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BETWEEN FORAGING AND FARMING

AN EXTENDED BROAD SPECTRUM OF PAPERS
PRESENTED TO LEENDERT LOUWE KOOIJMANS

EDITED BY

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JOS P. KLEIJNE, HEDWIG H. PONJEE AND CORIJANNE G. SLAPPENDEL



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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 BP¹. 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 acetolysis. Sample distance was 2.5 cm. Prior to the laboratory treatment, a tablet with *Lycopodium* spores was added (Stockmarr method). The

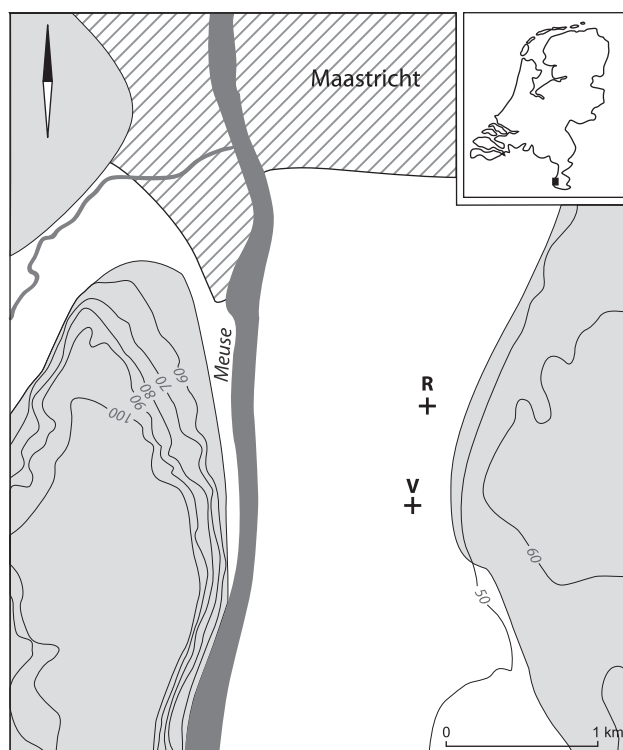


Figure 10.1 The situation of the sites Maastricht-Vogelzang (V) and Maastricht-Randwijck (R); white: valley deposits.

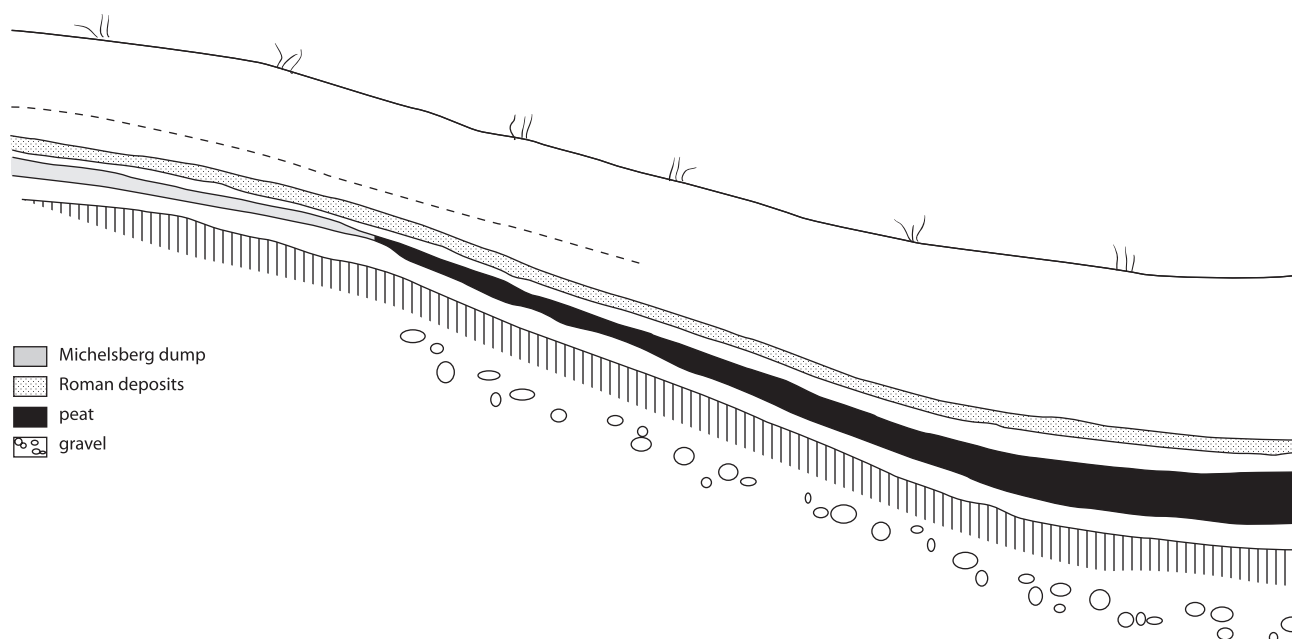


Figure 10.2 The section of the main excavation trench.

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 cf. 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

trench	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	3	4
level	1	1	1	1	1	1	1	1	1	1	1	1	1	3	4	–	–
feature	1	1	1	1	1	1	1	9	9	10 A	10 A	10 B	7/10/11	13	4	5	16A
	A	A + B	A + C	C	C + D	C + E	D	upper 10 cm	bottom	upper 10 cm	–	–	–	–	–	–	–
sample volume, liters	3	3	10	2	9	5	27	5	10	8	5	5	7	5	7	5	5
Cultivated plants																	
<i>Hordeum vulgare</i> var. <i>nudum</i>	2	–	–	–	1	–	5	–	–	–	–	–	–	1	–	–	–
<i>Triticum aestivum/durum</i>	17	–	14	–	4	–	75	–	–	4	–	1	3	1	–	–	–
<i>Triticum durum</i> , rachis	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–
<i>Triticum dicoccum</i>	–	–	–	3	–	–	7	–	1	4	4	3	–	1	–	–	–
<i>Triticum monococcum</i> -type	–	–	–	–	–	–	–	–	–	–	–	1	1	–	–	–	–
<i>Triticum</i> sp.	–	–	–	–	2	10	–	–	–	–	–	–	8	3	–	–	–
Cerealia fragments	22	5	24	22	24	–	128	–	–	24	12	11	22	17	–	–	–
<i>Pisum sativum</i>	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–
Gathered fruits and nuts																	
<i>Corylus avellana</i>	–	–	2	–	3	1	8	–	–	6	7	1	5	7	1	–	–
<i>Prunus spinosa</i>	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–
<i>Rubus fruticosus</i>	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–
Weeds																	
cf <i>Galium spurium</i>	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–
Poaceae with small seeds	2	–	–	2	–	–	–	–	–	–	–	–	–	–	–	–	–
<i>Vicia hirsuta/tetrasperma</i>	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–
indeterminatae	1	–	1	–	–	–	–	–	–	–	–	–	1	–	–	–	1

Table 10.1 Seeds and fruits retrieved from the Michelsberg site Maastricht-Vogelzang.

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 reed-mace) and the kind of ferns producing *Monoletae psilatae* type spores, with some willow

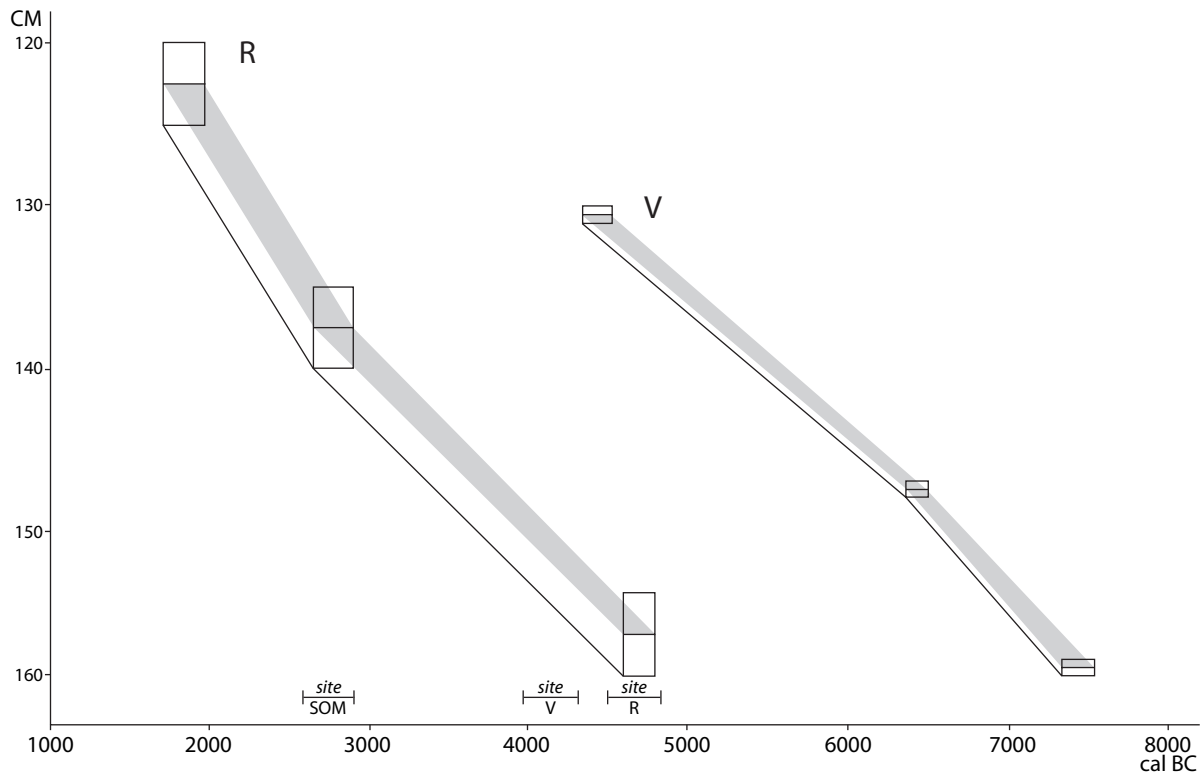


Figure 10.3 The time-depth graphs for the Vogelzang (V) and Randwijck (R) deposits, combined with the time span of the Rössen site (R), the Michelsberg site (V) and the SOM site (SOM).

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 ± 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 ± 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 ± 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 ± 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

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 flintmines 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 ^{14}C dates. Because the ancient channel was sampled by coring, material from several centimetres of peat had to be sent in for conventional ^{14}C 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 combination *Corylus/Quercus/Ulmus/Tilia/Fraxinus/Alnus*, a phase identical with the last phase present in the Vogelzang peat. The Rhineland standard gives a date of 5300-4500 cal BC for this, and the Randwijck date is acceptable. The middle ^{14}C value, 4215 ± 45 BP, or 2910-2660 cal BC, provides the date for a vegetation of *Corylus/Quercus/Alnus* with less *Tilia* and *Fraxinus*, almost no *Ulmus* and no *Fagus*. Following the standard, the date should lie between 2500 and 2000 cal BC and may therefore be c. 500 years too old. However, this is debatable, since the behaviour of *Tilia*, *Ulmus* and *Fraxinus* plays a major role in the assessment and precisely these curves are commonly influenced by human action.

The uppermost date of 3500 ± 40 BP or 1940-1730 cal BC belongs to a similar vegetation, but now with some *Fagus* pollen. A match with the standard is difficult, because the first *Fagus* there occurs together with a rise in *Pinus*, and this combination is absent in Randwijck. Between the

horizon connected with this date and the middle date lies a *Quercus* optimum. The standard shows a comparable optimum, associated with low values for *Tilia* and a minimum for *Corylus*. This falls between 2300 and 1500 cal BC. In view of this the Randwijck date seems to be reliable. Looking at the time-depth graph, the middle date would also not be very aberrant, and, if anything, rather too young than too old.

It may be considered hazardous, but I would like to proceed with seeking the signal of the Michelsberg culture in the Maastricht-Randwijck diagram by looking at the time-depth graph (fig. 10.3). The signal should be present between 156 and 146 cm, or, if sticking to the centre of the dated part of the core, narrowed down to 154-148 cm below surface. The latter zone has been indicated in the pollen diagram. This diagram was originally made with reference to a Rössen site situated on the edge of the ancient channel. The site has provided four ^{14}C dates, 5845 ± 45 , 5835 ± 35 , 5790 ± 35 and 5730 ± 35 BP, which calibrated give, all taken together, a date span of 4830-4490 cal BC. Plotted on the diagram, the Rössen occupation should be visible between 158-154 cm or, narrowed down, between 156 and 154 cm. This is just below the Michelsberg horizon.

A look at the pollen curves tells that the lower boundary of the Rössen horizon corresponds with a decline in the curves of *Ulmus*, *Tilia* and *Fraxinus*. These declines are offset by rises in the *Corylus* and *Quercus* curves. Except for the behaviour of *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 pastureland 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*

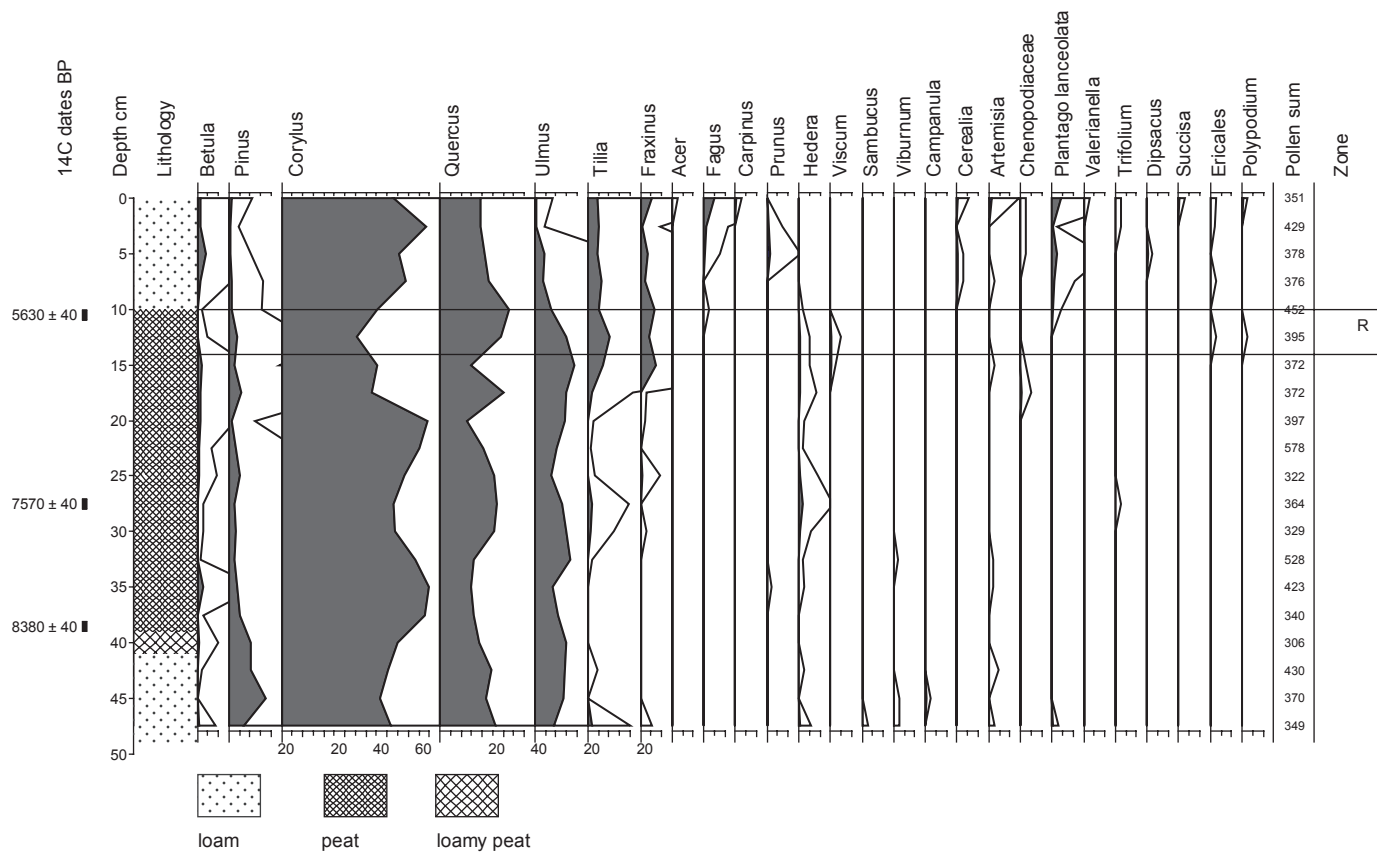


Figure 10.4a The pollen diagram Maastricht-Vogelzang, the upland part. Zone R stands for Rössen Culture. Exaggeration 10x.

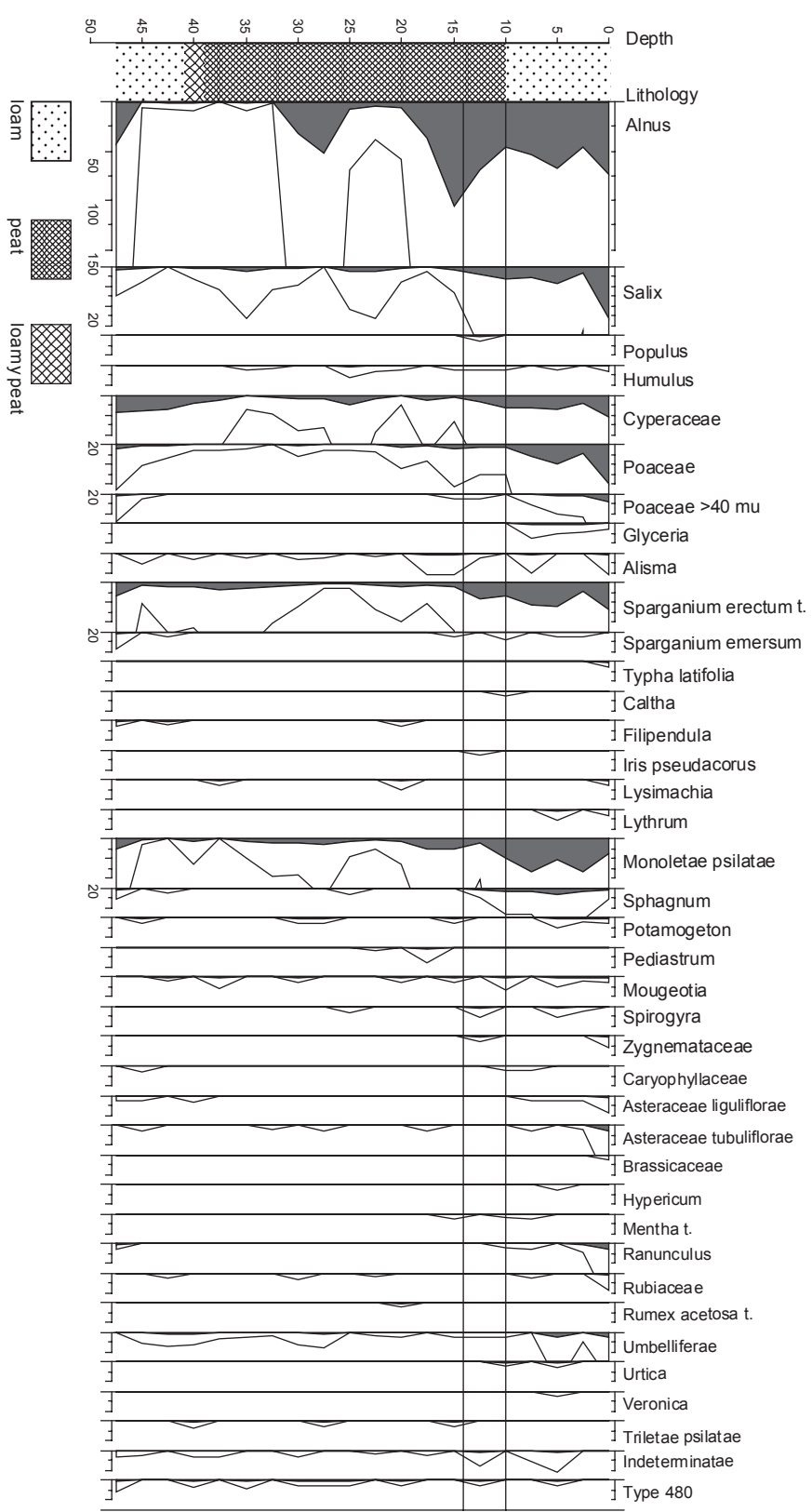


Figure 10.4b The pollen diagram Maastricht-Vogelzang, the wetland and ecologically indeterminate parts. Exaggeration 10x.

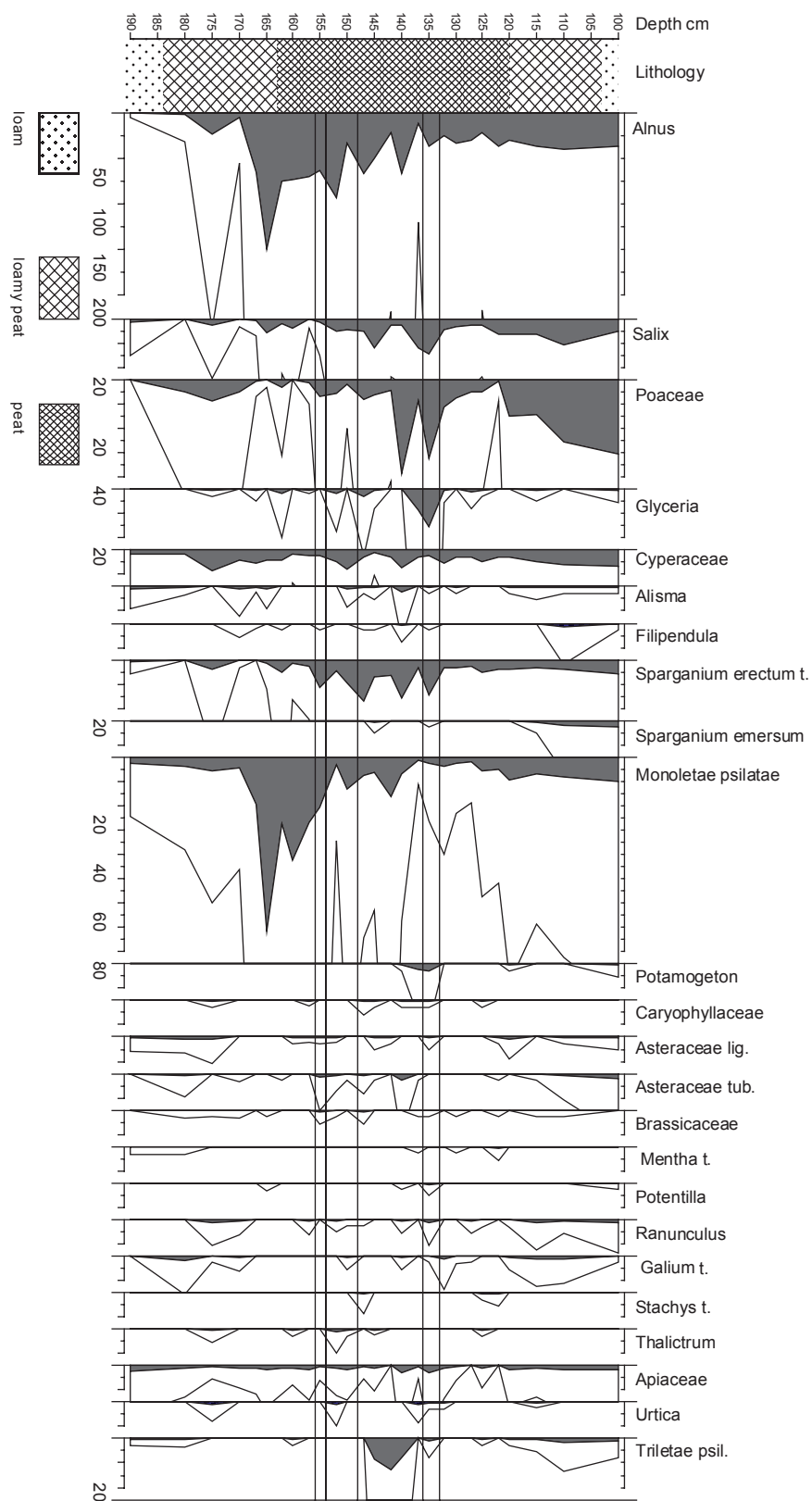


Figure 10.5b The pollen diagram Maastricht-Randwijk, the wetland and ecologically indeterminate parts. Exaggeration 10x.

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 Wartberg Culture in Germany, have been discovered in the Vogelzang-Randwijck region as well. A ^{14}C 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 Randwijck 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 Randwijck peat. If the Rössen horizon, based on the calibrated ^{14}C 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 Randwijck 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 patula/prostrata*), fat hen (*Chenopodium album*), black bindweed (*Fallopia convolvulus*) 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 Randwijck 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 be 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-Randwijck 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.

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Note

In this article the following ^{14}C dates are referred to:

Maastricht-Vogelzang site:	GrN-21043, 5310 $\pm$ 80 BP
Maastricht-Vogelzang diagram:	GrN-22478, 5630 $\pm$ 40 BP
	GrN-22480, 7570 $\pm$ 40 BP
	GrN-22481, 8380 $\pm$ 40 BP
Maastricht-Randwijck site:	GrN-16715, 5730 $\pm$ 35 BP
	GrN-16716, 5845 $\pm$ 45 BP
	GrN-16717, 5790 $\pm$ 35 BP
	GrN-16718, 5835 $\pm$ 35 BP
Maastricht-Randwijck diagram:	GrN-17121, 3500 $\pm$ 40 BP
	GrN-17122, 4215 $\pm$ 45 BP
	GrN-17123, 5870 $\pm$ 50 BP
Maastricht Stein group:	GrN-14237, 4180 $\pm$ 60 BP

Calibrations were carried out with the programme OxCal v3.10

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