

THE MESOLITHIC BONE INDUSTRIES OF NORTHEAST GERMANY AND THEIR GEO-ARCHAEOLOGICAL BACKGROUND

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Abstract

In Mesolithic times, weapons, tools and instruments made of animal bones, antlers, and teeth will have been a normal and extensive part of man-made human equipment. Numerous Mesolithic bone artefacts have been accidentally found or dredged out from organic sediments in northeast Germany. There are more than 550 bone points and around 70 other bone tools from 71 find spots from bogs and wetlands. It is the same with some excavations: extraordinary numbers of Mesolithic bone artefacts came to light at Hohen Viecheln in Mecklenburg and at sites Friesack 4 and Friesack 27 in Brandenburg. Since the excavation of many Mesolithic sites everywhere in Northern Europe it has been very clear that implements and tools made of animal bones were an essential part of human equipment. Animal bones were a 'hard' material, but still softer and better workable than stone and silex, they were also different from wood. Therefore this raw material could be used for producing objects with more or less hard 'demands': spear- and arrowheads, daggers, knives, fishhooks, objects with a cutting edge, objects with a shaft hole, awls, chisels, ornaments, and others. The abundance of Mesolithic bone objects in northeast Germany is in some respect the result of the specific geological and geomorphological situation induced after the Weichselian glaciation of the region. There are four ice-marginal valleys with side-channels crossing the country as depressions filled now mostly with humic/wet sediments. Additionally there are many lakes and bogs with organic sediments along the shores, also with many swampy areas. The ancient organic objects in these sediments are mostly preserved, even after some periods of cultivation in the last three centuries. Such geomorphological conditions seem to have been very favourable for the preservation of Mesolithic bone and antler relics.

In Mesolithic times, weapons, tools and instruments made of animal bones and antler – by evidence of the amount of such objects at some excavated sites – will have been a normal and very extensive part of man-made human equipment all over Europe. But due to preservation conditions, excavation possibilities, and regional differences of geo-factors for chance findings, there are great differences in the distribution of objects of the Mesolithic bone and antler industries in Northern Europe. Denmark (BRÖNDSTED 1960; MATHIASSEN 1948), southern Sweden (ALTHIN 1954), the Baltic countries (INDREKO 1948; RIMANTIENĖ 1994; ZAGORSKA 1992), the northern Russian plain (LOZOVSKI 1996; OŠIBKINA 2006), and last but not least northeastern Germany (GRAMSCH 1973) are rich in such artefacts.

Extremely numerous Mesolithic bone artefacts were often accidentally found or dredged out from organic sediments in northeast Germany. There are more than 550 bone points and around 70 other bone tools from 71 find spots (GRAMSCH 1973) from bogs and wetlands, excluding antler artefacts from further 150 localities which could partly be of Neolithic age (Fig. 1). The excavations at Hohen Viecheln in Mecklenburg (SCHULDT 1961) and at Friesack 4 (GRAMSCH 1987; 2000) and Friesack 27 (GRAMSCH 1991) brought to light extraordinary numbers of Mesolithic bone artefacts; at Hohen Viecheln 325 bone points and more than 70 other bone artefacts (SCHULDT 1961), and at Friesack 4 391 bone points (GRAMSCH 1990; 2009/2010) and 230 other bone artefacts (GRAMSCH 2011) plus 181 antler artefacts are reported (PRATSCH 1994). Such numbers should represent the 'normal' minimum equipment at sites with many occupation events within 3000 to 3500 years during Mesolithic times, as at Friesack 4. Other Mesolithic wetland sites with many bone implements are Rothenklempenow in Mecklenburg (SCHACHT 1993) and Zeestow 4 in Brandenburg (GRAMSCH 1964; SCHWARZLÄNDER 2007), but published details for these sites are still lacking.

It has been very clear since the excavation of Mesolithic sites in Northern Europe with preservation of bone (and antler) objects that implements and tools made of animal bones were a very essential part of the equipment (Figs. 2–5). Animal bone is a 'hard', but softer and clearly better workable/shapable material than stone and silex, it is also different from wood. Therefore it could be used for producing objects with more or less hard 'demands', like spear- und arrowheads, daggers, knives, fishhooks, objects with a cutting edge, objects with a shaft hole, awls, chisels, ornaments and others; 'types' partly deriving from Upper Palaeolithic times, but now supplemented by many new tools and new techniques of making/shaping. In Mesolithic times, the use of bone for equipment and behaviour really seems to have reached a new quality in prehistoric technology.

'Hard' artefacts made of bone and antler were useful objects, appearing in forms and 'types' which could never have been made from stone or flint. Very convenient were objects with a pointed end or with a cutting edge, of which the latter often have a shaft hole – mainly red deer antler implements –, or which could be used as insets of composite tools. Shafted bone and antler axes could have been used as hitting or punching instruments – like the 'tomahawk' of North American Natives.

With respect to the data given above, some questions arise. Firstly: How many bone and antler artefacts are for instance connected with one occupation event at the Friesack site, for which 50 to 60 occupations within about 3000 to 3500 years have been estimated? With about 800 relevant objects all in all there could have been on average 15 to 20 objects per occupation, a number which seems to be reasonable but should rather be doubled because of the large area not excavated up to now. A comparable estimation for the flint artefact numbers – between 2100 to 2600 pieces (including 40 to 60 microliths) per occupation – would also be plausible; in this respect the numbers should be doubled, too.

At Friesack 4 all 391 excavated bone points and fragments will have been in use at the site itself and in the areas around it. But only 23 % of them were intact objects, while 31 % were fragments displaying the distal part with the tip, whereas in 46 % the distal part is lacking. This means that 77 % of all bone points seem to have been fragmented in the process of use as spear- and arrowheads, but they were still brought back to the site, then partly dismantled from the shafts, partly embedded in the carcasses of hunted animals. The bone points could have been produced at the site, but some or many of them could also have been made at other places, whereas some intact points – mounted to the weapons – could have been taken along to other sites, not deposited at the Friesack site.

Of the other bone and antler artefacts, 60–70 % are fragmented, too. These objects will have been used at Friesack 4. Their manufacturing could also have been done elsewhere, not at Friesack, but at the site itself the production of such tools is also documented by many semifinished products and production waste pieces (GRAMSCH 2011; PRATSCH 1994). Similar numbers can be stated for the bone and antler artefacts excavated at Hohen Viecheln.

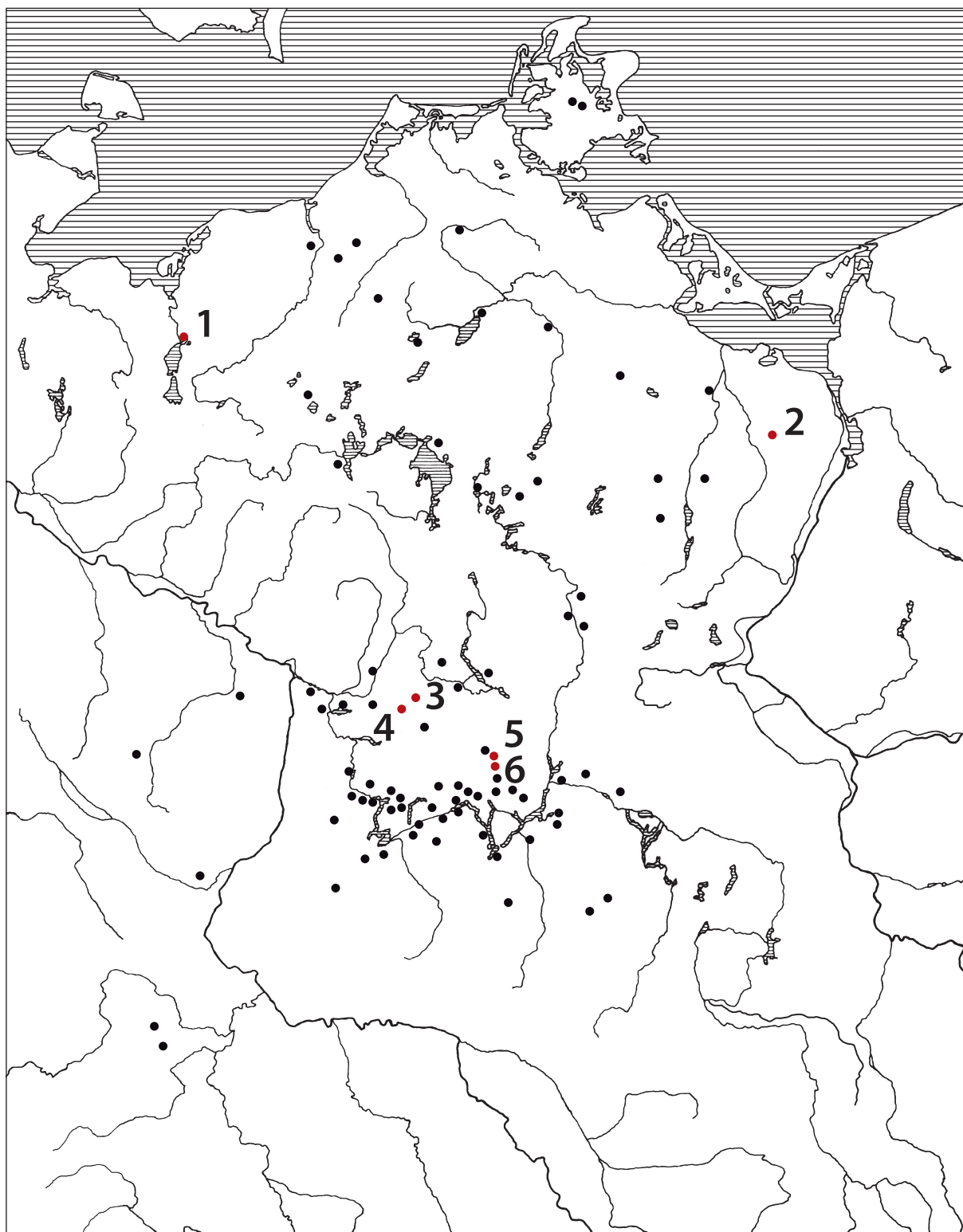


Fig. 1. Sites with bone artefacts (bone points and other artefacts, except antler objects) in northeastern Germany. Excavated sites: 1 – Hohen Viecheln; 2 – Rothenklempenow; 3 – Friesack 4; 4 – Friesack 27; 5 – Zeestow 4; 6 – Wustermark 22.



Fig. 2. Friesack 4. Mesolithic bone points. Length of the piece to the left: 13.1 cm.

According to the amount of bone and antler artefacts at Friesack 4, at Hohen Viecheln and at the British, Danish, Swedish, eastern Baltic and Russian Mesolithic bog sites, it can be estimated that in the Mesolithic on the North European Plain the production and use of artefacts, tools, weapons and other instruments made of

bone and antler (as well as the differentiation and number of 'types') exceeded the quantities of such objects in Upper Palaeolithic times, even if the large amount of such items in the Gravettian of the Czech Republic (KLÍMA 1994) and of southern Russia and Ukraine (EFIMENKO 1958) is taken into account. Bone and antler artefacts, tools, weapons and other instruments, all made of rather 'hard' materials, were preferred in the Mesolithic. They served partly special or new needs, and could easily be combined with equipment made of other raw materials, such as stone and flint, or especially wood. It has to be emphasised here that in Mesolithic times wood and bark were increasingly used for many purposes, e.g. weapons, handles and composite instruments, as is clearly demonstrated by 134 such artefacts from Friesack 4 (GRAMSCH 2013) and by objects from several sites in northern Russia (OŠIBKINA 2006), but unfortunately there is only scarce evidence from other regions of Europe, even if such objects must be clearly taken into account there, too.

The Mesolithic bone and antler artefacts were to a larger degree standardised and divided into 'types' than the Upper Palaeolithic ones. This means that the practical doings of Mesolithic people in hunting, fishing, gathering, extraction of other natural sources, crafts for making things, operations in nature, and last not least in personal clashes and warlike situations, were more connected with the use of new and specialised objects, which to a large extent were made of bone and antler. There are several different but stable types of bone points like spear- and arrowheads (simple points; finely and more deeply notched points; finely and more deeply barbed points – also differentiated by their length), chisel-like objects made of long bones, mainly used as insets in handles of antler or wood, bone hoes with shaft holes, bone daggers and knives, bone awls and perforators, fishhooks made of bone, and then different more *ad hoc*-tools made of animal teeth or turtle shells for practical jobs. Not mentioned here are the making and the use of objects for personal decoration and for 'psychic needs'. The same as above has to be said for objects made of antler from elk, red deer and roe deer, which also increased in numbers as well as forms/'types': antler hoes and handles with shaft holes, insets for handles, decorated 'bâtons-de-commandements' with shaft holes, pointed and differently shaped tines. Many 'types' or forms of artefacts were only produced in Mesolithic times, neither earlier in the Upper Palaeolithic nor later in the Neolithic, so that these forms can be seen as 'cultural indicators' of a Mesolithic age even of objects which are found without clear chronological or stratigraphical contexts. Noteworthy among the really new tools/'types' of Mesolithic times are especially the 'heavy' and large-sized objects with cutting edges at one end: insets of bone and antler, adzes and axes, mattocks, handles, picks and clubs – this means mainly tools for punching –, and additionally daggers and knives.

Fig. 3. Friesack 4. Deposition of six intact bone points *in situ* (late Pre-boreal).



A major problem in discussing Mesolithic material culture is the preservation of artefacts and tools made of bone and antler. I am convinced that the number of excavated sites in Northern Europe with preserved bone and antler objects is ample proof of the former existence of adequate numbers of many bone and antler tools outside the better documented

regions, too, even if the overwhelming majority of all Mesolithic sites in Northern Europe is still attested solely by flint artefacts and lacking organic ones. The second problem is the chance of finding organic objects in the neighbourhood of surface sites with flint. Very few of all the excavated wetland sites were detected during intentional prospections. Most of these sites and also the majority of accidentally found bone and antler objects were detected in the course of economic activities, such as peat-cutting, melioration work, channelling rivers and brooks, clay extraction, etc. Therefore, unknown numbers of existing Mesolithic organic artefacts are likely still 'waiting' unrecognised in the depths of wetland sediments.

So far, artefacts made of bone and antler have only been found and excavated at relatively few Mesolithic sites, in contrast to very many sites documented by flint artefacts only. I would stress that bone and antler items as we know them from excavated places and chance finds were produced and in use all over the plains of Northern Europe. The objects themselves were surely representative, qualitatively and quantitatively. They do not need to have existed in exactly the individual forms or 'types' known from the bone-rich sites mentioned above, but precisely as useful things for daily work in general and in particular.

The raw materials for the bone and antler implements were taken from the main subsistence animals of Mesolithic hunter-gatherer populations in Northern Europe: elk, red deer, roe deer, aurochs, and wild boar. Mainly antlers of elk and red deer were used, of the latter often also shed antlers, but also the limb bones such as metapodia, phalanges, humeri, radii, ulnae, and tibiae, then ribs and also scapulae. A general overview is given by CLARK (1975, tab. 7). The working of these materials has been best and in detail demonstrated for Mesolithic Northern Europe by DAVID (1999). Whole bones and antlers were worked, but more often just parts or splinters of them.

Total numbers of tools and of substantial equipment in Mesolithic Northern Europe were very high: tools, instruments and appliances made of flint, stone, bone, antler, animal teeth, animal hides, wood, bark, and plant fibres are documented. Even if only the amount of things for a 'normal' local group or family is estimated, these objects altogether were very numerous – and bulky, if they had to be transported from one occupation site to another. What to do with 'surplus' numbers of objects? One solution could have been that not all things were transported away from a site, but some may have been left behind, hidden for future use. An effective possibility for hiding would have been to put some things into the water, where organic objects were well protected against damage and rotting. This could perhaps explain why so many non-fragmented objects, ready for further use, have been excavated from sediments which were surely below the water-level during occupation phases, not only at Hohen Viecheln and Friesack 4, but



Fig. 4. Friesack 4. Mesolithic bone tools. Length of the piece to the left: 14.4 cm.

also at other bog and wetland sites in Northern Europe.

Among all Mesolithic tools and instruments for daily activities, the objects and products made of osseous materials became extremely differentiated. In my opinion, during the Mesolithic the production and use of bone and antler objects for daily use reached the highest level

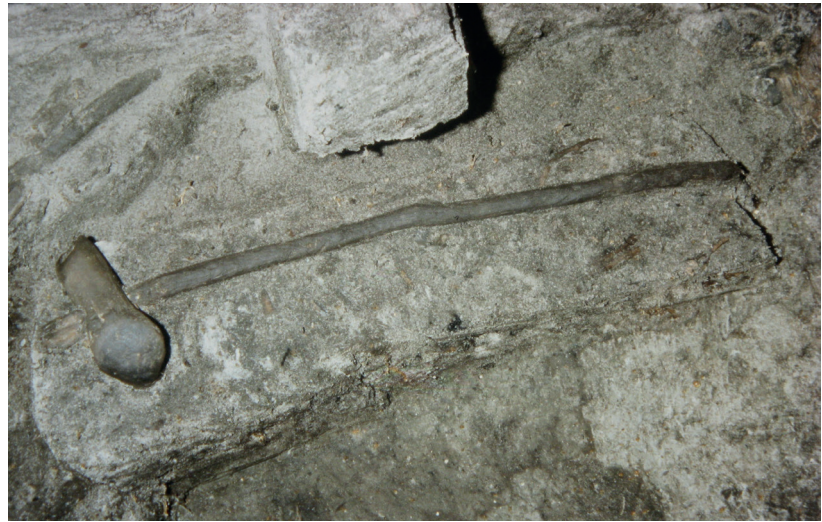
of the hunter-gatherer period in Europe. This is well demonstrated by CLARK (1936; 1975). As shown here, the use of bone and antler for the manufacture of tools and instruments as well as their use in the economic efforts and in other human demands of Mesolithic people were of great importance. At the same time, the extraction, treatment and use of natural resources helped to develop the skills necessary for the production processes, which then became manifest and were transmitted to later generations.

The data for food procurement in Mesolithic Northern Europe and the production of material equipment confirm the statements of CLARK (1975) and others (MELLARS 1978) that the Mesolithic inhabitants of the wooded zone of temperate Europe made optimal use of the existing natural resources.

The abundance of Mesolithic bone objects in northeast Germany is not only a result of their production but also of their preservation, as stressed above. The preservation is caused by specific geological and geomorphological situations induced after the Weichselian glaciation. Northeast Germany is a region with many lakes and bogs, with organic sediments along lake-shores and in swampy areas. There are four broad ice-marginal valleys (Glogow-Baruth to the south, Warsaw-Berlin and Torun-Eberswalde in the middle, Randow-Recknitz to the north), now partly filled with valley sands, partly with organic sediments of Holocene times. The organic artefacts embedded in these sediments are mostly preserved, even after some periods of cultivation and an artificial lowering of the ground water level during the last three centuries.

The geomorphological conditions in northeast Germany seem to have been very favourable for the preservation of Mesolithic organic relics. In Brandenburg and in Mecklenburg-Western Pomerania the isostatic conditions were more or less stable in the Holocene (LIEDTKE 2002). Therefore the formation of organic sediments in lakes, in depressions and along rivers, according to the general rise of the water table since Atlantic and Subboreal times, resulted in growing humic sediments, with more than three meters of peat growth until the Middle Ages in the western lower parts of the ice-marginal valleys. Below these sediments the organic objects from Mesolithic times are well preserved. Similar conditions were given along the rivers, where the meanders 'wandered' along, resulting in the preservation of wet sediments in residual lakes in the oxbows, as at the West Polish site Krzyz in a meander of the old Notec River (KABACIŃSKI 2009). In all cases mentioned above, the preservation of Mesolithic items can be expected, as shown by the few excavated examples.

Fig. 5. Friesack 4. Antler adze with preserved wooden shaft (late Pre-boreal).



This raises the question why so few Mesolithic bone and antler artefacts have been found up to now in other regions of Northern Germany. I see one reason in the possible negative movement of the earth's crust of about 0.5–1.5 mm per year in the plains of northern Central Germany, in parts of Lower

Saxony and the Lower Rhine region (LIEDTKE 2002) as well as in the Netherlands, which could have resulted in a significant lowering of Mesolithic organic sediments below the recent surface, so that they nowadays elude the eyes of amateur and professional archaeologists when commercial interventions into bogs and wetland areas are going on.

The preservation of Mesolithic organic objects is a lucky chance for archaeology, but how did all the objects – together with many thousands of flint artefacts at one site, like at Friesack 4 – get from the settlement site into the adjacent water? It is possible that fragmented things were intentionally disposed of into the water, but this will not have happened to all objects. Several objects could have been transported by colluvial erosion of sediments from an occupied site into the water during or after the periods of occupation, as shown at Friesack 4 (GRAMSCH 2000), where at least 2000 m³ of sand 'slid' into the shore-zone during Mesolithic times. But such a phenomenon alone cannot explain the high number of archaeological finds in the water and shore zone, as seen at Friesack, and at Hohen Viecheln, too. The phenomenon of depositions of a lot of artefacts can be seen at sites of similar character in Northern Europe, but it has not yet been solved or even seriously discussed. We can be happy about such lucky find situations, but we should also try to find out from which natural processes and human behaviours they resulted. One possibility is that objects were intentionally deposited in the shore zone or in the water, as perhaps the depositions of two sets of six intact bone points at Friesack 4 (Fig. 3, see GRAMSCH 2009/2010), or a clear deposition of worked bone splinters at the Swedish site Ageröd (LARSSON 1983) show. Such depositions could have been intended for hiding objects until the next visit to the place, but also as offerings to holy persons/powers, or represent cultic behaviour in general. But the latter possibility seems not sufficient enough for the interpretation of all objects which have been found in water and under wet conditions all over Northern Europe.

The last question is how the organic objects in areas with organic sediments are to be discovered, namely those adjacent to Mesolithic surface sites. In wetlands close to surface sites, it can be found out which sediments are present there by close-meshed trial augerings/borings. Sediment samples should be dated by radiocarbon measurements or/and pollen analysis. Analyses of the pH-value of the sediment are to be included in this procedure as well as determining the water contents, because bone, antler (and wood) have often been preserved since Stone Age times if the soil conditions are neutral. In case of success according to the presumption of the exploring action this means: detecting ancient stratified organic sediments of neutral status, then carefully starting to excavate with trial trenches seems to be a good strategy to find Mesolithic artefacts.

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