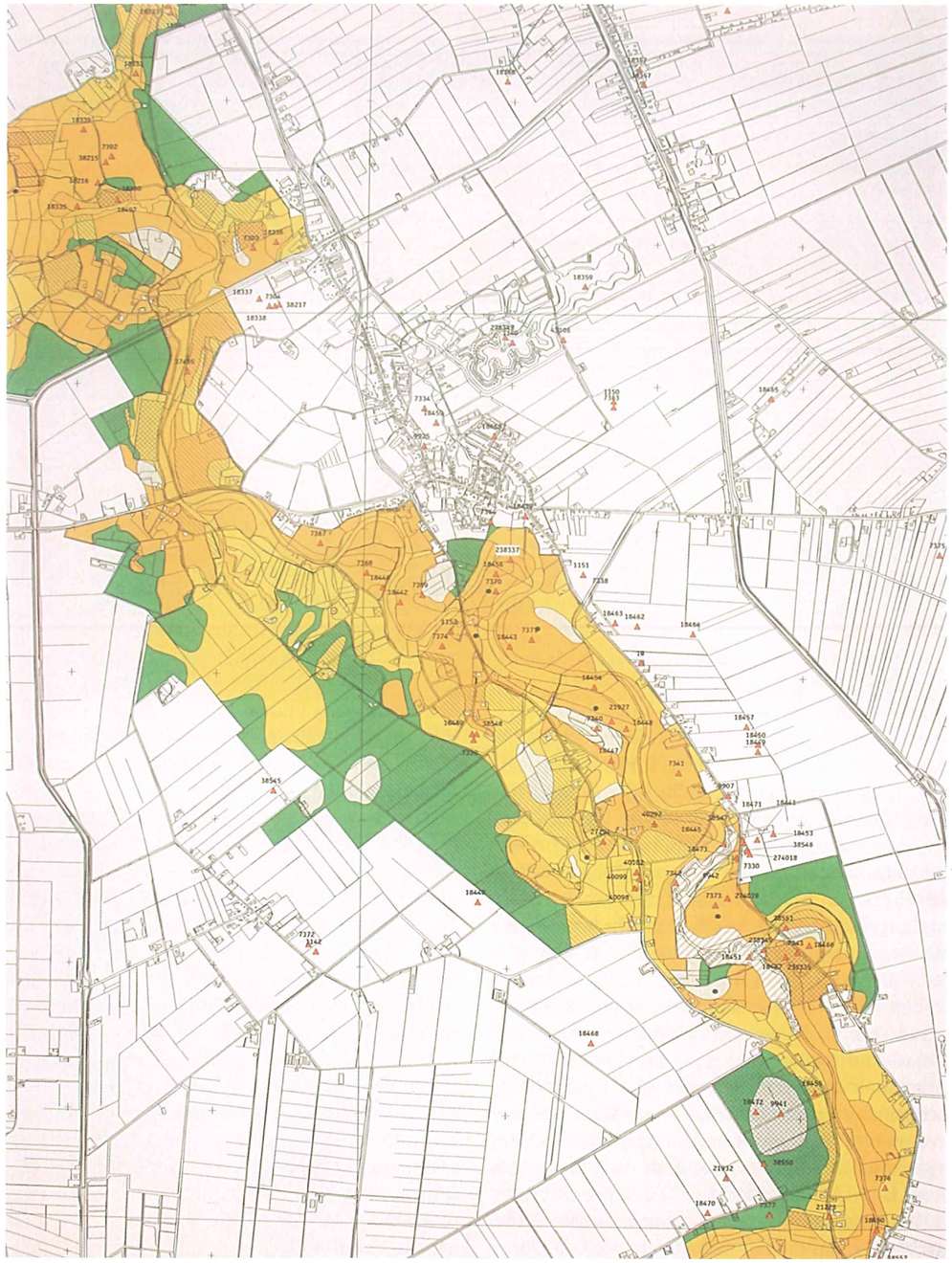

Fig. 10 Zone map showing the archaeological relevance of the stream valley of the Ruiten Aa, its flanking dunes and the adjoining cover sand plateau. Orange = high, yellow = moderate, green = low estimated value. Triangles and dots are sites (EHS Westerwolde, Archeologische verwachtingskaart, Alterra/RAAP 2001)

Fig. 11 The peat surface of mediaeval Houwingaham after the Dollard clay had been removed in 1998. In the middle the circular elevation of a moated site (XIII), (Bärenfänger & Groenendijk 1999)

Conclusion

In the Province of Groningen an attempt is being made to extend official heritage management from individual archaeological sites to historical landscapes. There is a national trend to map zones of archaeological interest and make planning activities subject to approval, depending on the archaeological significance of the location. Yet, we do not want archaeological sites just to appear as dots on a map, or as a group of dots constituting 'danger areas' with limited development capacity, but as part of a landscape entity where past human behaviour can be studied in its environmental context. Landscape archives must now be listed.

Surface sites are often seriously damaged at the time of discovery. In the Bourtanger Moor, especially in those areas dominated by surface sites, much information on the 'dry' component, such as features, is already missing. But the landscape still has its wetland merits where the present surface lies just above or beneath Ordnance Level. Whereas the 'dry' component of a site has been destroyed by farming or has been excavated in the past, the 'wet' component may still be present. In this respect, covered sites under the ground water table are even more valuable for future research. Yet the Bourtanger Moor area, with its abundance of surface sites, will not be a future landscape archive. Intact, fossil landscapes are found elsewhere, in regions where the Pleistocene soil is still covered with peat or marine clay. This can be illustrated on the map showing the surface of the Pleistocene in the Province of Groningen (Fig. 12). Here we find the best landscape archive below present sea level and buried under younger sediment. There are singular covered landscapes such as the medieval settlement of Houwingaham. There are multiple covered landscapes with a succession of Mesolithic or Neolithic occupation on the sandy subsoil, sealed by peat and subsequently covered with early marine sediment, occupied in the Iron Age, again buried under the present terp landscape. As a matter of fact these singular and multiple covered landscapes only occur where little erosion has taken place, which in a coastal region means, far enough from later tidal influence.

But there is a huge problem of scale. Determining the geographical boundaries of a fossil landscape is not easy. We must develop instruments to evaluate the invisible landscape below our feet in the way we do with the historical landscape at the surface. Another challenge is to make archaeological values as comprehensive as the historical environment – archaeological heritage management is grounded chiefly on public sym-

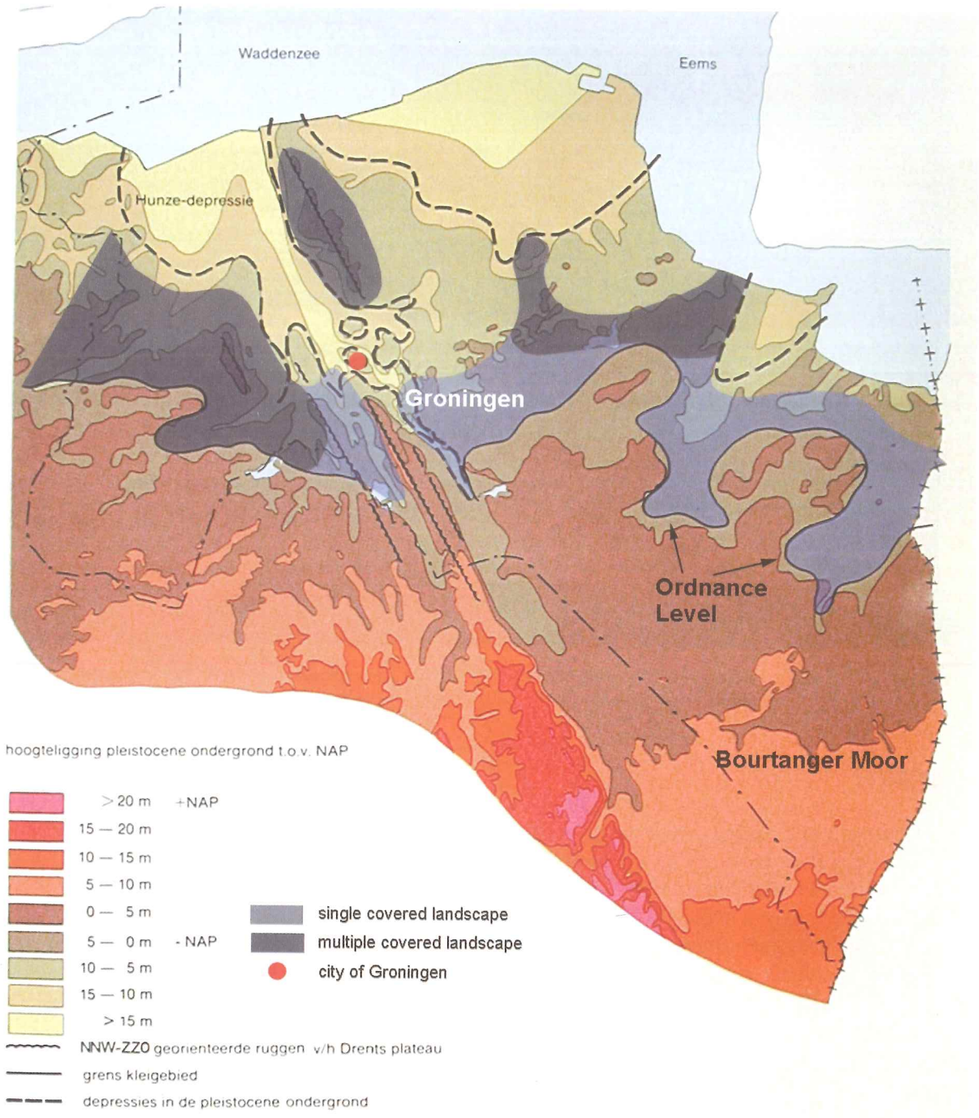

Fig. 12 The Pleistocene surface of Groningen between + 14 m and > - 15 m Dutch Ordnance Level. Singular and multiple covered landscapes are found under younger sediments, north of the Ordnance Level line (after Fysische geografie in de provincie Groningen, PPD 1985)

pathy and understanding. The invisible landscape needs to be explained and elucidated continuously, for it does not speak for itself. However, with archaeology there always will be a touch of mysticism.

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