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Extensive survey in the Antwerp harbour area: assessing the buried Mesolithic landscape at Verrebroek (East-Flanders, Belgium)

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1. Introduction

Since 1992, the Department of Archaeology of the Ghent University has undertaken several excavations and surveys at the extensive Early Mesolithic settlement of Verrebroek. The site was believed to cover a surface of at least 3 hectares, but recent research shows that the total occupation area may cover over 10 hectares. In the last few years, an area of about 6000 m^2 has been excavated, revealing over 50 spatially discrete features including several hearth-pits and surface-hearths (Crombé *et al.*, in press). In 1996, a first extensive auger survey over an area of approximately 5 hectares was undertaken (Crombé & Meganck, 1996). The goal of this survey was to evaluate the extent, preservation and palaeo-topographical setting of the site. The methodology applied will be discussed in the next paragraph.

Two years later, an area of some 4 hectares was submitted to an auger survey in the framework of a master thesis (Bats, 2001). The goal of this research was to evaluate the somewhat lower and wetter south-western part of the site and to get a better insight in the further extent and if possible relative chronology of the stone age occupation.

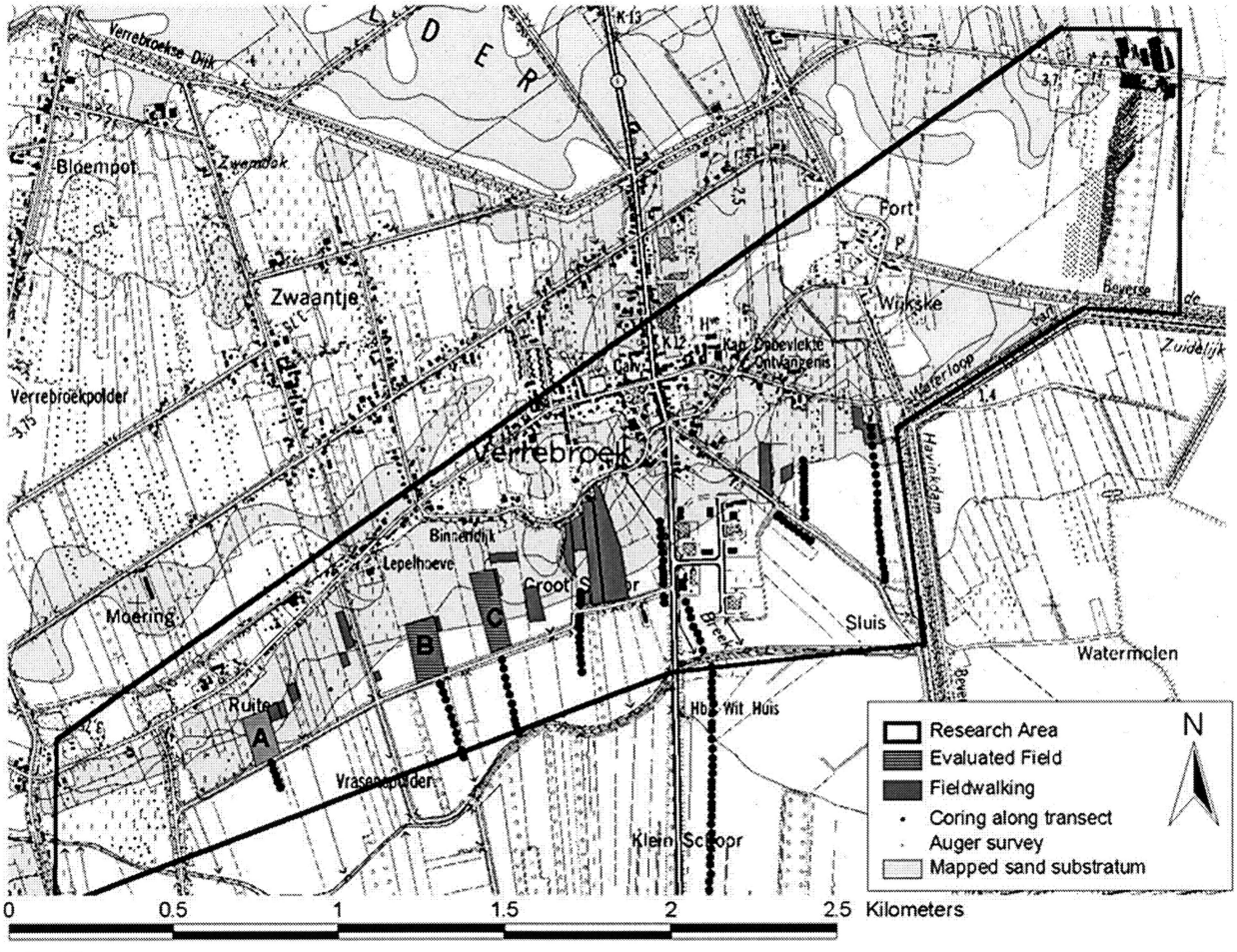


Fig. 1 – Overview of the project area.

Thirdly, in the summer of 2000 an area of over 2 hectares, under acute threat by the construction of a large drainage ditch, was evaluated by means of an auger survey (Cordemans, in press). More to the south-west of the site of Verrebroek-dock, following the southern edge of the large east-west oriented sandridge (see below), additional fieldwalking and corings for palaeo-environmental and evaluation reasons were made (fig. 1). This happened in the framework of the Interreg IIc project PLANARCH, which groups archaeologists from the United Kingdom, France, the Netherlands and Belgium in a combined archaeology - spatial planning project.

2. *Setting*

The site of Verrebroek-dock is situated on the eastern flank of a large east-west oriented sand ridge of Late Glacial origin, facing the Pleistocene valley of the Schelde to the east. Originally, the surface of this cover sand ridge displayed a micro-relief of shallow depressions and small dunes. A podzol developed in these sands. Due to its low-lying position (1 to 4 m above sea level) close to the estuary of the Schelde river, drainage became more difficult and eventually the site was covered with peat. Palynological analyses indicate that peat growth started around 4000 BP (Louwagie *et al.*, 1999). In Medieval times, a thick alluvial clay cover was deposited on top of this peat.

3. *Methodology*

In the 1996 auger survey, two different grid sizes were applied: the immediate area (ca. 2 ha) around the known site was sampled in a 5 by 5 m staggered square grid (as described by Orson (2000) and Groenewoudt (1994)). The surrounding area (ca. 3 ha) was tackled by a 20 m staggered square grid. The main purpose of these wide-spaced augerings was to evaluate the palaeo-topography and site preservation. The applied technique consisted of alternately augering with the 7 and 15 cm Edelman auger. Meanwhile, the soil profile of each borehole was recorded on standard forms to allow palaeo-reconstruction. The underlying sand matrix was systematically sampled with the mega auger (& 15 cm). All samples were stored in labelled sealable plastic bags. Consequently, all samples were waterscreened on 1 mm meshes. Afterwards, the sampling residue was dried to the air and meticulously examined for the presence of flint fragments, charred hazelnut fragments, charcoal and bone.

A similar strategy was applied in the second auger survey. The grid used was a 5 or 10 m staggered square grid, and all cores were made with the 7 and 15 cm Edelman auger. Samples were waterscreened on 1 or 2 mm meshes.

In the last survey undertaken in the summer of 2000, all augerings were also executed in a 5 m staggered square grid with the 7 and 15 cm Edelman auger. All samples were waterscreened on 1 mm meshes.

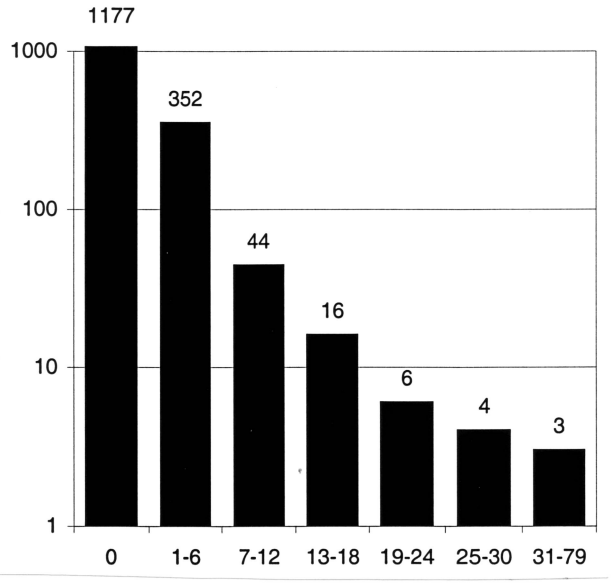
In addition to this survey, an evaluation took place of all fields in arable use where the ploughed-up sand substratum was visible. For evaluating the state of preservation of possibly present Stone Age sites, a dual strategy was applied. Firstly, the sand ridge was fieldwalked. Each of the 28 selected fields was walked over several times during a period of 6 weeks, employing parallel transects with a spacing of 5 m. Artefacts from each parcel were recorded separately. Secondly, based on the number of artefacts found by fieldwalking, three fields were selected for evaluation by means of an auger survey. On the first field (A) 190 pieces of flint were found by fieldwalking. The second field (B) yielded 68 flint founds and on the last one (field C) only 5 artefacts were found. All fields are situated on the same (partly clay covered) sand ridge, with an identical topography and arable use. For the evaluation, a 10 by 5 m staggered square grid was used, with 10 m between the rows and 5 m between the cores. Again, all samples were waterscreened on 1 mm meshes.

Finally, in order to get a better insight into the wider palaeo-topography and geomorphology of the area, an auger campaign was set up along 8 parallel transects at 250 m intervals. Along each transect, a core was taken every 25 m. For the alluvial cover, the 7 cm Edelman auger was used, but once the peat was reached a gouge auger with a diameter of 2.5 cm was employed. The soil profile was recorded on standard field maps. Some samples for palynological research and radiocarbon dating were taken.

The results of all auger surveys were processed in *Excel, Surfer* 7.0 and *Arcview GIS* 3.1 (incl. *Spatial analyst, 3D analyst* and *Imagewarp*).

4. *Results*

In total 1602 augerings were executed on the site of Verrebroek-dock itself. A total of 425 corings or 26,5 % contained at least one flint fragment. When all samples are categorised in 7 classes reaching from zero to 31 and more (fig. 2), it is clear that most augerings (1529 or 95,4 %) contained less then 7 flint fragments. Still, 73 samples contained 7 or more artefacts with a peak of 79 fragments in one coring. At least 14 concentrations can be observed over a distance of some 750 metres. C ombination of the sampling data with the recorded information on profile development clearly



Fig; 2 – Graph of the number of finds per number of corings.

shows that most concentrations can be found on the slopes. T his is not unexpected since the soil profile, *in casu* a wet podzol, is best preserved in this zones. The number of artefacts in the samples on the eastern slope even exceeds the number of finds in the samples taken in the later excavated area, revealing thousands of artefacts. The general view is of course biased by the incorporation of the top of the sand ridge in the plough layer. Fieldwalking on the more sandy outcrops previous to the 2000 auger campaign, yielded over 800 artefacts (Bats, 2001). This find distribution may lead us to the conclusion that the Mesolithic site that initially was believed to cover an area of about 3 hectares may in fact cover an area of at least 6 hectares. The palaeo-topography distilled out of the coring data, shows a large, slightly elliptical sand ridge with rather steep slopes to a shallow deflation in the west and a deeper depression to the east. The sand ridge is partly truncated (fig. 3). The original podzol profile is best preserved on the flank.

Earlier fieldwalking by amateur-archaeologists (M. De Meireleir & H. De Bock) in the neighbourhood already marked out the presence of several Stone Age sites on the connecting south-western part of the sand ridge. The additional fieldwalking revealed the presence of at least six previously unknown artefact concentrations (> 20 pieces of flint). Overall, units contained from none to over 130 pieces. Most artefacts were flint chips, but some bladelets and scrapers were also found. All concentrations can be generally dated to the Mesolithic.

In order to evaluate the preservation of these sites, the three selected fields were sampled. A total number of 243 samples was taken. The results show

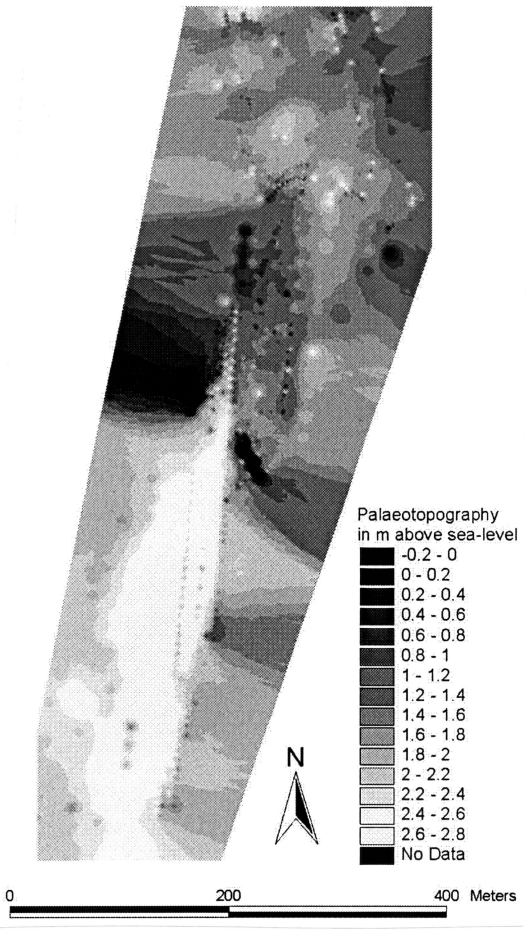


Fig. 3 – Palaeotopography derived from the auger data.

two very different patterns. In the first and second field, only a few artefacts were found in the auger samples; field A producing only 16 artefacts in the sampling residue and field B 5 artefacts. In the third field (C), on the other hand, 250 pieces of flint in at least four distinct concentrations were found. When the number of finds from the fieldwalking is compared with the number of finds from the auger survey, the difference is quite remarkable. Although the results are only indicative, since the area covered by the fieldwalking is not completely identical to the area of the auger survey, the figures speak for themselves. In Field A, 190 artefacts were recovered during the fieldwalking against 16 artefacts found in the samples, giving a ratio of 11.9. In field B, 68 artefacts were found, whilst only 5 pieces were observed in the auger samples, giving a ratio of 13.6. In field C, however, only 5 artefacts were recovered in the fieldwalking, whereas 250 artefacts were found in the cores, giving a ratio of 0.02. The high quotient in the two first fields is indicative of substantial erosion while the low quotient in the third field suggests a good

preservation. It can also be noted that the podzol profile in the third field (C) survived much better than in the other two fields. The combination of the very low quotient and the partly preserved podzol would seem to be a strong indicator of relatively good preservation of the archaeological remains in field C. Strangely, no direct explanation for this better conservation is available: the clay cover on all three evaluated fields varies from 40 to 60 cm. The most likely explication is a difference in tillage depth.

For the palaeo-environmental reconstruction, over 150 cores were taken. T his showed a general picture of a wide valley (fig. 4), consisting of a rather thick clay cover (varying between 0.5 and 1.1 m) on top of a peat deposit (with a maximum thickness of 2.5 m). Underneath the peat an organic, muddy-like 'gytja' was sometimes present. It is presumed that this package indicates the course of the palaeo-river channel. Beneath the peat and/or gytja, there was generally a greenish, coarse sand. Thus, a shallow palaeo-valley can be distinguished on the southern edge of the sand ridge. The valley seems to be 150 to 400 m wide with a (preserved) depth of only 1.5 - 2.0 m and a rather steep edge on the northern side. It is on the top and shoulder of this bank that most sites are situated. Therefore, rapidly covered archaeological remains and thus preserved organic artefacts might have been expected. A radiocarbon date from the bottom of the peat however, showed that peat-growth did not start before 43756 ± 30 BP (KIA-14320).

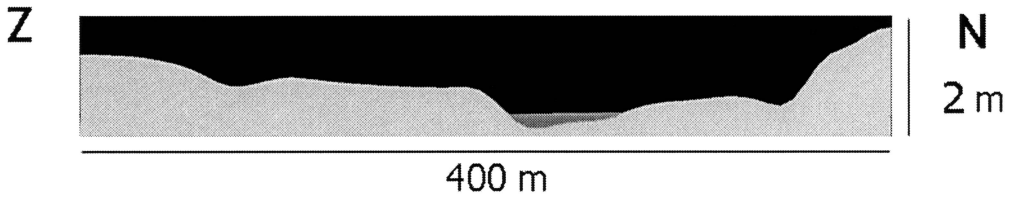


Fig. 4 – Generalised profile of the palaeovalley.

5. Conclusions

Combining all these research projects on and around the Verrebroek-dock site, we start to get a better view on the Stone Age occupation pattern. Apparently, the several kilometres large east-west oriented sand ridge was a major attraction pole for habitation during the Stone Age. The sand ridge provided a higher and thus drier living place in the immediate vicinity of a more marshy area, attracting a very diverse fauna. Also, the availability close by of drink water resources and raw material such as reeds, must have favoured occupation of the sand ridge. Because of the later topping off of the ridge by peat and alluvial clay, most of this rich archaeologically resource is well preserved. Several other covered sand ridges in the 'Scheldepolders' will almost certainly show a similar picture. The low visibility by the protective cover, makes it particularly difficult and at the same time interesting to investigate the past occupation of this region. Especially the recently increased stress by major infrastructure works and the intensification of agricultural use, obliges us to a intensified research in this largely unknown region with such high potential. Auger survey as prospection and evaluation methodology proves to be a suitable and fruitful to deal with archaeology in this covered area (Bourgeois *et al.*, 2001).

6. Acknowledgements

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Our gratitude also goes to amateur-archaeologists M. De Meireleir and H. De Bock, who have been fieldwalking the area for many years and who kindly communicate their results with us.

6. References

BATS M., 2001. *Prospectie- en waarderingsonderzoek van twee steentijdsites in Zandig Vlaanderen.* Unpublished master thesis. Ghent University.

BOURGEOIS J., CORDEMANS K., CROMBÉ Ph., MEGANCK M. & DE CLERCQ W., 2001. Archaeological sampling strategies in Flanders (Belgium). *In* : Evans, K. and Williams, J. (eds), *Archaeological Evaluation Strategies in Belgium (Flanders and Wallonia).* England, France and the Netherlands. (=*Papers from the Planarch Maidstone Seminar May 2000*).

CORDEMANS K., in press. *Final report of the Planarch Fieldwork in Flanders.* Kent County Council.

CROMBÉ Ph. & MEGANCK M., 1996. Results of an auger survey research at the Early Mesolithic site of Verrebroek 'Dok' (East-Flanders, Belgium). *Notae Praehistoricae*, 16: 105-115.

CROMBÉ Ph., PERDAEN Y. & SERGANT J., in press. The wetland site of Verrebroek (Flanders, Belgium): spatial organisation of a large Early Mesolithic settlement. *Proceedings of the 6th congress "The Mesolithic in Europe", Stockholm, 4-8/09/2000.*

CZIESLA E., 1988. Über das Kartieren von Artefaktmengen in Steinzeitlichen Gräbungsflachen. I *Bulletin de la Société Préhistorique Luxembourgoise*, 10: 5-54.

GROENEWOUDT B. J., 1994. *Prospectie, waardering en selectie van archeologische vindplaatsen: een beleidsgerichte verkenning van middelen en mogelijkheden.* Nederlandse Archeologische Rapporten, 17.

LOUWAGIE G., LANGOHR R., DEFORCE K., VERBRUGGEN C. & KLINCK B., 1999. Perception of landscape change through the soilscape study at the archaeological excavation of Verrebroek "Dok" (Province of East-Flanders, Belgium). In : *Proceedings of the geo-archaeology workshop: Landscape changes over Archaeological Time scales*, University of Reading, UK, 15-17/12/1999.

ORTON C., 2000. *Sampling in Archaeology* (Cambridge Manuals in Archaeology). Cambridge, Cambridge University Press.

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