Series editors: Corrie Bakels / Hans Kamermans

Copy editors of this volume: Harry Fokkkens, Bryony Coles, Annelou van Gijn, Jos Kleijne, Hedwig Ponjee and Corijanne Slappendel

Editors of illustrations: Harry Fokkkens, Medy Oberendorff and Karsten Wentink

Copyright 2008 by the Faculty of Archaeology, Leiden

ISSN 0169-7447

Subscriptions to the series Analecta Praehistorica Leidensia
and single volumes can be ordered exclusively at:

Faculty of Archaeology
P.O. Box 9515
NL-2300 RA Leiden
The Netherlands
10 Maastricht-Vogelzang, the Netherlands, a Michelsberg site in the valley of the Meuse seen from a botanical angle

Corrie Bakels

10.1 INTRODUCTION

The lower terrace of the river Meuse south of the town of Maastricht in the southern Netherlands has surprises in store for those interested in Neolithic cultures. Some of these were revealed in recent decades, the site Vogelzang being one of them (fig. 10.1).

Maastricht-Vogelzang was discovered during survey of a newly ploughed field by B. Knippels, a local archaeologist, who found a concentration of flint artefacts belonging to the Neolithic Michelsberg Culture, that flourished between c. 4400 and 3600 cal BC. His discovery was followed in 1994 by an excavation, carried out by the archaeological service of the town of Maastricht in close cooperation with the Faculty of Archaeology of Leiden University. The daily work was directed by F. Brounen, and L.P. Louwe Kooijmans kept a watchful eye on the proceedings.

The site lies on the bank of an ancient channel of the river Meuse. Most of it has been destroyed by medieval activities, but a strip of land immediately bordering the channel has been spared. The area preserved had obviously been used by the Michelsberg occupants to dump all kinds of waste, and much of the pottery consisted of the failures of pottery manufacture (Brounen 1995), while another component of the rubbish consisted of household waste, including carbonised seeds. A radio-carbon dating of charcoal gave a date of 5310 ± 80 BP. The style of pottery places the site in Michelsberg phase I / II (phases after Lüning).

The section of the main excavation trench showed that the waste layer ended sideways into a peaty fill of the former channel (fig. 10.2). Both the presence of carbonised seeds and the organic fill provided an opportunity for a botanical investigation, with the aim of looking for food plants and for the impact of the population on the vegetation surrounding their place of settlement. In view of the interest of Leendert Louwe Kooijmans in the Michelsberg Culture and in all kinds of botanical matters, it seems appropriate to present the results of this investigation in this volume dedicated to him.

10.2 MATERIALS AND METHODS

For macroremains analysis, the loamy fill of the dump was sampled in several spots and the resulting soil sieved in the archaeobotanical laboratory of the Faculty of Archaeology, Leiden University. The samples were processed under running tap water using sieves with meshes down to 0.25 mm. The residues were air-dried and sorted, and the retrieved seeds and fruits identified and counted. All this work was done by H.J. Goudzwaard and W.J. Kuijper.

For a reconstruction of the vegetation by means of pollen, the fill of the channel was sampled by driving a 50 cm long sample box into the section provided by the main excavation trench. Subsamples of 1 cm thick were cut out of this box and treated with 10% KOH, HCl, a Bromoform-Ethanol mixture with sg 2.0 and acetylase. Sample distance was 2.5 cm. Prior to the laboratory treatment, a tablet with Lycopodium spores was added (Stockmarr method). The
resulting pollen was preserved in glycerine. The pollen counts aimed at an upland pollen sum of 300 or more; this pollen sum excludes trees, shrubs and herbs which may have contributed to peat formation, such as *Alnus* (alder) and even Poaceae. Identification was done with the aid of the keys of Faegri and Iversen (1989), The Northwest European Pollen Flora (1976-1988) and the reference collection of the laboratory. Cereal-type pollen was identified by the criteria set down by Körber-Grohne (Grohne 1957). The pollen counts were carried out by G. Korf who wrote an MA thesis on the subject.

10.3 RESULTS: SEEDS AND FRUITS

The results of the search for seeds and fruits are presented in table 10.1. Most of the samples came from feature 1, the main layer of waste. The other samples came from features which could be discerned separately during the excavation, but are essentially part of the general dump. The species list is short: four crop plants, three kinds of nuts and fruits gathered from the wild, and three herbs which are considered to be field weeds. The crop plants comprise three cereals: naked multi-rowed barley (*Hordeum vulgare* var. *nudum*), a naked wheat (*Triticum aestivum* or *Tr. durum*) and emmer wheat (*Triticum dicoccum*). Grains of einkorn-type (*Triticum monococcum*-type) may represent a fourth cereal, einkorn wheat, but may also represent grains from one-grained emmer spikelets such as occur in the top of the ears, and the few occurrences do not permit a distinction.

One single fragment of chaff belongs to durum wheat (*Triticum durum*) and therefore the grains identified as naked wheat probably belong to this kind of wheat. As naked wheat is dominant among the identifiable cereal remains, most of the unidentifiable cereal fragments may have belonged to this wheat too.

It is surprising that cereal chaff is almost absent, as are other kinds of cultivated plants, which are restricted to one single pea (*Pisum sativum*). The gathered plants are hazelnut (*Corylus avellana*), sloe plum (*Prunus spinosa*) and blackberry (*Rubus fruticosus*).

In view of the near-absence of chaff, it comes perhaps as no surprise that the remains of field weeds are scarce as well. Representatives of this class of herbs are a fruit of possible false cleavers (*Galium et spurium*), a grass with small seeds too damaged for identification (Poaceae) and a damaged seed of grey hairy tare or smooth tare (*Vicia hirsuta* or *V. tetrasperma*). Such herbs commonly enter a site together with the harvest, and end up in the waste of threshing and further processing of cereals. The scarcity of waste from cereal cleaning suggests that all the carbonised seeds and fruits represent kitchen waste, originating from the consuming household, not from farmyard activities. This does not immediately imply that the inhabitants of the Vogelzang site were not involved in farming, but shows that the dump is not a common farmers’ dump. The seeds and fruits may represent the kitchen waste of the potters, who discarded their failures on that particular spot. As will be
explored further in the discussion, the plants found at Vogelzang are common for Michelsberg sites.

10.4 RESULTS: POLLEN

10.4.1 The pollen diagram Maastricht-Vogelzang

The sediment in the bottom part of the sample box, 50-41 cm, consists of river loam (silt deposited by the river). What follows is a general transition through peaty loam and loamy peat, 41-39 cm, to peat. At 10 cm below the top there is an abrupt transition back to loam. The top of the box is equal to 120 cm below surface.

The ancient channel obviously was cut off from the main stream of the Meuse, after which river loam had a chance to settle, followed by local peat formation. At some time the channel became part of the main stream again, as is suggested by the abrupt transition from peat to river loam. Part of the peat may have been eroded, as there is definitely a hiatus between the formation of the uppermost peat and the deposition of the second river loam. Three conventional 14C dates were obtained for the peat and the time-depth graph for the deposit shows a more or less regular accumulation rate (fig. 10.3).

The pollen diagram reveals that the sedimentation of pollen took place during a time when Corylus (hazel), Quercus (oak) and Ulmus (elm) contributed most of the tree pollen rain (fig. 10.4). Pinus (pine) may have played a minor role in the beginning, but as this was a period of river loam deposition this pollen may originate from vegetation upstream, possibly in the Ardennes. In the upper part of the diagram Tilia (lime) and Fraxinus (ash) appear, while Fagus (beech) and Carpinus (hornbeam) occur only after the hiatus. The upland (dryland) vegetation included Hedera (ivy) as well, but remains of other species are scarce. The conclusion is that the drier areas in the wide valley were covered with oak-elm-hazel forest during most of the period covered by the diagram. The wetter parts of the valley were covered by a wetland herb vegetation and Salix (willow). Some Alnus (alder) may have grown there, but stands of true alder carr occur only from the time horizon when Tilia and Fraxinus appeared in the region. The ancient channel was covered by Alisma (water-plantain), Cyperaceae (sedges), Sparganium erectum-type (bur-reed or lesser reedmace) and the kind of ferns producing Monoletae psilatae type spores, with some willow.

<table>
<thead>
<tr>
<th>trench</th>
<th>1</th>
<th>1</th>
<th>1</th>
<th>1</th>
<th>1</th>
<th>1</th>
<th>1</th>
<th>1</th>
<th>1</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>level</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>4</td>
<td>--</td>
</tr>
<tr>
<td>feature</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>9</td>
<td>9</td>
<td>10A</td>
<td>10A</td>
<td>10B</td>
</tr>
</tbody>
</table>

| sample volume, liters | 3 | 3 | 10 | 2 | 9 | 5 | 27 | 5 | 10 | 8 | 5 | 7 | 5 | 7 | 5 | 5 |

<table>
<thead>
<tr>
<th>Cultivated plants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hordeum vulgare var. nudum</td>
</tr>
<tr>
<td>Triticum aestivum/durum</td>
</tr>
<tr>
<td>Triticum durum, rachis</td>
</tr>
<tr>
<td>Triticum dicoccum</td>
</tr>
<tr>
<td>Triticum monococcum-type</td>
</tr>
<tr>
<td>Triticum sp.</td>
</tr>
<tr>
<td>Cerealia fragments</td>
</tr>
<tr>
<td>Pisum sativum</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Gathered fruits and nuts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corylus avellana</td>
</tr>
<tr>
<td>Prunus spinosa</td>
</tr>
<tr>
<td>Rubus fruticosus</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Weeds</th>
</tr>
</thead>
<tbody>
<tr>
<td>cf Galium spurium</td>
</tr>
<tr>
<td>Poaceae with small seeds</td>
</tr>
<tr>
<td>Vicia hirsuta/tetrasperma</td>
</tr>
<tr>
<td>indeterminatae</td>
</tr>
</tbody>
</table>

Table 10.1 Seeds and fruits retrieved from the Michelsberg site Maastricht-Vogelzang.
at the edges. Plants from open water were very rare. During the period of peat formation the channel was obviously an eutrophic marsh.

As mentioned in the introduction, the Michelsberg dump ended sideways in the peat layer. This offered the possibility of looking for signals of the impact of the Michelsberg population on its environment, by looking for signals in that part of the diagram which represents the peat formed during human presence near the channel. There were no artefacts which could help in connecting peat to occupation. The $^{14}$C date of the site is $5310 \pm 80$ BP, or $4330-3970$ cal BC. Though the date is based on charcoal, not on seeds, it falls well within the range suggested by the pottery style. This implies that the dump, and with it the site, is younger than the top of the peat (fig. 10.3). However, the dates from the peat may be erroneous, since dates based on eutrophic peat can be too old due to the reservoir effect. Therefore, the credibility of these $^{14}$C dates has to be checked, and the standard pollen diagram of the German Rhineland provides the means (Meurers-Balke et al. 1999). This diagram was made for a comparable environment in a region not too distant, namely 50 km to the east, and part of the standard consists of dates obtained for a diagram in the valley of the river Rur, a wide valley not unlike that of the Meuse (Kalis 1988).

The Vogelzang date of $8380 \pm 40$ BP, or $7540-7340$ cal BC, belongs to a vegetation zone Corylus/Quercus/Ulmus without Tilia, Fraxinus and Alnus. The standard places this zone between 7300 and 6700 cal BC. The date may therefore be slightly too old. The next Vogelzang date, $7570 \pm 40$ BP, or $6490-6370$ cal BC, agrees with the standard for a vegetation with Corylus/Quercus/Ulmus and some Tilia, Fraxinus, Alnus, which gives a date of c. 6500 cal BC. When taking only the Rur diagram into consideration, the date should lie between 6400 and 5300 cal BC. Thus the second date seems to be broadly acceptable. The third date, $5630 \pm 40$ BP or $4540-4360$ cal BC, belongs to a vegetation with deciduous trees, but still without Fagus. The standard provides a range between 5300 and 4500 cal BC, while the Rur valley diagram on its own provides a range after 5300 and well before 3500 cal BC. The lowest date is perhaps on the old side, the middle and the third are as expected, or, if anything, on the young side. The time-depth curve gives no reason to assume serious changes in sedimentation rate, and the Vogelzang series looks acceptable. Therefore, the age of

![Figure 10.3 The time-depth graphs for the Vogelzang (V) and Randwijck (R) deposits, combined with the time span of the Rössen site (R), the Michelsberg site (V) and the SOM site (SOM).](image-url)
the peat implies that the organic deposit, as far as preserved, is not of the same age as the site. The suggestion that the Michelsberg dump and the peat layer are contemporaneous, a suggestion based on observations made during the excavation, is therefore false. The layer of peat, as far as preserved, is older than the site.

This might have been the end of the story but for another pollen diagram. In 1993 M. Alkemade, C. Vermeeren and I published a pollen diagram from the location Maastricht-Randwijck (Bakels et al. 1993). It is based on an ancient channel of the Meuse, quite similar to the Maastricht-Vogelzang one and situated at a distance of only 600 m (see fig. 10.1). The diagram revealed an impact on the vegetation caused by the Neolithic Rössen Culture, which precedes the Michelsberg Culture, and we wondered at the time why we did not see an impact from the following Michelsberg Culture, as the famous Rijckholt-St. Geertruid flintmires of Michelsberg age are not far off. The diagram has to be reconsidered here.

10.4.2 The pollen diagram Maastricht-Randwijck

As mentioned above, the Maastricht-Randwijck diagram has already been published, and therefore only an excerpt of the diagram is presented here (fig. 10.5) showing the part with the peat deposit and the most relevant pollen curves. The deposit is dated by three 14C dates. Because the ancient channel was sampled by coring, material from several centimetres of peat had to be sent in for conventional 14C dating, resulting in a cruder dating of horizons than in the Vogelzang case. The time-depth graph based on the calibrated dates is given in fig. 10.3, and the dates are discussed in the same way as the Vogelzang dates.

The oldest Maastricht-Randwijck date, 5870 ± 50 BP, 4850-4590 cal BC, belongs to a vegetation zone with the same way as the Vogelzang dates. It is based on an ancient channel of the Meuse, quite similar to the Maastricht-Vogelzang one and situated at a distance of only 600 m (see fig. 10.1). The diagram revealed an impact on the vegetation caused by the Neolithic Rössen Culture, which precedes the Michelsberg Culture, and we wondered at the time why we did not see an impact from the following Michelsberg Culture, as the famous Rijckholt-St. Geertruid flintmires of Michelsberg age are not far off. The diagram has to be reconsidered here.

However, this is debatable, since the behaviour of Ulmus and Fraxinus, this points to an opening-up of the forest, and is rather tempting to attribute this event to actions of the Rössen population. The trend continues during the subsequent horizon, the one I have designated above as Michelsberg. What in the original publication has been described as a Rössen signal, is perhaps a combination of Rössen and Michelsberg. The vegetation of the area had possibly no chance to regenerate in the interval between these two occupations. People deforested the higher parts of the river valley, sparing Quercus and propagating Corylus in the mean time. They even cut down some Alnus according to its pollen curve. The decline of Fraxinus may possibly be attributed to an intensive use of this tree, not only for its wood but also for its leaves to be used as fodder. Normally Fraxinus reacts with a rise of its pollen curve as a result of the opening-up of the forest, as it is a light-demanding kind of tree. The Ulmus and Tilia declines may also, at least partly, have been due to use of leaves and twigs as animal feed. Herb pollen is scarce, and it is possible that there was insufficient herb vegetation to offer pasturage for the Neolithic livestock. Or, the lack of herb pollen will have to be attributed to grazing pressure on the existing herb vegetation, preventing the flowering of herbs. In both cases leaf fodder may have supplemented the animals' feed.

The most striking curve in the Randwijck pollen diagram is however the curve of Cerealia (cereals): both Hordeum
Figure 10.4a The pollen diagram Maastricht-Vogelzang, the upland part. Zone R stands for Rössen Culture. Exaggeration 10x.
Figure 10.4b The pollen diagram Maastricht-Vogelzang, the wetland and ecologically indeterminate parts. Exaggeration 10x.
Figure 10.5a The pollen diagram Maastricht-Randwijk, the upland part. Zones R, M and S stand for Rössen Culture, Michelsberg Culture and SOM Group. Exaggeration 10x.
Figure 10.5b The pollen diagram Maastricht-Randwijck, the wetland and ecologically indeterminate parts. Exaggeration 10x.
and *Triticum* type are present and the curve is almost continuous, starting in the Rössen horizon. The cereal pollen may have entered the pollen rain because of threshing activities next to the channel, as already suggested for the period of Rössen occupation (Bakels et al. 1993). The Rössen site revealed naked multi-rowed barley, bread wheat and emmer wheat, all three being cereals which do not readily release their pollen into the air. Only during their processing the pollen is beaten out of the glumes (chaff). However, the continuous curve cannot be attributed to a continuous use of the local channel bank as a threshing site, because continuous occupation on this stretch of bank, or the opposite bank, has not been demonstrated. Cereals may, however, have been grown on the terrain closely bordering the channel, and not only during the Rössen period, but also in later periods. It is striking that some of the usual ‘anthropogenic indicators’, Chenopodiaceae (goosefoot family) and *Plantago lanceolata* (ribwort plantain) for instance, are absent during these zones and occur only later in the record. But the curve of *Polygonum aviculare* (knotgrass) indicates the presence of heavily trampled areas (another indicator of a wayside environment bordering the channel, but in a later period, is *Plantago major*/media, great plantain or hoary plantain).

The wide valley of the Meuse seems to have been continuously inhabited during the Neolithic, as traces of the Stein Group, a local version of the Warthberg Culture in Germany, have been discovered in the Vogelzang-Randwijk region as well. A 14C date for this group, obtained on the basis of charcoal in the fill of a pit, gave 4180 ± 60 BP or 2900-2580 cal BC. This horizon has also been plotted on the diagram. Because the time-depth curve in this part is more difficult to interpolate, the horizon designated as Stein Group may have been drawn a little too high. One is tempted to attribute the second decline of the *Ulmus* curve, a decline after re-growth, and the following rise in *Quercus* percentages, to this Neolithic group but that is something for future research.

After this excursion to the Randwijk diagram I would like to return to the Vogelzang diagram, where the trend in the curves of the topmost centimetres of peat can be seen to be very similar to the trend in the start of the Randwijk peat. If the Rössen horizon, based on the calibrated 14C dates, is projected on the Vogelzang diagram, the same declines in the curves of *Ulmus*, *Tilia*, *Fraxinus* and *Alnus* are observed, and the curves of *Corylus* and *Quercus* show a rise. It looks as if the Vogelzang peat stops where the Randwijk peat starts.

10.5 Discussion

The food plants and weeds discarded by the Michelsberg people living on the border of the former Vogelzang channel fit well into the current list of plants found on Michelsberg sites in the region. Two Dutch sites qualify for comparison: Maastricht-Klinkers and Heerlen-Schelsberg. Both are attributed to Michelsberg phase III and are therefore slightly younger than Maastricht-Vogelzang.

Maastricht-Klinkers is situated on the plateau above the Meuse valley, northwest of the town of Maastricht. The Michelsberg features consisted of several pits filled with domestic waste, which included carbonized grains of naked multi-rowed barley and unidentified naked wheat. In addition, some seeds of orache (*Atriplex patulal/Prostrata*), fat hen (*Chenopodium album*), black bindweed (*Fallopia convulvus*) and a catchfly species (*Silene sp.*) were found (Schreurs 1992).

The site of Heerlen-Schelsberg is a causewayed camp on top of a plateau 25 km east of Maastricht (site unpublished, excavated by J. Deeben and J. Schreurs). Its various features contained naked multirowed barley, durum wheat (*Triticum durum*, both grains and the characteristic chaff), emmer wheat (*Triticum dicoccum*), a few grains of einkorn-type wheat (*Triticum monococcum-type*) and pea (*Pisum sativum*). The wild nuts and fruits identified were hazelnut (*Corylus avellana*), crab apple (*Malus sylvestris*, both pips and fruits) and lime (*Tilia sp.*). The finds also included weeds, the species present being fat hen (*Chenopodium album*), black bindweed (*Fallopia convolvulus*), cleavers (*Galium aparine*), nipplewort (*Lapsana communis*), dock (*Rumex sp.*), clover (*Trifolium sp.*), smooth tare (*Vicia tetrasperma*), drooping brome or barren brome (*Bromus sterilis/tectorum*), fescue or rye grass (*Festuca sp./Lolium sp.*) and scarlet pimpernel (*Anagallis arvensis*) (Bakels 2003). The presence of significant amounts of barley and wheat chaff together with the list of weed species suggests that crops were processed on this site. The kind of waste found in the Heerlen-Schelsberg causewayed enclosure has all the characteristics of ordinary waste as found in a farmyard setting. Though the plant species found here and at Maastricht-Vogelzang are comparable, the latter site is different in offering more of a consumer aspect.

The influence of the Michelsberg inhabitants of Maastricht-Vogelzang on their surroundings is reflected in a decline of lime, elm and ash and, in the wetter parts of the landscape, alder. It was a continuation of a development started by their predecessors, the people of the Rössen culture. The original vegetation would have been a mixed deciduous forest, consisting of oak, elm, lime and ash on the drier terrains, and a marsh vegetation with stands of sedges and other wetland herbs interspersed with willow and alder carr on the wetter grounds. How many openings were present in the higher areas is difficult to assess, but the high percentage of hazel pollen suggests a considerable amount of forest edge.

Turning to a comparison of the Meuse evidence with that known from the German Rhineland, the same effect of Rössen people on their environment is reported for the latter
region as for the Meuse valley, but for one difference, namely that the curve of ash rises in the Rhineland (Meurers-Balke et al. 1999). This rise is attributed to the inhabitants’ positive attitude towards ash, expressed as a sparing of the trees. The reason offered is that ash was a valued provider of fodder, the same explanation as is offered above for the decline of ash in the Randwick and Vogelzang situation. The distance between the stands of ash and the place where people actually lived may play a role here. A decline close to the archaeological sites and a rise where the distance was greater is quite feasible, especially if ash close by was coppiced more frequently.

The Michelsberg occupation is not yet very well recognized in the Rhineland diagrams, but there are signs that the forest recuperated to some extent between the Rössen and Michelsberg occupation, in contrast to what we see for the Meuse. The part of the Meuse valley south of Maastricht was probably continuously occupied by people, which may possibly explained by the nearness of good sources of flint in the Rijckholt-St. Geertruid area at the valley’s edge. It must have been a choice location for Neolithic people.

In its curve of cereal pollen the valley is rather unique.

10.6 Conclusion
The lower terrace of the wide valley of the river Meuse south of Maastricht seems to have been inhabited continuously or almost continuously from the Rössen period onwards. The cultivation of cereals and peas was part of the activities of both the Rössen and Michelsberg people. The impact on stands of trees like ash, a favourite provider of leaf fodder, suggests that their activities included the tending of livestock as well. The pollen diagram Maastricht-Randwick suggests that this way of life was also shared by the subsequent Stein group, a cultural group still fairly unknown.

The analysis of both the macroremains and the pollen from the Maastricht-Vogelzang site has, once again, shown the importance of the Meuse valley south of Maastricht for the study of the Dutch Neolithic. It is to be hoped that it will have the attention of archaeologists also in the near future.

Acknowledgments
Archaeobotanical studies like this one are based on teamwork. Without the skill of Wim Kuijper and Johan Goudzwaard the friable carbonised seeds would never have been retrieved. Wim Kuijper helped me to sample the former channels of the river Meuse at the locations Vogelzang and Randwick. Geertje Korf counted the Vogelzang pollen. The Randwick diagram was made by Marjolein Alkemade-Eriks. I wish to thank them for their excellent work. And last but not least, the English of this compilation and integration of results was revised by Kelly Fennema.

Note
In this article the following ¹⁴C dates are referred to:

Maastricht-Vogelzang site: GrN-21043, 5310 ± 80 BP
Maastricht-Vogelzang diagram: GrN-22478, 5630 ± 40 BP GrN-22480, 7570 ± 40 BP GrN-22481, 8380 ± 40 BP
Maastricht-Randwick site: GrN-16715, 5730 ± 35 BP GrN-16716, 5845 ± 45 BP GrN-16717, 5790 ± 35 BP GrN-16718, 5835 ± 35 BP
Maastricht-Randwick diagram: GrN-17121, 5500 ± 40 BP GrN-17122, 4215 ± 45 BP GrN-17123, 5870 ± 50 BP
Maastricht Stein group: GrN-14237, 4180 ± 60 BP

Calibrations were carried out with the programme OxCal v3.10

References


C.C. Bakels
Faculty of Archaeology
P.O. Box 9515
NL-2300 Leiden
The Netherlands
c.c.bakels@arch.leidenuniv.nl
Contents

Preface  ix

1 Jan Hendrik Holwerda and the adoption of the three-age system in the Netherlands  1
    Leo Verhart

2 The temporality of culture changes  15
    Harry Fokkens

3 Timing, tempo and temporalities in the early Neolithic of southern Britain  25
    Alex Bayliss
    Alasdair Whittle
    Frances Healy

4 The end of the beginning: changing configurations in the British and Irish Neolithic  43
    Richard Bradley

5 The Danubian-Baltic Borderland: Northern Poland in the fifth millennium BC  51
    Peter Bogucki

6 The Mesolithic-Neolithic transition in Western Denmark seen from a kitchen midden perspective: a survey  67
    Søren H. Andersen

7 Tracing the Neolithic in the lowlands of Belgium: the evidence from Sandy Flanders  75
    Philippe Crombé
    Joris Sergant

8 A southern view on north-south interaction during the Mesolithic-Neolithic transition in the Lower Rhine Area  85
    Bart Vannuffel

9 The foam that flies ahead of a wave of advance: thoughts on the early neolithisation of the Lower Rhine uplands  99
    Pieter van de Velde

10 Maastricht-Vogelzang, the Netherlands, a Michelsberg site in the valley of the Meuse seen from a botanical angle  111
    Corrie Bakels
11 Phosphate mapping of a Funnel Beaker Culture house from Flögeln-Eekhöltjen, district of Cuxhaven, Lower Saxony 123
W. Haio Zimmermann

12 The Schipluiden pottery: mobility, exchange and mode of production 131
Daan Raemaekers

13 Hazendonk layers over and over again 139
Luc Amkreutz
Leo Verhart
Milco Wansleeben

14 The scale of human impact at the Hazendonk, the Netherlands, during the Late Neolithic 153
Welmoed Out

15 An eagle-eyed perspective. *Haliaeetus albicilla* in the Mesolithic and Neolithic of the Lower Rhine Area 167
Luc Amkreutz
Raymond Corbey

16 Were beavers aware? A change of perspective on the neolithisation of Britain 181
Bryony Coles

17 Exotic flint and the negotiation of a new identity in the ‘margins’ of the agricultural world: the case of the Rhine-Meuse delta 193
Annelou van Gijn

18 Engaging with stone: Making the Neolithic in Ireland and Western Britain 203
Gabriel Cooney

19 Points of contact. Reflections on Bandkeramik-Mesolithic interactions west of the Rhine 215
Marjorie de Grooth

20 On the Production of Discoidal Flint Knives and Changing Patterns of Specialist Flint Procurement in the Neolithic on the South Downs, England 235
Julie Gardiner

21 Upper Largie and Dutch-Scottish connections during the Beaker period 247
Alison Sheridan
22 Neolithic Alpine axeheads, from the Continent to Great Britain, the Isle of Man and Ireland 261
Pierre Pétrequin
Alison Sheridan
Serge Cassen
Michel Errera
Estelle Gauthier
Lutz Klassen
Nicolas Le Maux
Yvan Pailler

23 A note on prehistoric routes on the Veluwe and near Uelzen 281
Jan Albert Bakker