

The Niersen Beaker burial: A renewed study of a century-old excavation

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Abstract

In 1907, Holwerda uncovered an exceptional primary grave underneath a barrow on the eastern slope of the ice-pushed ridge of the Veluwe. The Niersen Beaker burial contained the human skeletal remains of multiple individuals. The preservation of the bones, extremely rare on the Dutch sandy upland, motivated Holwerda to lift the grave and transport it to the National Museum of Antiquities (RMO). The grave presents a rare insight into Beaker graves in the Netherlands, where skeletal remains are rarely preserved. A new physical anthropological analysis, paying particular attention to the taphonomy in the grave, and a critical review of what Holwerda observed in the field has allowed us to re-interpret the grave. In this article it will be argued that this grave contained not only the remains of a female in crouched position, but also the disarticulated remains of two more individuals placed at the back of the grave. Surprisingly not only human remains were uncovered, but also two bones belonging to a large mammal (a cow or a horse). The specific position of some skeletal remains and the description by Holwerda allow us to interpret the grave as a small open burial chamber on top of which a barrow was constructed.

Keywords: Niersen, Holwerda, Late Neolithic, burial mound, Bell Beaker, physical anthropology, barrows, burial chamber, animal bones, disarticulated remains, secondary burial.

1 Introduction

Little over a century ago, Jan Hendrik Holwerda, then curator of the Dutch department in the National Museum of Antiquities (RMO) in Leiden, spent several years researching prehistoric barrows in the Veluwe area (central Netherlands). During the 1907 campaign Holwerda excavated a barrow west of Vaassen in the vicinity of Niersen. This barrow, G₄, covered an exceptional primary grave with human skeletal remains of more than one individual, which were reasonably well-preserved, a rare situation on the Dutch sandy upland. Holwerda consolidated the grave by using plaster and lifting it en bloc. The grave was transported to Leiden where measures were taken to preserve the find. The grave was on display to the public for several years. At some point during the early part of the 20th century, the grave was stored in the museum and has been there ever since.

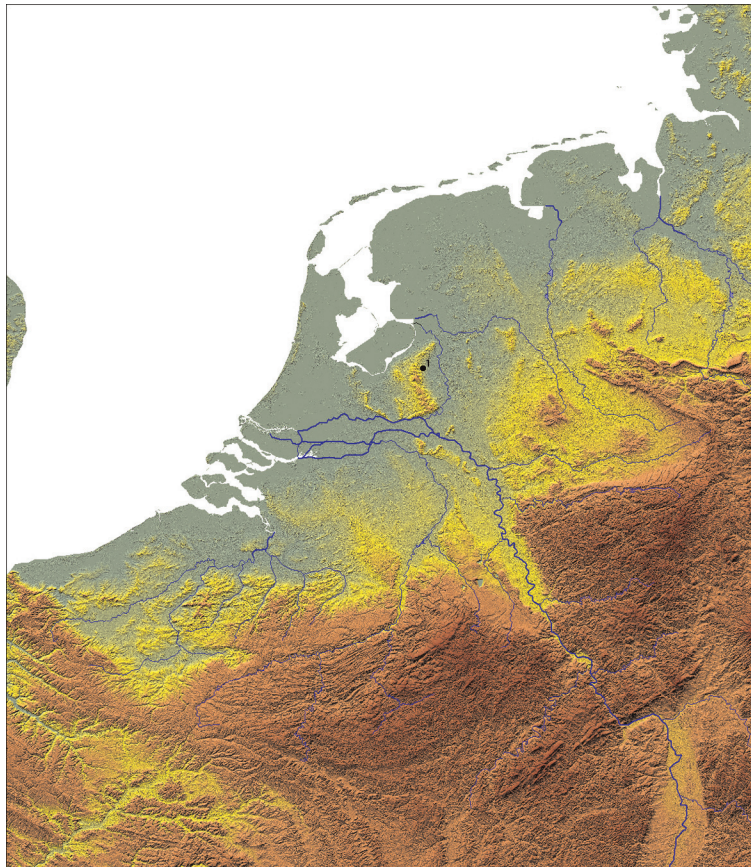


Fig.1 Location of Niersen

Recently, the Niersen find has attracted new scientific interest. In 2008 a new NWO-funded research programme started at the Faculty of Archaeology, Leiden University. This multidisciplinary programme, titled *Ancestral Mounds* aims to investigate the role and meaning of barrow landscapes dating from the Late Neolithic to the Middle Bronze Age in the southern and central part of the Netherlands (visit www.grafheuvels.nl). The project, which also involves the National Museum of Antiquities and the State Service for Cultural Heritage (RCE), focuses on the analysis of already excavated and published data on burial mounds in conjunction with new limited fieldwork (Bourgeois 2008). In this respect the Niersen burial is of special interest since it offers the opportunity to re-analyse both the original fieldwork and field data. Hundreds of barrows were excavated in the 20th century, but barrows with good preservation conditions are very rare in most regions where barrows are located. The Niersen burial thus provides insights into what we are missing and offers opportunities for the application of new scientific methods and perspectives. It may eventually become worthwhile to re-trace Holwerda's initial steps and re-investigate the burial mound itself.

This paper offers a new analysis and interpretation of the Niersen burial based on recent investigations of the excavation data, the burial, the human remains and some associated finds. We firstly present the history of the find and a description of the current state of the burial. Subsequently the results of the physical anthropological examination will be presented and the excavation data will be reviewed.



Fig. 2 The Niersen burial after it was rediscovered and cleaned.

2 Discovery and rediscovery

In the summer of 1907, Dr Jan Hendrik Holwerda, curator and later director of the National Museum of Antiquities, was invited by HM Queen Wilhelmina to investigate several burial mounds in the vicinity of Niersen, at her estate on the Veluwe (Holwerda 1908). The year before Holwerda had received a similar invitation on her behalf to investigate barrows on the Royal Estate at Hoog-Soeren (Holwerda 1907). Apparently archaeology and the relics from the past in general were of special interest to Her Majesty (Van der Waals 1973; see also Holwerda 1909, 320).

2.1 *In Her Majesty's service: discovery*

Holwerda arrived at the Royal Estate in the summer of 1907. He was allowed to investigate eleven burial mounds at two locations, labelled G1-7 and D1-4. Holwerda noted that three of the mounds (G1-3) had already fallen victim to 'urn diggers', and directed most of his attention to mound G4. Holwerda (1908) is not explicit on the methods and strategy he used to excavate mound G4. Based on his description, some of the drawings and photographs, and the excavation data of mounds G5 and D4, it is likely that he excavated the mound in layers, occasionally preserving one profile bank across the mound (e.g. Holwerda 1908, Pl. III.1). It is certain that he cleared away all larger sections when he encountered the first traces of the grave and completely opened up the area of the entire mound (*ibid.*, Pl. I.1a). After removing the surface and top layers of the mound, during which he uncovered several secondary interments, Holwerda discovered a large circular feature consisting of charcoal and following the contours of the hill. He interpreted it as belonging to a burnt cylindrical construction on top of the original graves. In addition, he found a pavement of cobbles below the entire burial mound which, according to him, were placed there on purpose. In the centre, there was a large upright stone, of c. 60 cm in length, partially protruding from the cobble pavement, marking the area of a possible second primary interment (*cf. infra*). He then describes the primary grave (Holwerda 1908, 4-7), which he, not bereft of any enthusiasm, characterizes as a find of a highly rare nature and extreme importance. In the midst of the cobble floor, he identified an ovoid area devoid of stones and 'surrounded by a burnt lining',¹ which he interpreted as a burnt wooden fence marking off a small burial pit. Inside the pit at a depth of c. 30 cm below the cobble floor, the remains of two interments were discovered. Holwerda alerted local physician Dr Hanedoes van Almkerk from nearby Vaassen, who made a preliminary assessment of the burial. He described several of the most important bones that were visible. The description is of importance since it is the only field assessment of the skeletal elements that were visible from above, which was subsequently sealed by plaster.

Holwerda interpreted the observed features and in effect the complete barrow as the remains of a collapsed mortuary house. A photograph of a model was added to the article, the model itself was sent to Her Royal Majesty, Queen Wilhelmina. The next year, he re-interpreted his observations and considered the (Neolithic) barrows to be remnants of large wooden beehive-like constructions or *koepelgraven*, which he linked to the corbelled vaults found at Mycenae (Holwerda 1910, 21-30). He made a new model, sent it to the Queen, and asked her to destroy the old model as it was no longer up to date. This later reconstruction received some (deserved) criticism (e.g. Van Giffen 1930, 143ff.).

2.2 *The lifting of the grave*

The main reason why Holwerda chose to lift and preserve the grave en bloc can be found in the description of the bones by Hanedoes, who describes them as grey with a soapy consistency. Holwerda literally argues (Holwerda 1908, 5-6) that further excavation of the skeletons in the field would make any preservation impossible and would hinder an adequate and detailed analysis of the bones. This is why he decided to have the area where the bodies were deposited covered in plaster and moved as a block to Leiden. He reasoned that in case of a failure to preserve the bones in this manner, the plaster would at least allow him to make an adequate cast (Nieuwenhuis 1908, 19). In order to do so the grave had been isolated by removing the surrounding sand to a depth of about 30 cm. The resulting block was subsequently covered in a thick cap of plaster, reinforced with iron rods and angle-pieces (*ibid.*) and several wooden boards were inserted under it. The pretty voluminous and heavy block in its wooden crate was then moved by horse and cart to the station and transported by train to Leiden.

The plaster cap was turned upside down in Leiden and the bones were cleaned under better conditions. It should be noted that, because of this, we are looking at the underside of the grave and as such have a mirrored view compared to the field situation. The work was carried out and supervised by Dr A. W. Nieuwenhuis, a well-known anthropologist. His report (Nieuwenhuis 1908) follows the initial report on the excavation.

Nieuwenhuis reports that he and several others were invited by Holwerda to further excavate the burials. Nieuwenhuis established that the grave had been lifted in its entirety, whilst removing the sandy and slightly gravelly subsoil. To carefully isolate and preserve the vulnerable bones they used little wooden sticks and brushes made of badger hairs. Loose sediment was removed with a vacuum cleaner. Nieuwenhuis also describes how the soil colour in the vicinity of the burial changed to a reddish colour, while the sediment surrounding the bones was more like a solid black mass. The bones themselves were in a very poor condition, which is why they were eventually consolidated with glue. After excavation and consolidation the burial was on view in the Dutch exhibition of the RMO for many years (NN 1930, 17-18).

While in later years several more attempts were made to lift other burials en bloc (Holwerda 1910, 4), it is probable that the one at Niersen was the first ever Dutch case. In any case it allows us to re-examine and reinterpret the find.

2.3 Rediscovery and attempts at modern analyses

The Niersen burial may have been moved to one of the safety depots during WWII, but it was only in 1960 that it was no longer on display, when the exhibition of Dutch antiquities had to be temporarily moved in view of construction works. It was no longer included in one of the later so-called permanent displays and has gradually escaped the attention of the subsequent curators (pers.comm. Prof. Dr Louwe Kooijmans). When a renewed interest in the grave arose as a result of the *Ancestral Mounds* project, it was thought that the grave had been lost over the years, in spite of the fact that it was an original archaeological object registered in the Museum inventory. An intensive search brought to light a crate which contained the Niersen burial. The crate, measuring 117 by 97 cm, is the original display box, painted white on the inside and is mentioned in Holwerda's 1908 contribution (Pl. IIa).

Inside the crate, which was covered by a wooden board, a plaster block measuring 108.5 by 92.5 cm was preserved. The remains of the Niersen burial were visible under a thick coat of dust. Apparently the block had been damaged at some point when it was transported, since one of the long sides showed evidence of chipping and crumbling. It is likely the block was damaged when in upright position, either during display or transportation, perhaps during the evacuation of objects during WWII, when it was wedged to the side of the crate. Underneath the block several loose fragments of gypsum and bone were found. However, overall the burial had survived remarkably well (fig. 2).

One of the first actions after rediscovery was cleaning and documenting the burial. Cleaning took place under supervision of the RMO restoration department and much like a century before involved brushes and a vacuum cleaner. During cleaning loose bits and pieces were collected and documented in a 20 cm grid that had been fixed over the burial. It was noted that the whole burial was covered with at times rather copious quantities of glue. Drops of it were also recorded on the bottom of the crate, implying that consolidation had taken place right before or after initial display. A sample of the substance was sent to the laboratory of the *Instituut Collectie Nederland* (ICN) where it was analysed. As expected the bones seem to have been preserved in organic bone glue (pers. comm. Dr Luc Megens, ICN, July 22nd, 2009).

After initial cleaning, the team provided detailed photographs, a technical drawing and an initial physical anthropological assessment. The limited visibility of some of the bones and the smeared surface due to the glue prevented an adequate analysis of some of the lower lying

bones. A view 'inside' the block seemed necessary. Assistance was provided by the special technical service of the Dutch National Police,² who brought a mobile X-Ray scanner to the museum. This enabled a more detailed view of the layout of the grave. Some of the results of this research are incorporated below.

In view of the unique preservation of the burial and the fact that the bone glue had only affected the outer surface of the bones and the surrounding sediment, it was decided to sample the burial for physical and chemical analysis, up till now however with negative results. Previously fragmented pieces of bone from several locations were sampled and sent off for radiocarbon analysis and isotope research. Unfortunately the lack of sufficient collagen prevented a radiocarbon date (pers.comm. Prof. Dr J. van der Plicht, April 2009). The isotope analysis is still pending and may shed some light on dietary (oxygen, carbon and nitrogen isotopes) and locational (strontium isotopes) aspects (*e.g.* Haak *et al.* 2008). If successful, further sampling will involve both individuals as well as analysis of the dental elements. In addition some of the soil below the bones was sampled, to see whether palynological data could be obtained. Unfortunately no pollen was preserved in the sediment. This is generally the case in this type of subsoil. To establish genetic affiliations with contemporary and subsequent populations in the area, analysis of ancient DNA (aDNA) was considered. Mrs E. Altena (LUMC) was invited to assess whether aDNA analysis was feasible. After inspection of the grave she concluded that the preservation of the bone and the post excavation treatment strongly reduced the odds of success for aDNA analysis. Therefore no aDNA analysis was attempted.

3 Human remains

The results of the examination of the human remains that are visible on the cleaned surface of the plaster block are presented below. It is important to keep in mind that we only see the inferior surface of the burial, viz. the lower part of the burial. Regarding the horizontal position of the bones references in the text will be made to the situation depicted in figure 5. Remarks on the vertical position of the human remains refer to the original stratigraphic context of the bones in the field. The description below is based on close observation of the present surface of the burial and the radiographs mentioned above (fig. 4).

3.1 Observations in the field: 1907

The first physical anthropological observations in the field by local practitioner Dr Hanedoes van Almkerk were included in Holwerda's 1907 publication. When Dr Hanedoes studied the grave, the skeleton was not fully cleaned and several bones on the surface were strongly decomposed into a grey mass that had the consistency of soap. His observations are especially important since he described the original superior surface of the buried remains, which today is covered in plaster and of which only a few not very informative photographs exist. The remains were clearly identifiable as human. According to Dr Hanedoes, the skeleton was lying on the back. On the exposed surface he observed the skull, which he describes as a section after removal or more likely complete decomposition of the superior right lateral part of the skull. He further mentions that the vertebral column and the right arm were visible as soil discolourations. Solid bone was preserved from the proximal part of the humerus and a section of the left pelvic bone. He also observed a large part of what he calls the left femur. He mentions that the proximal part was relatively well preserved, whereas bone decomposition in the area of the popliteal fossa had resulted in considerable bone loss. Parallel to the femur a longitudinal stretch of grey soaplike mass was visible and its original shape could not be determined. Dr

Hanedoes recognised the presence of the skeleton of a second individual by the presence of a skull, other parts of this skeleton were not visible at the time he inspected the burial.

3.2 *Observations in the laboratory: 1907*

Prof A.W. Nieuwenhuis (1864-1953) published his observations in 1907, shortly after the examination of the burial in the laboratory and the analysis of the human remains. In this article, Nieuwenhuis (1907) provides a detailed overview of the bones and discolourations in the soil and how they were cleaned from the soil. He clearly mentions that certain bones and parts of bones were in such an advanced state of decomposition that it was difficult to determine what was bone and what was soil. He divides the bones in two groups. The bones at the left (= southern) side are considered to be more interesting since these represent a fairly complete crouched inhumation. In his view the skull was long headed (dolichocephalic) with a sloping forehead and strongly developed supraorbital ridges. He describes this crouched inhumation in some detail. Some of his interpretations differ from our views, which will be described below. In describing the position of the body in the grave, Nieuwenhuis seems to temporarily forget that he is observing the underside of the burial. He mentions that the body was buried with bent and flexed knees turning its *back side* to us, which factually should read *front side*. He identified the posture of the body in the grave as similar to a *Hockergrab* or crouched burial. Comparing the skeleton in the left part of the burial with the bones in the right part, Nieuwenhuis noticed a difference in robusticity. This led him to the assumption that the *in situ* burial was a female and the disarticulated, more robust bones were possibly male.

The second part of the burial was considered to represent disarticulated human remains of one individual consisting of a skull, a mandible, femora, a tibia, a humerus and three long bones probably of the lower arm. Nieuwenhuis assumed that these bones were of one individual because of their similarities and robustness.

3.3 *Description of the human remains: 2009*

The work of Holwerda and Nieuwenhuis has resulted in the rare preservation of a Beaker inhumation grave, which allows us to study it with modern techniques and put it in a new perspective. In general, Nieuwenhuis' division of the human remains in two sections is still valid today, but it is evident that besides the human remains a third concentration of bones contains animal skeletal remains (fig. 3). Nieuwenhuis' identification of these bones as being the remains of the foot of the crouched inhumation are no longer tenable. Two bones are visible in this section of the grave, one is easily recognisable as the dorsal surface of a metapodal of a large mammal, probably of a cow or horse (pers. comm. Mrs Inge van der Jagt, Faculty of Archaeology, Leiden). The second bone has a flat surface and is larger (± 13 by 10 cm) than the remains of the human pelvis nearby. It lacks morphological features that would help to identify it by species, but attribution to the human skeleton can be ruled out by its large size and shape.

3.4 *The crouched burial: taphonomy*

What was described by Nieuwenhuis as a complete skeleton is in fact a partial skeleton with most of its bones intact and in position. This deposition will be referred to as the crouched inhumation. This skeleton is found in the southern part of the recovered burial. The human remains are represented by dark brown soil discolourations and smaller and larger bone fragments. Combining the visible parts with the information from the radiographs and the field

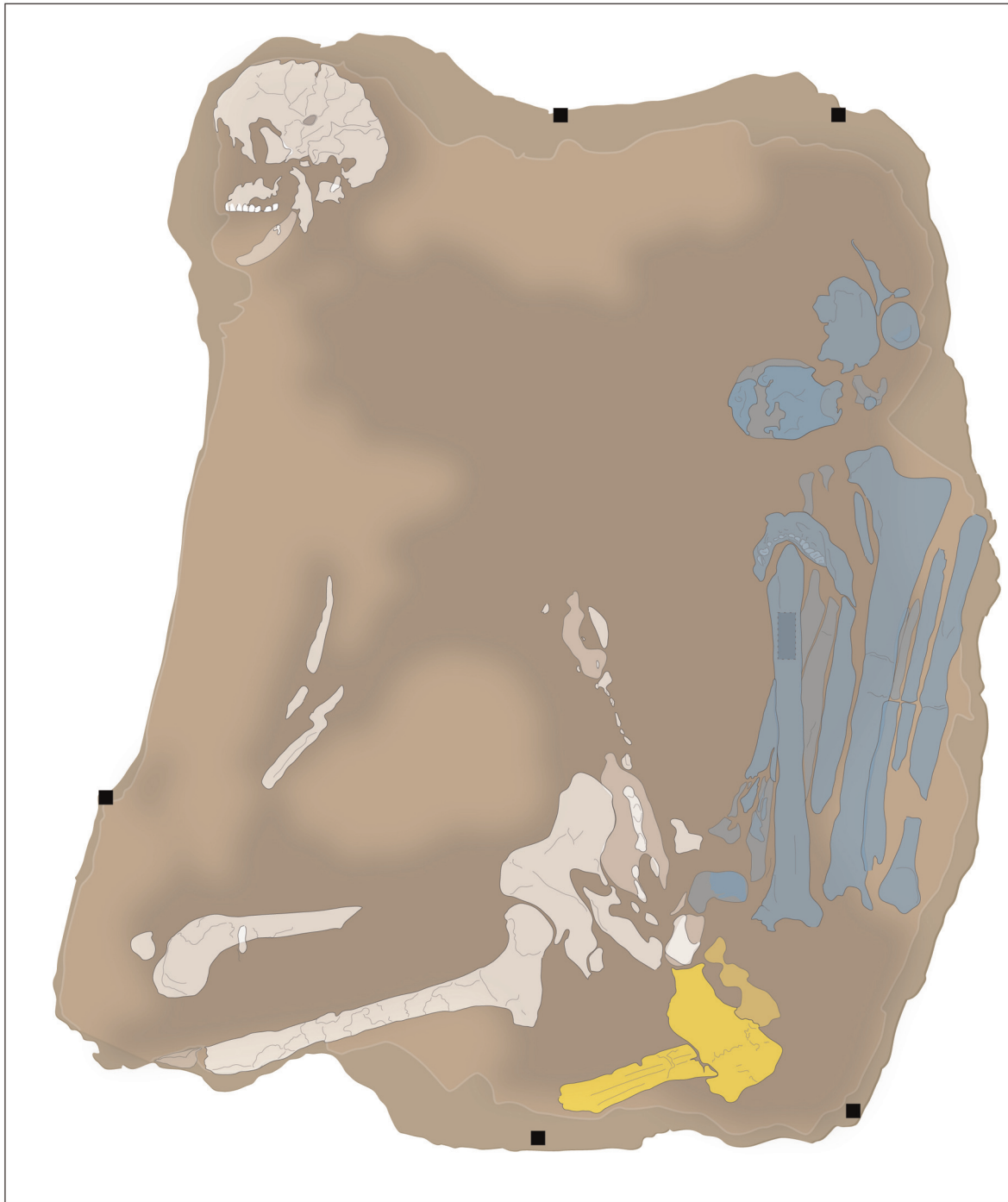


Fig. 3 Visible and exposed bones on the surface of the gypsum block. Grey bones belong to the inhumation in situ, blue bones belong to the disarticulated bones, the yellow bones were identified as animal bones.

observations recorded in photographs and the description by Hanedoes van Almkerk, it is evident that we see the skeleton of a person who was buried on its left side with semiflexed legs in relation to the trunk. The left arm extends out of the trunk and is flexed at the elbow joint. The right arm was described by Hanedoes van Almkerk but he does not mention its position. The position of the pelvic bones on top of each other, the parallel position of the femora, and the way they articulate in the hip joint provide evidence for a burial on the left side. Similarly the skull was found to be lying on its left side. Since several spinous processes of the vertebrae were found to represent the lowest part of the vertebral column we may assume that the upper half of the body was slightly rotated towards a dorsal position. Hanedoes van Almkerk's inter-

pretation that the person was lying on its back was made on the basis of a not fully uncovered skeleton in the field and has to be revised. Holwerda's assumption that the body was deposited in the grave in a sitting position has also been refuted.

The soil discolouration which surrounds the bones is difficult to interpret. First of all it is not known whether the present margins of the discolouration mark the original distribution of the darker coloured soil. Some isolated spots of dark coloured soil above the femora may indicate that some of the soil was lost during the cleaning of the burial in the laboratory. Furthermore the discolouration of the soil extends around and between all three bone concentrations.

The loss of the lower part of the legs shows that the burial was not completely recovered. The left femur was damaged in the process of recovery and originally extended outside the margins of the recovered block. No trace is visible of the tibiae and feet. In one of the field photographs (providing a view from above) a linear mass is, however, visible probably representing the right tibia. This mass suggests that the knee joint was lying in a semiflexed position, with an angle between the femur and the supposed tibia of circa 90 degrees. During the recovery some bone was also lost in the area of the skull. The top of the skull is in contact with the gypsum.

Bone loss also occurred as a consequence of intense bone decomposition. Smaller bones, like those in the hand, and bones with lower bone densities, like vertebral bones or the proximal and distal ends of long bones, have completely dissolved in the soil.

The loss of complete bones and sections of bones shows that the conditions in the grave and soil were not ideal for bone preservation. If we compare the situation documented in the field and in the laboratory it is notable that the lower lying parts of the skeleton are better preserved than the higher parts. In particular, the skull and the pelvis and lower extremities are better preserved. However small fractures are also visible in preserved bone sections.

An important indicator for the conditions in the burial context at the time of deposition and changes in the time after deposition, is the analysis of joint articulation and the position of individual parts of the skeleton. It is important to note that the original deposition surface of the burial can no longer be determined, which makes it difficult to determine the exact position of the body and skeleton in relation to this deposition surface. What can be described is the position of the parts of the skeleton relative to each other. The skull is lying on its left side, facing south. The occipital bone and the atlas were observed articulated. Further, the mandibular condyle was found articulated with the mandibular fossa at the skull base. The lower jaw was found in an open position and had thus moved outside the volume of the body. As a whole the skull, mandible and atlas were found in a position circa 25 cm from where we assume the shoulder girdle and the first thoracic vertebrae would have been. A series of actions may have resulted in this position. First, the skull may have been separated from the body before the moment of deposition and placed at this location in the grave. Second, the skull may have been separated from the rest of the body during the decomposition process and displaced due to natural decomposition processes of the body and underlying organic material. A third possibility is that the skull was displaced due to intervention in the grave after the initial decomposition process had dissolved the connective tissue between the first and maybe the second cervical vertebrae (atlas and axis) and the rest of the cervical vertebrae.

Remains of the left arm can be seen to the left of the body, with the radius and ulna in an acute angle of circa 45 degrees with the humerus. These bones seem to articulate with each other and the humerus may have articulated in the shoulder joint. Due to the poor state of preservation this cannot be determined with more certitude. The bones of the pelvic girdle are distributed in a manner which suggests that the left part of the pelvis rested on the bottom of the grave and the right half of the pelvis was displaced into the volume of the body during decomposition and is now lying on top of the left half. The pelvis was also found in close association with the disarticulated bone deposition. It seems that the right pelvis may have leaned against the disarticulated bones. The left femoral head was found articulated with the hip joint.

In conclusion, the taphonomical data show us that the skull was displaced. If we consider this displacement the result of natural decomposition processes then both the distance of displacement and the position of the mandible could be interpreted as indications that the body was lying in an open space in the grave (Duday 1990). This is no longer true if we assume that the skull was displaced due to later human intervention in the grave. In that case the jaw may have opened at the time of intervention. Therefore, evidence for the presence of an open space depends on the interpretation of the displacement of the skull.

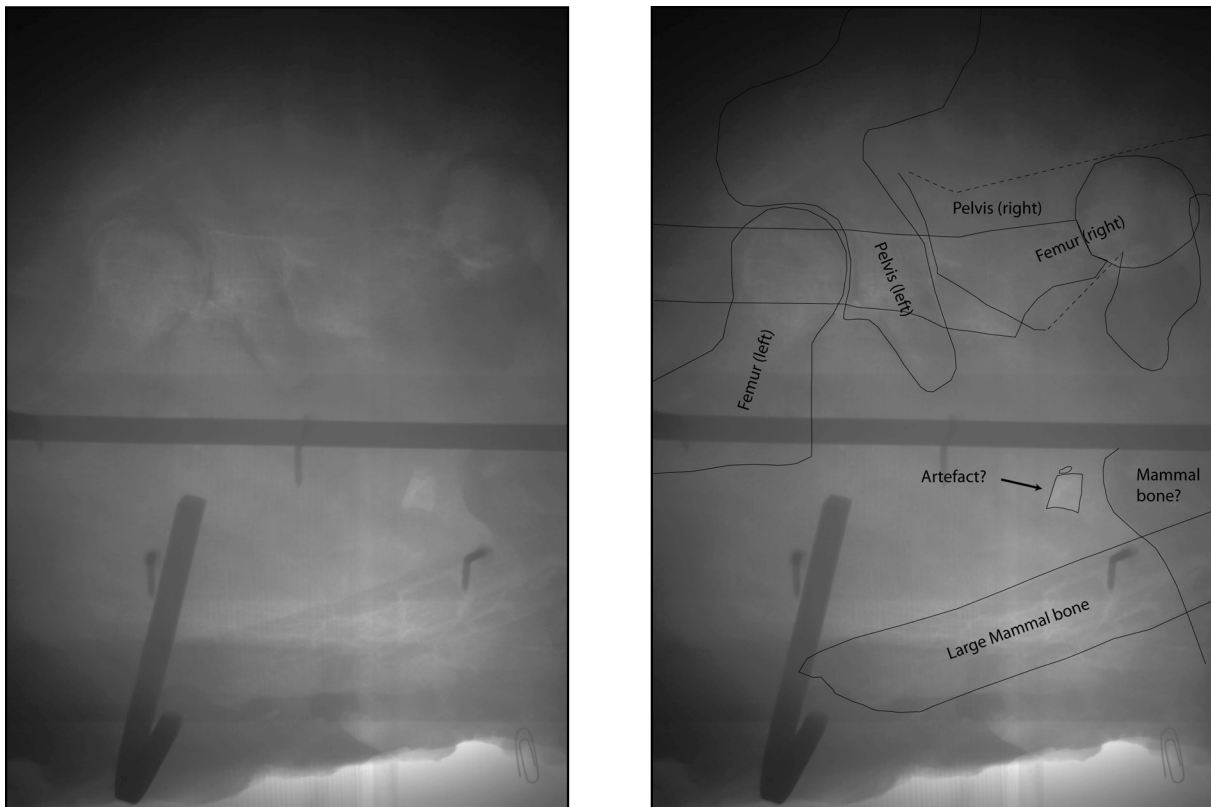


Fig. 4 An X-ray photo of the pelvic area of the inhumation in situ and the animal bones. In the right image the interpretation of the bones is added. The left femur is also visible in the block, the right femur is only visible in the X-ray photo.

3.5 Physical anthropological examination

Although the pelvis and the skull are only partially preserved and partially fixed in the matrix, sufficient features can be assessed to determine sexualisation degrees. Sexualisation degrees were determined using the methods recommended by the Workshop of European Anthropologists (WEA 1980). Both the values for the pelvis and the skull indicate that the crouched inhumation was of female sex (Table 1).

In its current state it is difficult to estimate the age at death of this female individual. All indicators show that it is an adult individual. All observable epiphyses have fused and a few dental elements show marked attrition. In addition a part of the surface of the pubic symphysis can be observed. This feature can be used to estimate age in adults (Acsádi & Nemeskeri 1970; WEA 1980). The presence of pitting or other supposed parturition changes (White & Folkens 2005, 380) would be a reason not to use this part of the skeleton for age determination. However, no

such parturition changes are visible. Because of the formation of a continuous rim along the dorsal margin and the disappearance of the original structure on the surface of the pubic symphysis it would be categorised in phase 3 or higher. This is indicative of an age at death of 40 years or more. Stature cannot be calculated precisely since none of the long bones can be measured in full. For the left femur the total length can be reconstructed. Preserved in the grave is 44 centimetres of this bone, the missing part can be estimated at measuring circa 4 centimetres. If we assume that the total length of this femur originally was *c.* 48 cm the stature of this female would be 172.7 centimetres (using the regression formulas of Trotter & Gleser 1958). No evident pathological changes were observed during visual inspection of the bones at the surface of the grave. Nieuwenhuis notes the robust characteristics of the skull and his conclusion that this differed considerably from modern Dutch skulls is not supported by the re-investigation of the human remains. It is possible that Nieuwenhuis was more accustomed to the study of more gracile Asian human remains, which led him to this conclusion.

Feature Pelvis	Weight	Score	Weight*score
Greater sciatic notch	3	-1	-3
Pubic angle/arch	2	-1	-2
Ischial body	2	-1	-2
Iliac fossa	1	-1	-1
Sum	8		-8
<i>Sexualisation degree pelvis</i>	-1.00	Percentage: 42%	
Glabella	3	-1	-3
Superciliary arch	2	1	2
Mastoid process	3	-1	-3
Supramastoid crest	2	-1	-2
Sum	10		-6
<i>Sexualisation degree cranium</i>	-0.60	Percentage: 31%	

Table 1: Sex determination of the pelvis and the skull (WEA, 1980) All features are scored between -2 and +2, ranging from hyperfeminine to hypermasculine.

3.6 Disarticulated human remains

In the northern part of the burial the remains of a deposition of disarticulated bones were preserved. These bones will be henceforth referred to as 'disarticulated deposition'. As far as can be seen in the present situation this deposition consists of a skull, a fragment of a pelvis, a mandible and – on top of this mandible – large diaphyseal sections of at least nine long bones. The mandible is lying with the superior surface facing downward.

Determination of the long bones was impeded by the fact that the bones were often lacking the proximal and distal ends and were partially still embedded in the soil. Some long bones seem to have extended outside the plaster encasing the burial. Some bones from the disarticulated deposition may have been lost during excavation and recovery of the burial. Among the nine long bones in the disarticulated deposition were two femora (right and left), probably three tibiae, two humeri and one fibula. One bone could not be identified due to the fact that it was fragmented. Most bones may well have been paired bones from one individual. The presence of what is assumed to be a third tibiae indicates that two (or more) individuals may be represented in the disarticulated deposition.

The long bones in the disarticulated deposition are roughly lying parallel to each other, the proximal and distal ends are not all on the same side, suggesting the bones were rather casually deposited together. The soil was also darkly coloured around the disarticulated deposition. In general these bones are much better preserved than those of the crouched inhumation. This may result from the fact that these bones were deposited in the grave without adhering soft

tissue. The absence of soft tissue may have slowed down the decomposition of the bone (Mant 1987).

Sex determination for the main individual in the disarticulated deposition can only be based on a general impression of the robustness of the long bones and the mandible, which indicates this was possibly a male individual. Stature can be estimated based on the length of the left femur (49.3 cm). When calculated according to the regression tables for European males by Breitingner (1937), the stature of the individual would be around 175.4 centimetres. No evident pathology was observed on the exposed bone surfaces.

4 A Re-evaluation of the grave and the burial mound

Holwerda's excavation was one of the best in its time. It was not ideal, yet the documentation and material still allow us to rework and review his interpretations. Unfortunately no detailed excavation drawing is preserved, and the photographs available are cluttered or not detailed enough. This means that we must almost completely rely on Holwerda's, at times sketchy, description of the finds. Luckily his observations on barrow G₄ are the most extensive of all barrows in this group (barrow G₇ only receives a single line of text), allowing us to reconstruct in some detail what Holwerda discovered.

What follows is a revised interpretation of the barrow with each relevant feature discussed, from top to bottom. In figure 5 we have attempted to reconstruct a schematic section of the barrow on the basis of Holwerda's observations, his photographs and his published excavation drawing. Holwerda made references to two levels in his excavation for the measurement of the depth of features, the first one is the top of the mound, the second one is the 'ground level' or *begane grond*, i.e. the present day surface next to the mound. Holwerda mentions that the mound was 1.65 m high, which implies that both levels are 165 cm apart.

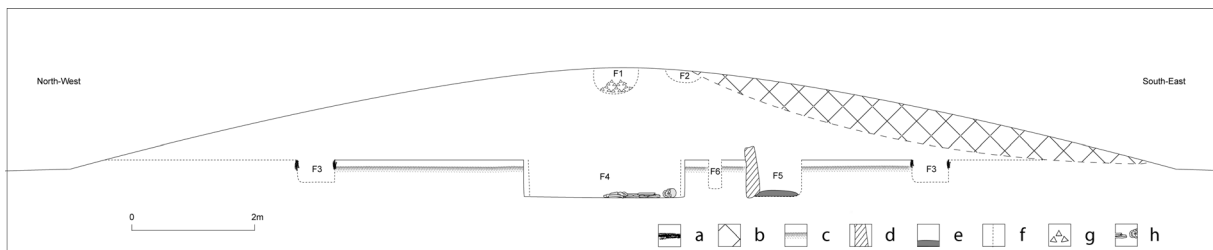


Fig. 5: A schematic profile of the Niersen barrow. a: Fragments of charcoal; b: destroyed part of the barrow; c: the cobble floor under the barrow; d: Large upright stone; e: decomposed organic matter; f: features of which the exact dimensions are unknown; g: cremation remains; h: skeletal remains (for the colour codes see figure 3).

4.1 The burial mound

The barrow was 18 m in diameter and approximately 1.65 m high.³ The eastern part of the barrow had been partly excavated, but this damage seems rather restricted. The mound itself was built of red-yellow loamy sand intermixed with some charcoal. Since Holwerda specifically noted the rather loamy nature of the barrow, this would indicate that it was probably loamier than other barrows. This may partially explain why these skeletons were preserved at all. Apparently the conditions below some barrows on the ice-pushed ridge of the Veluwe were relatively favourable for the preservation of skeletal remains and remains of inhumations were discovered underneath several barrows.⁴ However, only one of these (Speulde) was lifted and

preserved for future generations. The others were exposed and drawn in the field and thus decomposed rapidly.

It is unclear whether or not the barrow was erected in one single period. No mention is made of multiple layers and Holwerda describes the barrow as one homogenous unit. We therefore suppose that the barrow was erected in one single event. The description of the profiles of barrows G5 and D4 (Holwerda 1908, 7-8 and 11 respectively) indicates that if distinct multiple mound-periods were present, he may have observed them, although maybe not recognized them as such.

Holwerda implicitly assumed that the present day surface outside the barrow was also the level of the old surface underneath the barrow. He therefore situates the old surface at 1.65 m below the top. However, features which would normally become visible under the barrow indicate that the old surface was about 15 cm higher. At that level the first traces of a palisaded ditch were discovered and an oval discolouration indicated the presence of the primary grave.

The cobble floor mentioned by Holwerda probably originated due to cryogenic sorting of the sediment and is not an anthropogenic feature. Several old and new barrow excavations in the region show a similar feature (*cf.* Holwerda 1910, 5-7; Fontijn in prep.; Arnoldussen *et al.* 2008, 181).

4.2 Secondary graves

The first feature Holwerda encountered was 'a big lump of burnt bones', a cremation grave dug into the top of the barrow (Feature 1). In all likelihood this represents a secondary grave, from a much later date, dug into the already existing barrow. The barrows D1-4 at nearby Dobbe Gelle, described in the same article, show similar types of graves. There the associated pottery and a bronze pair of tweezers suggest a date in the Late Bronze Age or Early Iron Age (*cf.* Jockenhövel 1980, 58). It appears that the cremation remains were not preserved after the excavation, at least no mention of them is made in the inventory lists.

Close to this grave Holwerda found a large patch of charcoal (F2), although it was already partly destroyed. A sherd found close by was dated as 'Germanic' *i.e.* Iron Age. Unfortunately the sherd can now no longer be traced. The patch of charcoal may represent the remnants of a funerary pyre, as has also been seen at barrow D4 (Holwerda 1908, 11), and barrow 3 at Apeldoorn-Wieselse weg (Fontijn in prep.).

4.3 The surrounding feature

The next feature Holwerda describes is the surrounding feature of the primary mound period (F3, fig.6). At a depth of 1.5 m below the top of the mound, thus at the level of the old surface, a 'burnt strip' was found with a circumference of about 10 m. In all likelihood, the burnt feature Holwerda describes was an orange-reddish discolouration typical for soil features in the region (Fontijn & Van der Linde in prep). In this case we are dealing with a trench under the foot of the primary barrow. At some places the outer edges of the ditch are said to have been lined with charcoal, creating two concentric circles 60 cm apart. That it really was charcoal is supported by one of the barrows at nearby Vaassen, where tumulus III also had a 3 m long stretch of charcoal in the fill of the ditch (*cf.* Lanting & Van der Waals 1971, fig.9). These charcoal stretches give us the approximate width of the ditch. The depth of the feature is not mentioned.

The lines of charcoal probably represent the outer sides of superficially charred posts or burnt wickerwork running in between posts. Holwerda also mentions that at regular intervals, the soil was burnt more intensely than in other places. In our opinion this may indicate that posts had stood in this trench, as these would show a different discolouration than the fill of the

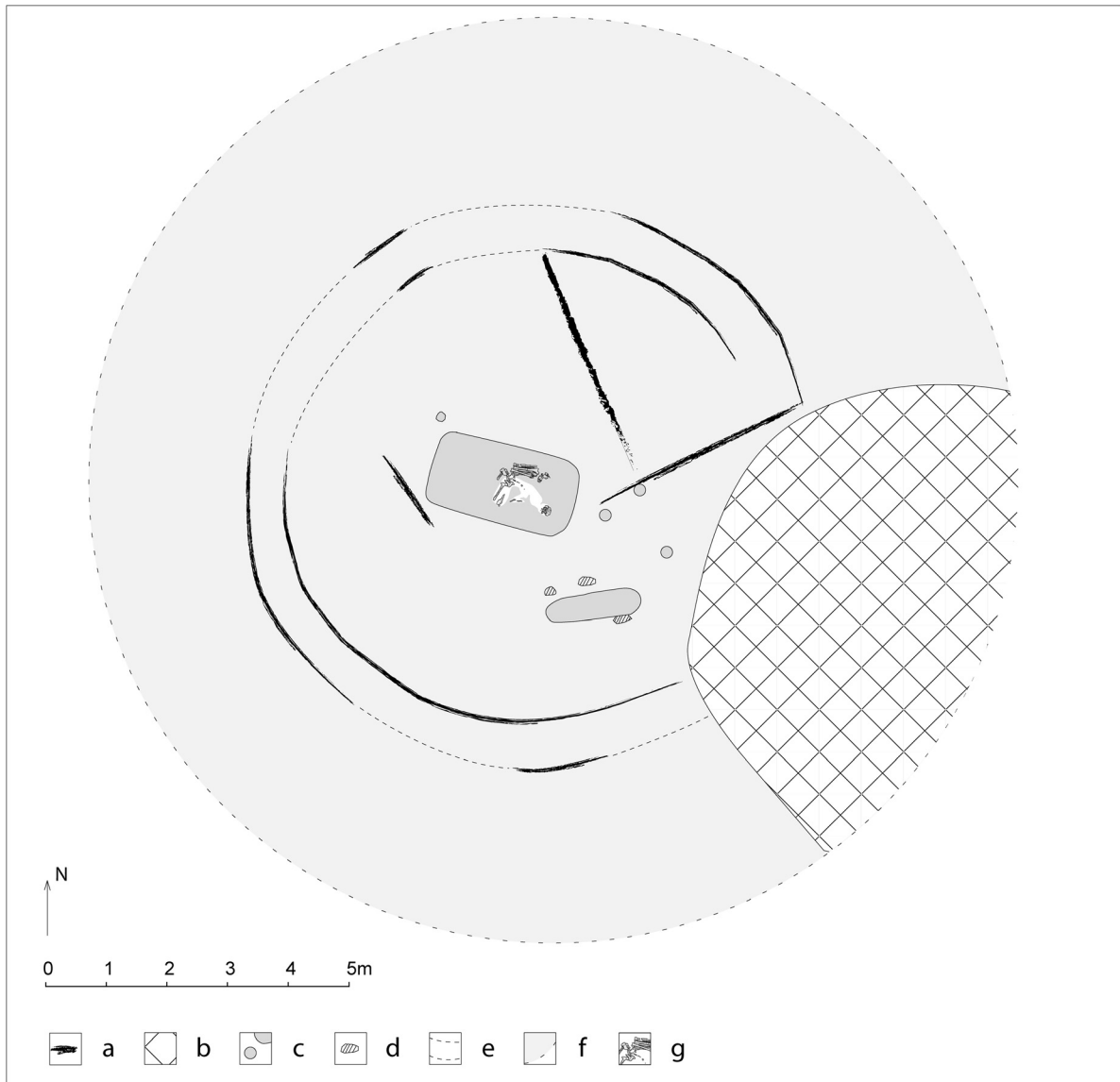


Fig. 6 The redrawn excavation plan of the Niersen barrow (after Holwerda 1908, Pl.I.2). The scale is estimated on the dimensions of the surrounding feature and the length of the skeletons drawn by Holwerda. The correct position of the skeletons is depicted here. a: stretches of charcoal; b: estimated destroyed part of the barrow; c: anthropogenic features; d: large stones; e: estimated position of the surrounding feature; f: circumference of the total barrow as given by Holwerda; g: skeletal remains (for the colour codes see figure 3).

ditch. Palisaded ditches are commonly found around Neolithic barrows in the region (cf. Vaassen, tumulus I and III, Lanting & Van der Waals 1971; or Emst Hertekamp, tumulus 5, Holwerda 1910, 8-9).

Holwerda's description and reconstruction of the barrow is, however, not without problems. The trench would have had posts which stood upright, creating a wooden cylinder, not much unlike the reconstruction suggested by Modderman (1984, 57; for a similar reconstruction see Lawson 2007, 168). That the barrow represents the remains of a collapsed house or roof (Holwerda 1908, 16) can be refuted since the area within the palisaded trench would have been filled in with sods and sand. Whether or not the palisaded trench would have been pulled out before the barrow was erected is still subject to debate (cf. Lanting 2008, 62). Either way a barrow was built on top of the grave.

4.4 A wooden burial chamber

The first traces of the primary grave were observed at the level of the old surface (*i.e.* 15 cm above the ground level, *cf. supra*). The grave itself consisted of a rectangular pit with rounded corners (F4). The first traces of the skeleton were discovered 30 cm below the surface (or 45 cm below the actual old surface). Since the skeletal remains are at least 15 cm thick, the grave pit must have been dug at least 60 cm into the old surface. On the basis of the small excavation plan,⁵ the grave pit is estimated to be at least 2.5 m by 1.5 m.⁶ Holwerda mentions that the sides of the pit were burnt, but in all likelihood the traces of discolouration he observed were the remnants of a burial chamber or planks supporting the sides of the pit. It is uncertain whether or not these planks were burnt, effectively leaving charcoal, or that only a discolouration was visible.

The sequence of events which can be established from the current data prior to the construction of the barrow is as follows. First a pit was dug 60 cm beneath the old surface, the sides of which were lined with wooden planks. Whether or not the bottom was also covered with planks is unknown, although this occasionally occurs in some Late Neolithic graves (Lanting 2008, 61). This construction in effect created a small open burial chamber, 2.5 by 1.5 m wide, and 50-60 cm deep.

Open burial chambers are rarely attested in Late Neolithic burials. In most cases the discovered remains were either too badly preserved to draw these conclusions or they were not thoroughly excavated. Open burial chambers can sometimes be identified at sites with good preservation conditions for skeletal material and where good excavation techniques were employed. Grave I at Molenaarsgraaf showed a similar burial construction (Louwe Kooijmans 1974, 243-249). There, a boy aged 15 was buried inside a wooden burial chamber, probably after choking on the fin ray of a pike. Post-mortem, the skull rolled away from the body, which is only possible if the burial chamber was open during the decomposition of the body.

At Niersen, the displacement of the skull of the crouched inhumation is also indicative of an open burial chamber (*cf. supra*). The position of the woman's head is a difficult matter to interpret. Either it was already detached from the body, and placed some distance away from the shoulders, or, as we think is more likely, the skull moved away due to taphonomic reasons and was displaced at least 25 cm from where we expected it to be. Corroborating the latter scenario would be the observation that one of the long bones lying on top of the disarticulated deposition is completely shattered, suggesting that the roof of the chamber collapsed on top of the bones. The bones lying on the bottom of the grave are then better preserved, but the top ones, receiving the full blow, were more heavily damaged. Although several other bones also show post-mortem breakages, it is difficult to attribute these to the collapsing of the roof. They might also have occurred during the recovery of the grave and its subsequent transport. Another argument in favour of an open burial chamber would be the observation that when a body decomposes in an open space, the decomposition is intensified and bones from the thorax survive very badly. Longbones and the skull are usually the best preserved parts, as is the case with the woman's remains (Panhuisen 2005, 126-130). All in all, the evidence would point to an open burial chamber, rather than intervention in the grave (of which no clear cut trace can be seen in the soil), or an already detached skull.

Once the burial chamber was constructed the deceased were placed in it, including the disarticulated remains of at least one individual and the inhumation of a female. The following two scenarios can be suggested for the activities at the site:

1. The burial chamber remained accessible for a long time (several years), while people buried at least two individuals in it. The older decomposed bones were moved aside to make room for the new skeleton.

2. The burial chamber represents a single event, in which the decomposed bones of at least two individuals were collected from elsewhere and subsequently placed in a burial chamber together with a recently deceased woman (the crouched inhumation).

Whatever may have been the case, the disarticulated bones were first placed in the grave. Both the position of the bones as can be observed on the present surface of the burial, as well as the information from the radiographs indicate that the crouched inhumation was stratigraphically placed over the disarticulated deposition, and thus the last person to be deposited in the burial chamber.

The disarticulated bones were not 'shoved aside' as Holwerda claims, but picked up and carefully positioned in a bundle, where at least one femur was placed inside a mandible, with the other bones placed next to it. The skull and a fragment of the pelvis were placed to the west of the bundle. It is impossible to say whether or not the disarticulated bones decomposed here in the grave, or if they decomposed elsewhere and were brought to the grave at the moment of burial of the crouched inhumation. At least some of the bones are more robust than the female, which might suggest that we are dealing with the bones of at least one male (*cf. supra*).

After the disarticulated bones were placed in the grave, the inhumation of a mature woman (40 years or older) was added. She was lying on her left side with her head oriented towards the east-south-east, facing south-south-west. Her legs were drawn up in a semi-flexed position and her arms were placed in front of her thorax, a classical *Hocker*-position.

As far as we know, no grave goods were found in the grave, although Holwerda does mention a small fragment of pottery. The fragment was re-traced (e1908/1.21), but is so small and weathered that it is very likely that the find was made in a secondary position. Below the pelvis of the crouched inhumation, two animal bones could be identified. One of these is the metapodal of a large mammal, a cow or horse (*cf. supra*), the other could not be identified. These bones must have been intentionally deposited in the grave pit and might be considered as a grave gift.

After deposition of the crouched inhumation, the burial chamber was sealed and a barrow was constructed on top of the grave.

4.5 A second primary grave?

Another pit was discovered to the south-east of the burial. The pit was lined with stones, one of these can be seen standing upright in one of the photographs (Holwerda 1908, pl.I-1). Holwerda claims that this stone was partially weathered, although re-examination of this stone at the museum does not indicate any such weathering. The stone is weathered on one side and less on the other. It is clear that the stone (e1908/1.24; dimensions: L. 59 cm x W. 27 cm x T. 16 cm, weighing 41 kg), stood on the side of the pit, yet how far it protruded above the old surface is difficult to say. The other stones with which the pit was lined were not collected. The dimensions of the pit can be estimated at 0.5 m by 1.5 m, although the depth of the pit is unknown. Holwerda mentions that the feature contained the unrecognisable remains of some decomposed matter. Whether we are dealing with another grave pit containing the completely decomposed remains of an inhumation, or a pit, perhaps unrelated to the barrow, containing some other type of material is unclear. Grave pits lined with stones do occur in Late Neolithic contexts (e.g. Eext Kerkweg tumulus 3, Lanting 1973, 270-271; Diever, tumulus 1, Lanting 2008, 173-177).

4.6 Pre-barrow activities?

To the east of the wooden burial chamber three post holes were discovered, although Holwerda does not clarify their function. They were covered by the barrow, although it is unclear whether they are related to the burial ritual. No structure can be inferred from these three posts but the mound was partly dug away in that section. Another option is that they are not related to the barrow and the burial activities taking place. In that case they may belong to settlement activities on the site prior to its function as a burial place. Several long stretches of charcoal on the old surface indicate that a fire had burnt on the site before the barrow was built, perhaps representing the remains of burnt posts? Whatever the case, before the barrow was erected, several activities took place on the site, including the building of a construction and the burning of long posts.

Pottery found the year after the excavation indicates that the site may have been used as a domestic site in the funnel beaker (TRB) period. Many sherds belonging to multiple vessels were discovered during the ploughing of the terrain close to the barrow, including at least twenty TRB-sherds and possibly many more.

Together with the TRB-pottery, many other sherds were discovered. Next to several hundreds of undecorated sherds of pot-grit tempered pottery, two groups of decorated sherds can be identified. They belong to two large pot-beakers. Only parts of the rim and the body are preserved, no bottom sherds were found, indicating that they were probably deposited upside down (Lehmann 1965). Whether or not these activities are contemporaneous with the barrow is unknown, but the presence of pot-beakers close to barrows has been noted before. Possibly, we are dealing with a different type of burial ritual contemporaneous with the construction of the barrows (Louwe Kooijmans 1974, 291-292).

4.7 Dating of the barrow and the burials

In general it can be assumed that the grave dates to the Late Neolithic, the combination of the crouched burial, the east-west orientation of the female and the palisaded trench surrounding the grave are all typical for the Late Neolithic⁷ in the region (Lanting & Van der Waals 1976). However, the exact dating of the barrow and its primary grave is proving difficult. No charcoal was preserved in the lifted grave and attempts at radiocarbon dating the skeleton have so far proven futile. There are no inorganic grave gifts. Only a tiny fragment of pottery was found in the fill of the grave. Holwerda claims that it is a fragment of a beaker vessel, but it is so small that nothing can be said of its age, neither of its association with the grave. The quartz-temper and two nail-impressions, however, do not oppose a Late Neolithic date.

Two sherds of a Veluwe Bell beaker were found in the mound, but their exact position is unknown, so their relevance for dating the barrow is limited. They may have been brought up with material used in the construction of the mound and thus give a *terminus post quem*, or they may have been deposited on top of the already existing barrow and thus deliver a *terminus ante quem* (cf. Van Giffen's extensive critique, 1930, 144-154).

The large cremation grave that was dug into the barrow delivers a more reliable *terminus ante quem*. This practice is dated to the Late Bronze Age and Early Iron Age. The cremation remains were not preserved and could thus not be directly dated.

The orientation of the grave is no help either, since west-east orientation occurs throughout the Beaker period (e.g. Lanting 2008, 35, 60). The *Hocker*-position of the crouched inhumation (lying on its side, with the arms in front of the body and the knees drawn up at a right angle to the body) is also typical during the entire Beaker period.

The repositioning of secondary decomposed remains in the same grave is, albeit extremely rare, not unknown. In a Bell Beaker grave at Ottoland-Kromme Elleboog, a skeleton was found

with its head orientated to the east and facing south. At the feet of the skeleton, a bundle of longbones belonging to a second individual was found (Louwe Kooijmans 1974, 312). The similarity between both graves is striking. A radiocarbon date of the disarticulated longbones from the Ottoland burial, places it between 2450 and 2140 cal. BC (GrN-6384; 3820±45BP; Louwe Kooijmans 1974, 312). Recently a new radiocarbon date was obtained from the skeleton which can be dated between 2280 – 1955 cal. BC (GrA-15919; Lanting & Van der Plicht 1999/2000, 92). In this case it would thus seem that the disarticulated bones belonged to at least one individual who had died roughly a century before being placed in the grave pit.

Equally rare is the deposition of faunal remains within grave pits, which are rarely well documented. At Emst-Hanendorp tumulus II, Holwerda (1911, 19) discovered the skull of a cow (he interpreted it as a horse, but close inspection of the glass negatives of the photograph of the object, kept at the RMO, reveals the specific dental patterns of a cow; Wentink in prep.). In the grave, an All Over Ornamented beaker was found, together with a smaller beaker, a Grand-Pressigny dagger and several flint flakes, allowing the grave to be dated to the period 2600–2450 BC (Lanting & Van der Plicht 1999/2000, 81). The grave is interesting in its own right, since it is part of the so-called Bell Beaker road (Bakker 1976) on which the barrow of Niersen is also situated. The Emst barrow lies some 3 km to the north of the Niersen barrow.

At Garderen-Solsche Berg, also on the Veluwe, the silhouette of a large mammal (probably a cow) was found in a grave pit under a barrow (Bursch 1933, 69-70). The primary grave was associated with a GP-dagger, a flint axe and amber beads, dating the grave to the second half of the Late Neolithic A. Faunal remains deposited in graves also occur in later Beaker contexts (cf. Zeijen and Molenaarsgraaf; Louwe Kooijmans 1974, 321-323).

Indirect dating evidence comes from parallels in the structure of the grave and the surrounding feature. Reliable parallels for palisaded ditches are found all over the Netherlands, dating to the second half of the Late Neolithic A (cf. Eext, Van Giffen 1939, 6-8) or the earlier half of the Late Neolithic B (e.g. Lunteren-Vlooiënpoel, Bloemers *et.al.* 1981, 49; Bennekom-Kwade Oord, Van Giffen 1954).

Rectangular large grave pits, with planks lining the edge of the pit, occur in the same period (N=23). Two such graves at Anlo were radiocarbon dated to the Single Grave culture (grave A and E, Waterbolk 1960, Jager 1985, fig. 22). A three-period barrow at Mol (Belgium) had three maritime Bell Beakers in its primary grave. A patch of charcoal on top of the (primary) barrow was dated between 2565 and 2300 cal. BC. Molenaarsgraaf grave I is also a close parallel, but dates several centuries later, between 2130 and 1900 cal. BC (Louwe Kooijmans 1974, 249).

The Niersen grave can thus, on the basis of parallels, be dated to the Late Neolithic. It might be possible to refine this dating range to 2600 till 2200 BC, if we combine the evidence of the surrounding feature, the grave pit, and the parallels for animal burials and secondary depositions. However, this is only a suggestion; direct dating of the grave would of course be preferable. If the conservation conditions permit it, radiocarbon dating of teeth enamel will be attempted in the future.

5 Conclusion

Holwerda's observations are valuable, but limited nonetheless. His foresight in lifting the grave, however, is what has allowed us to re-study the grave and to reconstruct the sequence of events as they unfolded almost five millennia ago.

Around 2500 BC (give or take a few centuries), a grave pit was dug and the edges were lined with planks. A small wooden burial chamber of modest dimensions was thus created. Several features in the vicinity of the burial chamber point to activities prior to the construction of the barrow. At least three post holes point to a construction standing close to the grave, the nature of which cannot be ascertained. Several long stretches of charcoal on the old surface indicate

that a fire had burnt on the site before the barrow was built, perhaps representing the remains of burnt posts.

Within the grave the disarticulated bones of at least one individual were repositioned and carefully arranged in the northern part of the grave. The presence of the third tibia is difficult to interpret, was it placed in the grave by chance (they collected bones of what they thought was one individual, by chance mixing in a third) or was it a deliberate act? Admixture of additional bones is common when bones are defleshed and no longer easily recognisable. Either way the admixture of additional bones gives us insight into the way bones or the deceased were treated in the Late Neolithic.

Whatever the case, the body of a mature woman was then placed in the southern part of the grave. She was lying with her back to the disarticulated bones, her head oriented east-south-east looking south-south-west. Her body was placed on her left side, with her knees semi-flexed and her arms placed in front of her thorax. Several bones of a large mammal (a cow or a horse) were placed beneath the buttocks of the crouched burial.

Once the woman was placed in the grave the burial chamber was sealed off, creating a small open space. After several years, the chamber probably collapsed under the weight of the barrow, crushing at least one of the top lying long bones of the disarticulated remains.

The small burial chamber was probably not the only grave underneath the barrow. Another pit lined with stones was dug next to the burial chamber. At the bottom of this pit completely decomposed remains were found, probably representing a second primary grave.

Surrounding the grave, a palisaded trench was constructed, delineating the place where the barrow was to be built, whether or not the palisade was left in place is unsure. The traces of charcoal suggest that some form of wickerwork might have run through the posts, or that the posts themselves were set on fire. Once the palisaded trench was built, a barrow made up of loamy sand was erected on top of all the features, sealing off the primary graves.

It is only some 1500 years later that the barrow was re-used for burial and a pyre was constructed on the top of the barrow. Probably at the same time a large volume of cremation remains was placed in a pit dug on the top of the barrow.

The biography and the sequence of events that can be reconstructed from this barrow all point to the importance of a grave such as the Niersen burial to the understanding of burial ritual in the Late Neolithic. The exceptionally rare preservation of bones on the sandy uplands does not allow us many insights as to who exactly was buried in these graves. The disarticulated remains tell us that human bones were apparently manipulated (and carried around?) once the body had fully decomposed. At least in the case of the grave at Ottoland Kromme Elleboog, the disarticulated remains were from a person who had died at least a century before being placed in the grave alongside another person. Equally interesting are the animal bones found in the grave. Apparently cow bones, and probably horse bones did play a role in the burial ritual.

Both the grave and its position within the wider barrow landscape are unique in the Netherlands. Lying on a 6 km long barrow road, the Niersen barrow occupies prime position (fig. 7). A discussion on this linear formation would take us beyond the scope of this article, but is deserving of future interest.

Summing up, many avenues of research are opened up by the lifting and preservation of such a find. In the future, a CT scan of the grave will be taken, to recreate a complete 3D image of the burial, hopefully shedding some light on the bones still covered by the sediment. As has already been stated above, isotope analysis on the grave is still pending, but if successful, the results will shed light on dietary and locational aspects of the interments. In particular, the comparison between the two individuals would provide interesting insights into the composition of Late Neolithic society.

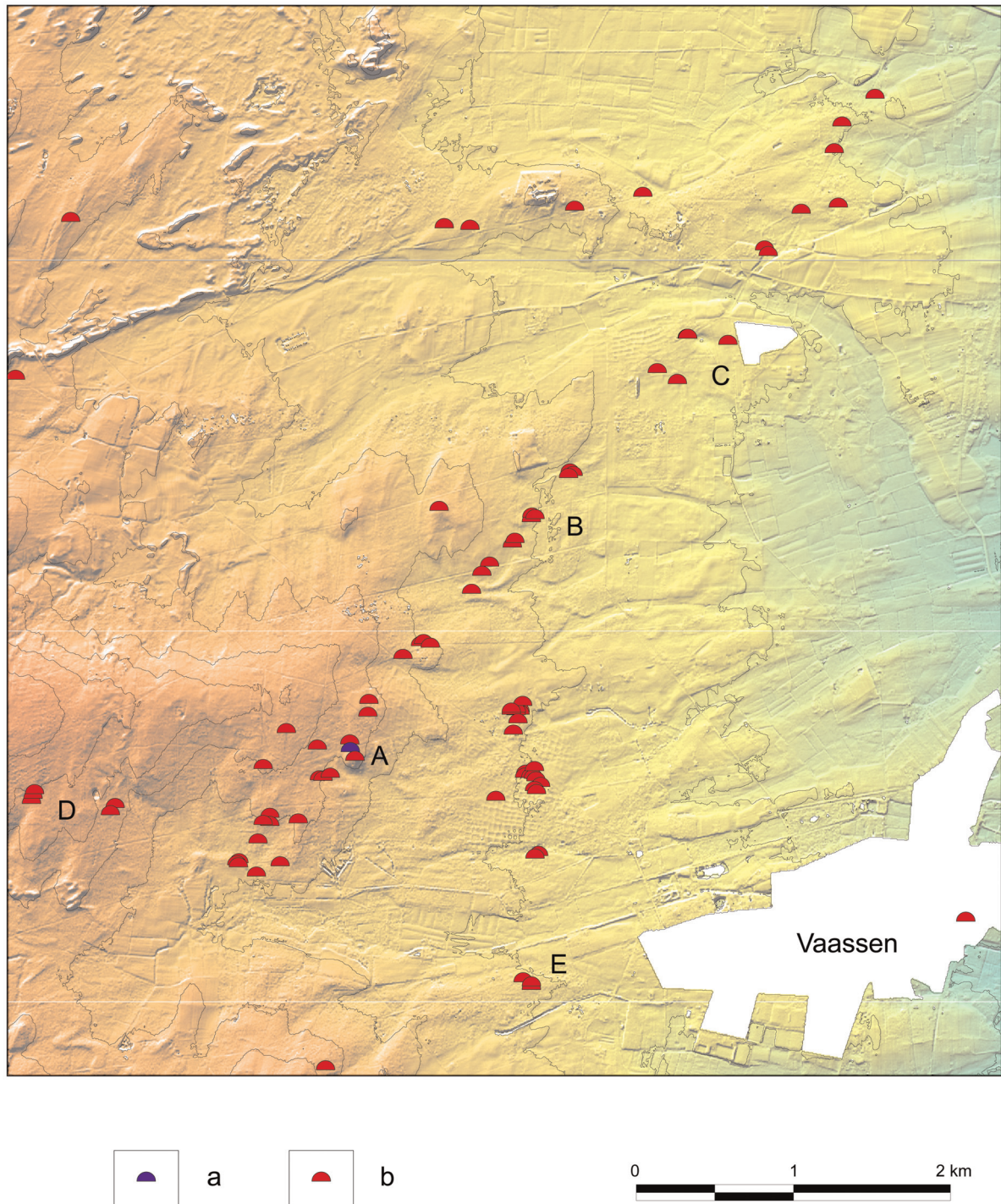


Fig. 7 The Niersen barrow road, with the position of barrow G4 and other sites mentioned in the text indicated. a: the Niersen barrow G4, b: other barrows. A: The Galgenberg barrows; B: the Hertekamp barrows; C: the Hanendorp barrows; D: the Dobbe Gelle barrows; E: the Vaassen barrows. Elevation model copyright AHN.nl

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Notes

1. Holwerda mentions that an oval discolouration was visible, surrounded by a burnt line, as if a wooden fence were burnt there. He does not specifically mention that charcoal was present, though this was probably the case.
2. The *Dienst Specialistische Recherche Toepassingen of the Korps Landelijke Politiediensten (KLPD)*.
3. The exact location of the barrow is unknown, Holwerda did not provide a map with his article. The ROB in 1984 reconstructed several barrows at Niersen from old spoil-heaps of the excavation. The barrow they identified as G4 is located at x: 191108 and y: 478789 in the Dutch co-ordinate system. There is however no direct evidence that this was indeed barrow G4.
4. E.g. Hertekamp barrow 5, Holwerda 1910, 9; Ermelose heide barrow 6, Remouchamps 1923, 5; Speulderveld Tumulus I, Modderman 1954, 34.
5. Louwe Kooijmans (1974, p.311, note 246) already observed that Holwerda made a mistake in the drawing of his excavation plan. The crouched inhumation should be at the south side of the pit with the disarticulated deposition at its back at the north side. This can be clearly seen in photograph Pl.I, 3 showing the bones in situ and can also be inferred from the skeletal remains in the museum. The skeletons are mirrored in the small plan of the barrow, but they are each mirrored individually and not the grave as a whole.
6. The measurements are on the basis of the length of the crouched inhumation, which from the top of the skull to the bottom of the pelvis is approximately 1m long. The scale obtained this way is in agreement with the 10 m diameter of the palisaded ditch encircling the barrow.
7. Generally dated between 2900 and 2000 cal. BC (Van den Broeke *et al.* 2005, 28).

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