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containing red ochre occur commonly in the graves of young females. Sea shells are also recorded elsewhere, such as the cowrie shells from Le Trou de l'Ambre in Belgium, and some burials in southern Germany and at the Dürrenberg in Austria. Cockle pendants occur in Early La Tène burials in the Ardennes. However, this is no comprehensive list. Clearly there is a trade in smaller marine objects (coral, amber and shells) which does not relate to the bulk movement of goods, and which is subject to different mechanisms. Possibly some of them could be moving on the back of the trade in salt which is now becoming better documented in western Europe, but the sea shells, and indeed the amber, deserve some more systematic study than they have enjoyed so far.

John Collis

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A NEW MESOLITHIC ARTEFACT FROM HARDINXVELD, THE NETHERLANDS

BJC: Chatting to Sara Champion at a recent Prehistoric Society event, she asked me what I was doing now. Research on beaver, I answered. With a characteristic wicked gleam in her eye, she then asked 'What sort of beaver, Bryony?'. Many people ask 'Which sort of beaver?' with less mischievous intent, and the straightforward answer is Castor fiber, the European beaver, rather than Castor canadensis, its North American counterpart. This short note describes the recent recognition of a new Mesolithic artefact, made from a beaver incisor, from the Hardinxveld excavations directed by one of the Society's former Vice-Presidents, Leendert Louwe Kooijmans of Leiden University in the Netherlands.

The Hardinxveld sites (LPLK)

The Hardinxveld sites were discovered in 1993 during the systematic coring prospection of a new railway line connecting Rotterdam harbour with its German hinterland, and called 'Betuwe Route' after

the river district it passes through. The present surface near Hardinxveld is about 1.5 m below sea level. The coring went down for several metres and touched the tops of two small Late Glacial river dunes at about 5 metres below sea level. Both appeared to have been occupied in the Late Mesolithic and were calculated to be disturbed by the planned railway. Excavation was made possible by the master contract between Dutch Rail (NS) and the State Service for Archaeological Investigations (ROB). Archaeological Research Leiden (ARCHOL) was contracted for both excavations because of the expertise in this type of deep wetland research at Leiden University. The fieldwork at both sites took place in the period July 1997 – June 1998. Two large and deep trenches, reinforced with steel sheet piling, were dug to a maximum depth of 10 m below sea level (Figure 1). Two 500 page reports will be published this year with detailed specialist chapters on all artefact categories, unfortunately fully in Dutch, but reading might be a good training in this language, for those who cannot wait for a translation that seems to be desirable. An English summary paper is, however, already in press and a preliminary presentation of the site was dedicated to the memory of Grahame Clark (Louwe Kooijmans 1999, 2001, in press).

Because of the extreme wetland conditions of the surrounding landscape and the continuous sedimentation under the regime of the rising sea level, almost everything a prehistorian might dream of appeared to have been preserved in the slope and marsh deposits adjacent to the settlement areas on the dunes. This makes the sites fully complementary to the rich Danish Ertebølle sites like Tybrind Vig and Ringkloster and as such unique for their information about the Late Mesolithic of the Lower Rhine Basin and even of the whole of Western Europe. The sites are dated 5500–4450 cal BC. Three main phases could be established. The site Polderweg had its main phase 5500–5300 cal BC, the other site, called De Bruin, 5100–4800 and 4700–4450 cal BC. Finds include burials of humans and dogs, a range of spectacular wooden artefacts (axe haft, broken bows and paddles, a complete dug out) masses of botanical and zoological remains, imported flint and natural stone. Pottery appears around 5000 cal BC and some bone of domestic animals in phase 3, seemingly connected with deposition rituals in the marshy margins of the gradually inundating dune tops. Both sites are interpreted on strong evidence as (mid-) winter base camps in which the occupants concentrated on pike fishing and the trapping of beaver and otter. In the younger phases there is additional evidence for modest summer activities as well.

Important artefact categories are those of animal material: antler, bone and teeth. Their numbers demonstrate the richness of the sites: 327 and 270 objects at Polderweg and De Bruin respectively,

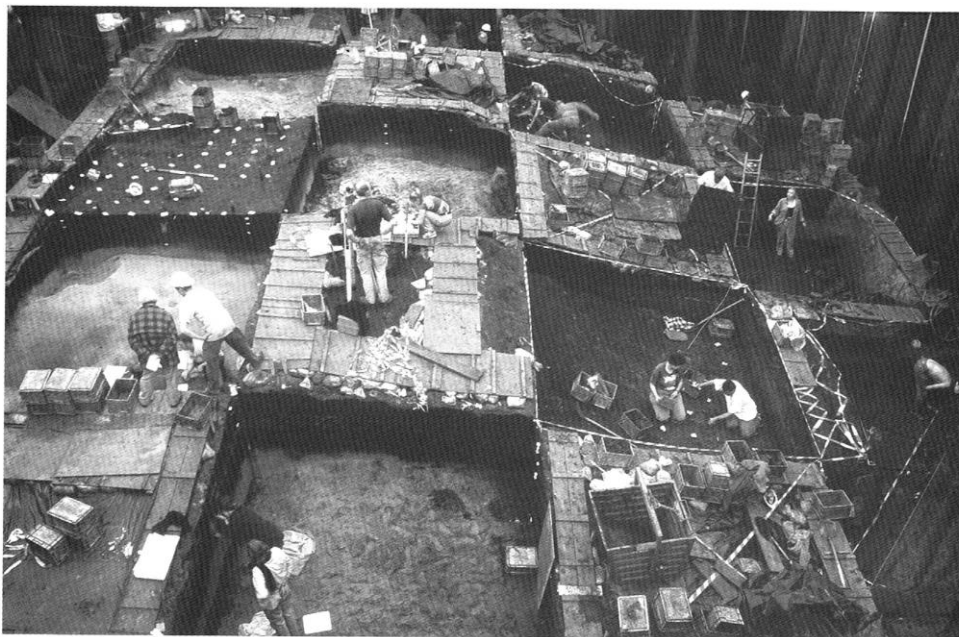


Figure 1. Hardinxveld Polderweg under excavation. Note the sheet steel piling protecting the site, and the sloping sides of the exposed dune.

mostly made of antler and metapodials, but also of teeth, mainly wild boar tusks. Worked beaver teeth are a modest artefact class, with respectively 6 and 8 specimens from Polderweg phase 1 and De Bruin phase 2. Absence in phase 3 might very well be related to the smaller amount of material from this phase. These numbers are indeed modest in relation to the fact that beaver is the most frequent of all animals, accounting for 2736 out of the 7096 identified mammal remains from the two sites. Both fragments of the artefact presented here were found at site Polderweg, phase 1 and so date from the period 5500-5300 cal BC. They were found about 1 m apart in different sections of the colluvial slope deposits of that phase and so the artefact should be considered either broken during use and discarded for that reason, or accidentally trampled and snapped in antiquity.

Examining the beaver teeth (BJC)

I was fortunate enough to visit the Hardinxveld excavations, and to see a number of the varied and well-made artefacts from the site, but at a stage before my research on beaver bones got under way. Later, in response to a request for information about beaver bones, which Jacqui Mulville sent out to archaeozoological colleagues, dr. Loes van Wijngaarden-Bakker and drs Jacqueline Oversteegen told me of the Hardinxveld beaver finds and the use of some beaver incisors for chisels. Earlier this year, during a visit to Leiden, I had the opportunity for a preliminary study of some of the worked incisors.

A fresh incisor from an adult beaver is approximately 125mm long and 8mm wide at the cutting edge. The tooth is curved, less tightly so for the lower incisor than for the upper one, and on the lower incisor there is an S-twist like that of a mammoth tusk. The outer surface only is covered in hard enamel, which is a bright orange-brown in colour. The cutting edge is straight, usually at right angles to the long axis of the tooth or sloping slightly down to the outer corner. Because the inner surfaces of the tooth do not have the hard enamel covering, a facet develops with use, which may be long, and slanting, or stepped, depending on what the beaver has been gnawing.

Four relatively intact incisors from the Hardinxveld sites were examined, together with five fragmentary finds. The cutting end of an incisor from Hardinxveld de Bruin had been trimmed to produce a chisel edge of about half the original width. The other three incisors, from Hardinxveld Polderweg, appear to have been trimmed to produce a knife-like blade rather than a chisel end. All were damaged, apparently with none of the original cutting edge left. While I was puzzling as to why anyone would remove all of a ready-made chisel edge from an incisor, and what use it might be put to without it, I turned to examine the fragments, all of which came from Hardinxveld Polderweg. Two finds at least looked like the broken remains of fairly complete worked incisors, but one was a very finely worked, nicely rounded tip of an incisor about 20mm long and 3mm wide, with the outer enamel

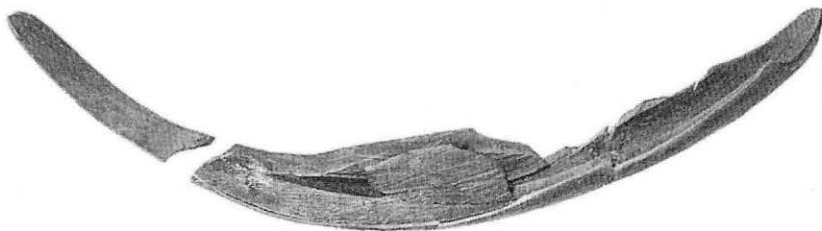


Figure 2. The two pieces of beaver incisor brought together to indicate the form of the original artefact. The incisor has been sliced longitudinally from mid point to tip, and the tip has been further worked to a flat rounded point. The object was originally about 12 cm long.

remaining on one surface. The proximal end was broken, not cut, and it was soon clear that it had broken off one of the relatively intact incisors from the same site: the two finds had been made in successive years and in different excavation squares, although only about 1 m apart. The fact that both were recovered and could subsequently be brought back together is a tribute to the skills of the excavators.

When the two pieces are put together (Figure 2), the result is a gently curved lower incisor trimmed to a long, narrow slightly curving tip with a rounded end, an object which from the precision of its manufacture looks as if it was deliberately, confidently produced to a known template.

What was this object? (BJC and LPLK)

The use of beaver jaws and beaver teeth to make artefacts is outlined by Osgood (1940) in his excellent survey of Ingalik material culture, a publication which Grahame Clark used in his note on a worked beaver jaw from the later prehistoric site of Ulrome in Yorkshire (Clark 1971). It seems that it is the combination of strength and curvature that makes beaver incisors good for tools - they are, after all, used in life to gnaw down mature trees, including oak. But the Hardinxveld Polderweg incisors have been worked to remove most if not all of the original chisel cutting edge, although some outer strengthening enamel remains.

If the worked end of the re-fitted incisor artefact was the working end, then it was deliberately made small, to work in a confined space perhaps. Osgood describes the use of beaver incisors to gouge out lumps in roots, to scrape out the inside of the concavities in snow glasses, to cut people's head hair, to work wood including the making of wooden bowls and plates, and to cut birch bark for canoes (Osgood 1940, 83-87). In a prehistoric context, one can imagine them being used to hollow out small objects, such as the wooden cups from Fiaev (Perini 1987), or making a small cavity in a larger wooden object, such as the pubic holes in some of the wooden anthropomorphic figurines (Coles 1990). However, the Hardinxveld incisor seems to have had its chisel edge removed, so perhaps it was used for a gentler task where strength and curvature mattered more than a cutting edge, for example easing out the

edible parts of shellfish and crustaceans, or cleaning out the human ear. Although no shellfish or crustaceans were found on the site, and one might wonder whether people of the Late Mesolithic systematically cleaned their ears, these suggestions give an idea of the potential of the artefact.

On the other hand, there is evidence from Hardinxveld to suggest that boars' tusks were trimmed at the distal end in preparation for hafting, and we should at least consider whether or not the beaver incisors were being used in the same way.

It is early days yet to come to any conclusion about the artefact, and more work needs to be done on the incisors and related material. But this new find from Hardinxveld is yet another demonstration of the inventiveness of Mesolithic people and of the diversity of ways in which *Castor fiber* has been exploited in the past. Meanwhile the full Hardinxveld excavation report is about to be published (LPLK) and the beaver research continues (BJC), with who knows what further discoveries to be made.

Bryony Coles and Leenderik Louwe Kooijmans

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