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THE MIDDLE PALEOLITHIC ENGRAVINGS FROM OLDISLEBEN, GERMANY

ABSTRACT: Three engraved bone fragments from a Micoquian context are described from the German site Oldisleben. They and their markings are analyzed, and aspects of the intentionality of the engraved patterns are examined. All three specimens show unequivocally purposeful decoration, numerous tool applications arranged in pre-meditated organization of numerous engraved marks. While their archaeological context needs to be better documented than is presently possible, their geological context seems to confirm the assumed typology of the accompanying stone tools. Both the stone tools and the engraved objects include fluviially worn specimens, and thus show similar preservation conditions. One of the objects is in all probability the oldest currently known example of two-dimensional iconography.

KEY WORDS: Oldisleben (Germany) – Bone fragment – Micoquian – Engraving – Internal analysis – Microscopy

INTRODUCTION

Oldisleben is a small country town a few kilometres south of Bad Frankenhausen, Artern County, to the north of Weimar. It is located only 10.5 km from the important Lower Paleolithic site Bilzingsleben (Mania 1991a, 1991b, Mania, Mania 1988, Mania, Vlček 1987, Mania, Weber 1986, Bednarik 1988, 1992a, 1993, 1995), and occurs in a region renowned for its late Lower Paleolithic and Middle Paleolithic occupation sites. The general region's brown coal open cuts and gravel quarries have long been a source of finds from these periods. Oldisleben is located close to an opening between two hill ranges, where the Unstrut River has broken through between the Hainleite and the Hohe Schrecke. This would certainly have channelled the movement of both hominins and herd animals past where Oldisleben is located now, nestled on the foot of the first of these ranges (*Figure 1*).

About one kilometre north of the town is an extensive former gravel quarry now drowned by the aquifer sectioned by it. The elevation of this site, Oldisleben 1, is about 124 m a.s.l., its location is N 51° 19.771', E 11° 10.653'. During late 1986 and early 1987, local collector Harald Tettenborn from nearby Heldrunen observed

the destruction through quarrying of Middle Paleolithic occupation evidence and salvaged a sample of stone tools and osteal material from the exposed Eem gravels. The lithics are of distinctive Micoquian characteristics, with thinly worked, well-trimmed bifacial points and handaxe-like implements of cherts and quartzite, found with more archaic, Lower Paleolithic types. Some of this material was slightly worn by fluvial transport, some is unworn. This typology, free of distinctly mousteroid or acheuloid characteristics (*Figure 2*), is well documented from several other eastern Micoquian sites in the region. Some of them, such as Neumark-Nord near Merseburg, have been excavated under impeccable conditions and are well dated to roughly 80,000 BP by their geochronology alone (Bednarik *in prep.*). Among the Oldisleben lithic material, which is probably somewhat earlier, occurred also numerous osteal items of a typical Eem fauna, including several polished bone fragments. Here I only consider three marked bone fragments that have been suggested to bear anthropic engravings (Guenther 1994, Bednarik 2003a), but which have so far not been considered or examined in any detail.

Since the lower part of the site profile is now drowned (attempts to examine the profile by diving remained

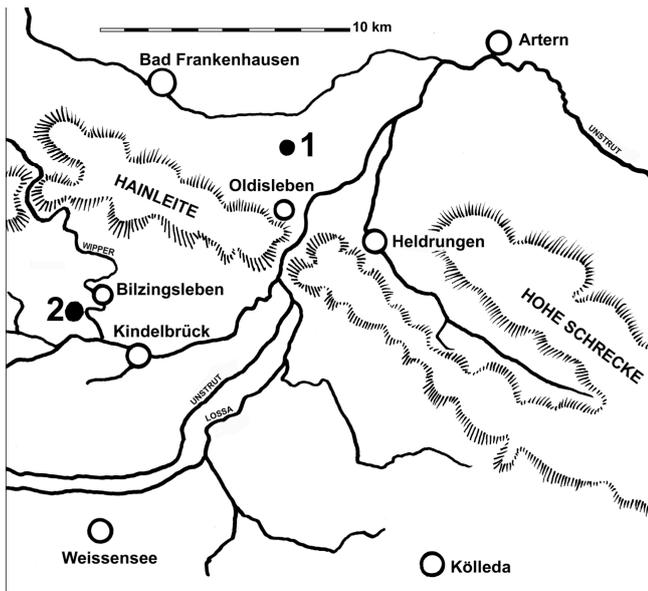


FIGURE 1. Map showing the locations of Oldisleben 1 (1) and Bilzingsleben-Steinrinne (2), north of Weimar, Germany.

inconclusive) I can only report the stratigraphic description Tettenborn provided to me verbally. The site's sediment profile was exposed up to 12 m height, and consists of, from the top, a humus layer, then a weathered soil horizon, followed by Weichselian loess facies, then sandy river gravel of the Eem, then a layer of clay, below which there is a second gravel and sand layer (*Figure 3*). The finds are from the lower gravel layer.

Mindful of the importance of this material to understanding the development of the world's earliest marking traditions I resolved to locate these finds and to study them thoroughly. Having examined literally thousands of supposed Pleistocene engravings of bone and other materials (e.g. Bednarik 1988, 1992b, 1992c, 1993, 1994, 1995, 1998, 2003b, Bednarik, You 1991) and having found that nearly all such reports refer to taphonomic or other naturally occasioned markings of a great variety of causes I was perfectly aware that the probability of these items being engraved was very remote indeed. To my surprise I chanced upon some of the best engraved specimens of pre-Upper Paleolithic portable paleoart ever found anywhere in the world. In terms of the quality of preservation and detail of surviving microscopic diagnostic evidence the Oldisleben pieces are almost unique. I have named them Oldisleben Nos. 1, 2 and 3 and describe and discuss them here. Like the accompanying lithics, the bones include both worn and unworn specimens. The combination of unworn and slightly worn material might suggest that the occupation site was on a gravelly riverbank, and that some of the finds have been transported a short distance.

OLDISLEBEN 1

Description

This in section distinctly wedge-shaped fragment of a scapula of an undetermined species is 166 mm long, with a maximum width of 38.2 mm and a thickness of up to



FIGURE 2. Some of the eastern Micoquian stone artefacts found together with the engraved bone fragments of Oldisleben 1. The tiny "handaxe" in the centre is rolled, the two other objects are unworn. Scale in cm.

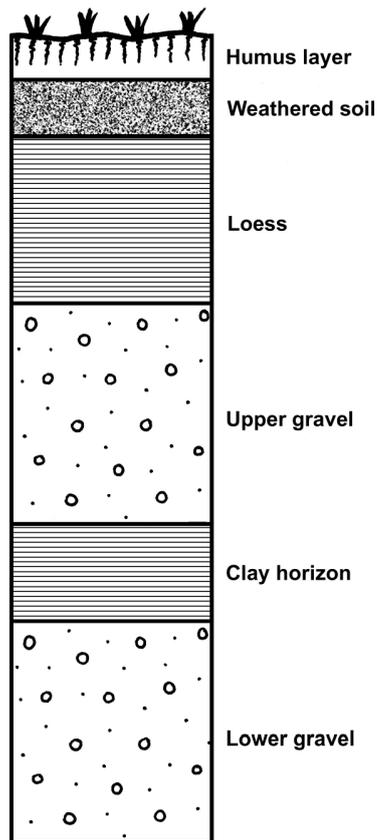


FIGURE 3. Schematic sediment profile of the Oldisleben 1 site. Its height ranges up to 12 m.

16.4 mm. It bears twenty-one very distinctive engraved grooves on one side, the other side is unmarked and there are no taphonomic marks on the object (*Figure 4*). In describing these engravings, the specimen is viewed with the thin edge up, and those of the main set are numbered from left to right. The flat surface of the bone is largely coated by a greyish carbonate deposit, some of the grooves still contain securely lodged quartz grains and they are as heavily corroded and patinated as the surrounding surface. Therefore the possibility of this being a modern fake can be excluded.

The engravings form two discrete groups. On the right is a set of thirteen sub-parallel lines, roughly perpendicular to the thin edge, on the left a set of diagonally arranged lines connecting to the "lower" margin. The grooves forming the first group are up to 24.4 mm long and of such distinctively similar morphology that it is highly likely that they were made in one sitting, by one hand, with one tool. Most of them have short subsidiary markings to the right of each groove, adjacent to the bone's thin margin. The first marking on the left (*Figure 5*) is the atypical groove No. 1, which is offset at an angle to the rest of the set and has a more detailed and fan-shaped structure. Located on a recess in the object's edge, it begins with a width of about 2.5 mm at the edge, with evidence of six separate tool applications. These converged to form a single groove 4.1 mm from the edge. The longest of the subsidiary markings is the one accompanying the sixth groove, measuring 2.35 mm in length. Only a notch occurs 1.0 mm right of groove 2. There



FIGURE 4. The engraved bone fragment No. 1 from the Oldisleben site.

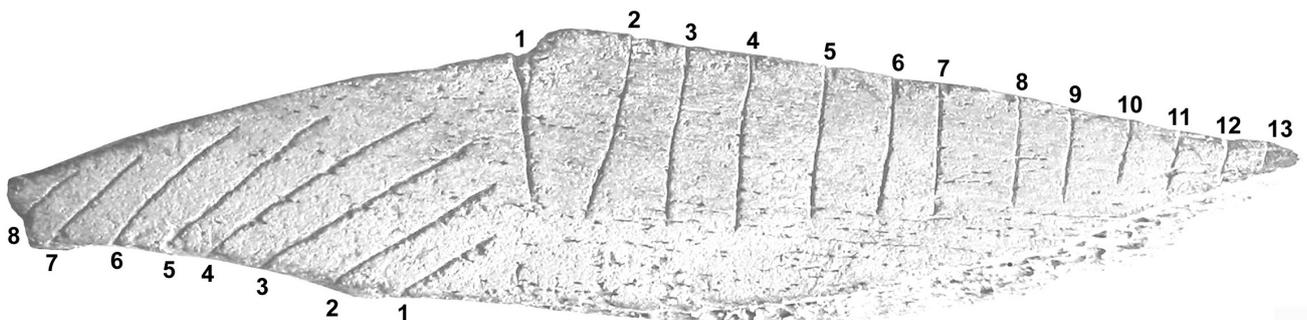


FIGURE 5. The Oldisleben 1 bone fragment showing the numbering of the grooves.

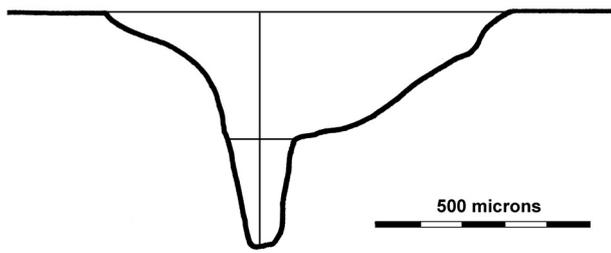


FIGURE 6. Section through groove No. 7 on the Oldisleben 1 object.

is a distinct short cut 0.4 mm from the third groove, and there are either two or three short marks about 0.9 mm right of groove 4. Two distinctive cuts occur 1.3 mm to the right of groove 5. The subsidiary marking near the sixth groove is 0.5 mm from it, while the seventh subsidiary marking is particularly distinctive and 1.05 mm from its main groove. The spacing of the eighth is 0.7 mm, that of the ninth groove 0.6 mm. The subsidiary marks on the next three grooves are each about 1.1 mm to the right of the grooves.

While these secondary markings are relatively shallow, the depths of some of the long grooves relative to their widths are quite extraordinary. All grooves are clearly the result of repeated tool applications, apparently up to four or five. However, in most instances traces of these multiple applications are not readily evident. The subsidiary line seems to continue in main groove No. 3, and there are short parallel *striae parasites* (d'Errico 1994) of about 1 mm length to the right of both Nos. 4 and 5, each time in the corresponding position of a slight ridge in the bone surface. The deepest of the grooves is No. 7, at 550 microns. Although the groove is about one millimetre wide at the surface level, at the shoulder where its section narrows fully it is only about 130 microns wide, thus forming a very narrow deep part (Figure 6). Just 250 microns to the left of groove No. 8 occurs a shallower duplicate groove, extending for about 4 mm, and the application of the same tool is evident in both grooves from the identical cross-sections as well as some faint but clearly visible striations.

The multiple tool applications are particularly evident in groove No. 9, to the left of which occur two single tool application grooves that appear to be the result of a single movement. Only 300 microns deep, this mark illustrates the mark-making process well. Groove No. 10 is similarly useful in that respect, because there are two single-application grooves to the left of it that share the main groove's point of commencement, rather as if the line was first "sketched in" before it was carved repeatedly. That *modus operandi* is also evident in the ninth groove. The tenth groove was then carved at least ten times as deeply, reaching up to 425 microns depth. In its middle part, the groove is of distinctly asymmetrical section, with the left margin nearly vertical, the right margin forming a sloping floor of flat, highly reflective appearance that reveals faint longitudinal striations. The eleventh and twelfth grooves have the same profile and features, though not as well

preserved, and were made evidently in the same manner, by the same tool. At the pointed end of the object there is a very short, thirteenth groove, matching the others in spacing and direction.

The second set of markings in this arrangement of linear grooves is that of the eight "diagonals". They appear to have been made in sequence from right to left, and again from the edge of the panel inwards, therefore the bone would have been turned between the executions of the two sets. However, there is no evidence here of the subsidiary markings observed in the first set. It seems that these lines were placed and spaced with greater confidence, occupying the remaining space systematically and deliberately. An indication of the direction of tool movement is provided by various features in the third groove of this set (now having turned the specimen as the maker would have done; cf. Figure 5), such as the direction of the scaling of the compressed bone matter on the floor of the groove, especially at pre-existing cracks, and the pattern of groove distortion where such cracks or structural features are crossed. Some morphological features of this asymmetrical groove section are repeated in the other lines of this set, such as the steep margin on the left side and the sloping margin or groove floor on the right. The first four grooves extend between 1.0 mm and 1.2 mm around the margin of the bone and distinctive tool marks are evident where the stone point first made contact with the specimen. Especially at the commencement of the second groove, the thinness of the tool point is particularly well evident. Hence there can be little doubt that all grooves of this diagonal set were also drawn from the margin inwards.

Interpretation

There is thus no good reason to assume that different tools were used in any of the grooves of either set. Differences in groove morphology are minimal and in all sections the distinctive narrowness of the point's furthest end is always evident. However, the degree of asymmetry is somewhat less pronounced in the "diagonals", which is likely to be the result of the stone tool point having been applied at a slightly different angle relative to bone surface. The subsidiary marks are remarkable, particularly as their great similarity in several cases suggests a very distinctive, deliberate process. These short subsidiary markings seem to indicate that the maker either hesitated, or spaced out the markings before choosing the precise course of each main groove of the perpendicular set. It is even possible that the layout was planned first by placing all the subsidiary markings along the margin of the fragment, as if to balance or plan the spacings before the actual grooves were made. Either way, the procedure would confirm what is already amply evident from the several repeated tool applications in each groove: that these cannot possibly be randomly executed, thoughtlessly placed engraved lines. They were made very deliberately indeed, with a determination and pre-meditation similar to that of a modern artisan, such as a carpenter or stone mason, faced with a similar task of

filling in a given space with, say, a predetermined number or spacing of hatched lines. While this tells us nothing about purpose, meaning or motivation, it decisively negates the possibility that these deep, repeated engravings are random markings that lack significant meaning or purpose.

OLDISLEBEN 2

Description

The second find from the same site and deposit is in a cognitive sense even more significant, because it conclusively refutes a long-held view of many commentators on the cognitive evolution of hominins that no evidence is available of structured symbols prior to the Upper Paleolithic. Oldisleben 2 is clearly a structured arrangement of five lines that form a recognizable graphic form (*Figure 7*).

This engraving occurs on a partially preserved shoulder blade of unknown attribution. The bone is 153 mm long and maximal about 103 mm wide, and its surface colour has been modified to a fairly uniform "light-brown" colour (Munsell 7.5YR 6.5/4) with a patchy appearance of "light-red" (Munsell 10R 6/7) in places. There is no mineral deposit on the bone fragment but it is quite well preserved. The surface bears only few linear markings. Two prominent but faint lines were occasioned when the bone was still quite "green", they are slightly sinuous and clearly predate the engraving, as indicated by three superimpositions. One of these lines runs the full length of the object, from margin to margin, and may well predate the formation of the present edges of the object.

The engraved design is placed much in accordance with the extant margins, but one of the five lines connects to the edge and runs slightly over it, so at least this margin predates the engraving. Most certainly, the engraved lines were executed on dried bone, as amply indicated by surface splintering on both margins of all grooves. The design's central line is 51.5 mm long and, at one of its ends, where it extends just slightly beyond the point of meeting two other grooves, is about 700 microns deep. This is by far the deepest part of the five grooves, most of the groove depths range from 250 to 500 microns. All five lines were made with a particularly sharp stone point, and clear evidence of reworking (second application of tool) is lacking. However, there is a possibility that the central line, at least, is the result of two tool applications, but preservation conditions do not permit a clear definition. None of the grooves contains any remaining striations, and all of them are relatively symmetrical in section. The heavily weathered surfaces of all engraved grooves and the absence of striations safely exclude the possibility of a recent fake. Finally, the dot described next, and the two curved lines on either side of it have become so worn that their artificiality is not even certain.

About 5 mm from the end of the central line, slightly offset to its general direction, occurs a small pit whose



FIGURE 7. The engraved bone fragment No. 2 from the Oldisleben site.

artificiality could not conclusively be established. There is considerable natural pitting present on the bone, especially towards the edge of the object, but this small depression differs from it in both morphology and surface condition. Although I could not detect evidence of tool rotation in it, it does in its slightly elongate shape resemble marks occasioned by stone tool impact. This pit is about 2.0 mm long and 1.2 mm wide and can tentatively be regarded as artificial. Similarly, the two curved lines on both sides of this dot are so worn and corroded that secure identification as anthropogenic is not possible.

Of crucial importance to the interpretation of this engraved motif is the observation that all five lines connect to others, yet they were clearly executed in separate actions. In other words, each time a line was completed, the tool was raised from the surface, however slightly, and turned to face a new direction. The similarity of the groove sections indicates not only that a single stone tool was probably used, but also that it was very likely turned for each groove to be applied in the same direction. Most stone tool points are randomly shaped, i.e. they yield different groove profiles depending on the direction of use, and such differences were not detected on this specimen.

Interpretation

On that basis it is an inescapable conclusion that the five grooves were arranged deliberately, that they were meant to meet the end of another line and connect with it. Indeed,

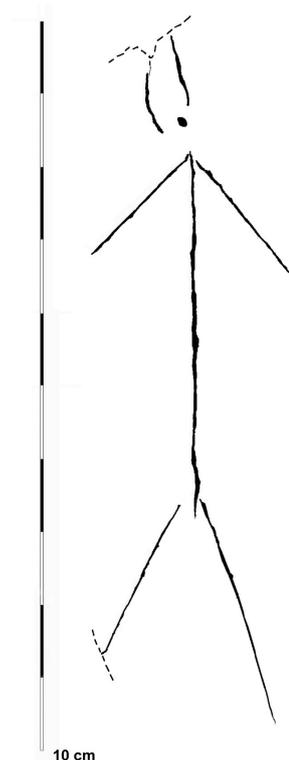


FIGURE 8. The engraved motif on the Oldisleben engraved bone fragment No. 2.

in two instances three separately incised lines meet up at the same location. The probability of such a construction occurring in a pattern of five randomly placed lines on a given area is almost nil; no reasonable person would entertain it. Moreover, this is not merely a question of probability of connecting, but also a probability that four short lines and one long line would form a symmetrical arrangement by chance. Each line could occupy one of millions of positions possible on the available panel, and after due consideration of these factors I suggest that the probability of this motif having been made without intention is lesser than the probability that we will ever determine its correct meaning (i.e. in practical terms it is infinitesimal and may reasonably be disregarded).

I therefore propose that this engraved motif is a pre-conceived design and a fully developed graphic symbol (Figure 8). As a scientist I have no desire to speculate about its meaning or purpose, the creation of archaeological myths is the domain of archaeologists. Naturally some will see a complex vulva design (a traditional favourite), others an arrow, or bird tracks, and others again will see a stick-man. There may well be merit in one of these speculations (and any of the others I can think of). In particular there can be no doubt that, were this motif occurring in rock art, it would certainly be described as a human figure, and indeed as a male human figure (the slight extension of the central line beyond where it meets two others would then be seen as a penis). The depiction of such figures with the detached "head" shown by a pit (or dot) certainly does occur often

in rock art (e.g. in northern Italy, India, Australia), and as indicated in the scientific description of the object it is possible that the pit is intended to be part of the motif. In that case there would be considerable merit in assuming that this is indeed an image of a man. Some may even point to two vague curved lines near this pit, on either side of it, that may form part of the motif and indicate the head (or hair, or an aura, or bad breath). I shall leave these speculations to those preferring speculation to falsifiability.

OLDISLEBEN 3

Description

The third engraved object from the Micoquian of the Oldisleben Eem is a flattish, rounded and heavily worn fragment of a large long bone of an undetermined species. It is 78.1 mm long, maximal 31.4 mm wide and 8.1 mm thick. The colour of the bone has been altered to a distinctive and fairly uniform "dark-reddish brown" (Munsell 2.5 YR 3/5) and its compactness, shiny surface and superb state of preservation are particularly noteworthy. They have helped to preserve the set of engraved grooves on its convex outer surface. The specimen is here described in the orientation assuming that the lines were carved from the top down, i.e. from the margin which they all approach and to which they are close to perpendicular (Figure 9).

Beginning from the left there are two short grooves whose orientation or spacing do not conform to that of the markings in the main body of engravings. Moreover, these two marks predate a margin formed at the time the bone was fractured, whereas the others extend from the edge of the panel, i.e. where the pronounced rounding of the bone commences. These two marks on the far left are therefore not considered here as forming part of the structurally very consistent set. Of significance is that grooves 1 and 2, the first two of the set of long lines, are on the bottom truncated by a crack dating from the smashing of the bone, because the section above it, which bears these two grooves, is raised considerably. The termination of the lines at this point indicates that the surface was already raised at the time they were incised, because the stone tool point did not reach the lowered surface. It is therefore apparent that the specimen has not been subjected to morphological changes since the engravings were made. The only exception is rounding by fluvial transport, which includes such alteration of the engraved grooves and thus postdates the artwork.

Groove 1 is drawn by a single line, whose upper end is set back from the margin by several millimetres (Figure 10). Mark 2 consists of two distinct tool applications, the first ending well above the crack, not being parallel to groove 1, while the second is perfectly parallel to groove 1 and, like it, ends at the crack. The second tool application appears to be a correction to create a parallel marking, in view of the identical slight curve to the left at commencement as well as the consistently similar angle in the remaining grooves.

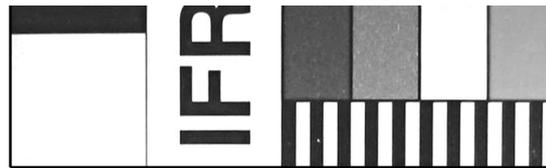


FIGURE 9. The engraved bone fragment No. 3 from the Oldisleben site.

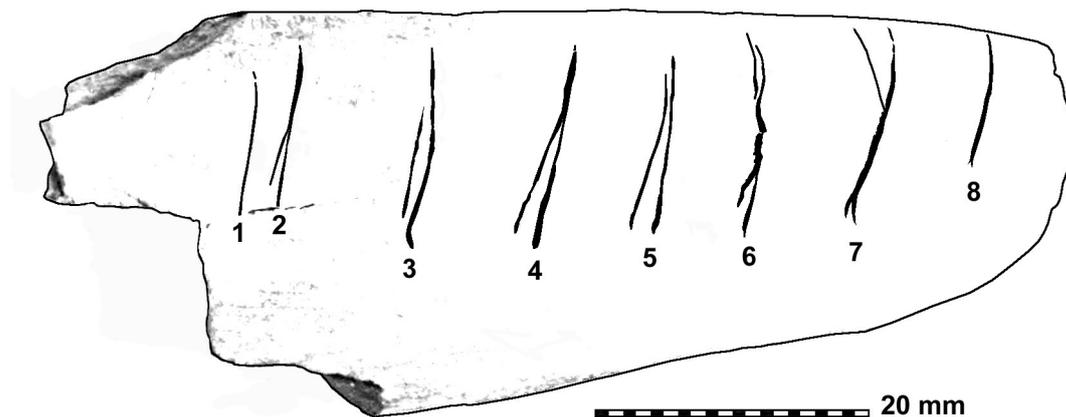


FIGURE 10. The Oldisleben 3 bone fragment showing the numbering of the grooves.

Groove 3 is a single line with a distinctive change of direction in the middle to comply with the pre-eminent inclination of the whole set, and it is supplemented by a separate, shallower and much shorter line, 0.5 to 0.7 mm to its left, that again seems to capture the dominant angle better. The fourth groove consists of two distinctly diverging tool applications and at the top it features parallel lines close by. Its patterning is distinctly repeated in No. 5, and the divergence of the two elements is even slightly more pronounced by the fact that one of them crosses over the other.

Groove 6 is a hybrid between the structures of Nos. 4 and 5 to the left, and the last two markings of the set to the right. The two lines it consists of are again crossing, and the divergence in the upper part heralds the constructions of the seventh and eighth grooves. These are Y-shaped, but in No. 7 there is also still a separation of two tool applications evident in the bifurcated lower end. This is

absent in groove 8, but both these arrangements were again occasioned by two separate tool applications. There is no duplication evident in groove 8, yet in its lower part it has the greatest depth of any marking on the panel (160 microns depth at 200–220 microns groove width) and there is a hint of bifurcation at the bottom end. The stone tool used was not very sharply pointed but extensive splintering in all grooves prevents reliable determination of its cross-section in most places. Nevertheless, there is no good reason to assume that more than one tool was involved in the manufacture of all these engravings, and the consistency in mark morphology speaks for itself.

Two further factors are clearly evident. From left to right, the point of commencement at the top of the grooves is progressively raised to extend into the rounded margin of the bone. At the same time, there is an increasing degree of curvature towards the right with each consecutive tool application. These two factors are probably connected and

they convey a strong impression that the markings were produced in their order from left to right, in the sequence of their increasing "conventionalization".

Interpretation

The interpretation of these engraved marks is fairly straightforward. Their characteristics suggest that they were made in one sitting from left to right, drawn from top to bottom. After some hesitant initial markings, a pattern was established of equally spacing these grooves, and although there are morphological changes from left to right, these are progressive, and each mark offers formal aspects of the previous mark. In other words, each mark after the initial hesitant decision of how this set was to appear resembles most closely its immediate neighbours, hence the first (No. 3) and the last (No. 8) are the most dissimilar. Therefore it appears that the procedure of making each mark, its direction, length and spacing was uncertain when grooves 1 and 2 were made, but the rhythm evident in the overall set was determined by groove 3 and this pattern was then progressively "conventionalized" as the maker had settled on a preferred form.

It is therefore significant to note that this set of engravings is not just a set of sub-parallel grooves, but that each mark was made carefully, deliberately and with an overall outcome in mind, with increasing confidence and determination. In some ways the marking strategy is reminiscent of that observed in Oldisleben 1, but in other respects it differs from it. Most particularly, the spacing in one of the two sets on specimen 1 was arrived at by deliberately placing tentative marks on the edge, whereas that in object 3 was mastered "subconsciously". The extensive fluvial wear that occurred after the marks were made excludes the possibility that these are modern fakes.

SUMMARY

This paper presents morphological descriptions of three engraved bone objects from the Micoquian of Oldisleben, eastern Germany. In the past, it has often been argued that Lower and Middle Paleolithic line markings made with stone tool points were not made deliberately, but that they are in fact incidental results of some utilitarian activity, notably where bone surfaces were used as cutting boards (Davidson 1990, White 1995, cf. Marshack 1991). Another often-quoted explanation is that linear marks on bones were de-fleshing traces. Actually, the most commonly found linear markings on Pleistocene specimens are taphonomic marks, occasioned by one of various post-depositional processes (Bednarik, You 1991, Bednarik 2001: 178–179).

The three Oldisleben specimens, however, provide unequivocal evidence that all three were "decorated" deliberately and purposefully. The patterns engraved on objects 1 and 3, with their numerous repeated tool applications and pre-meditated organization of individual

marks to compose intended arrangements, already show this most adequately. The motif engraved on object 2, however, is the structurally most complex motif so far found in a European Middle Paleolithic context, consisting of five deliberately interconnected lines. They form what is in all probability the oldest currently known iconographic composition. Irrespective of its iconic status, the motif's structure could not realistically be attained without a preconceived idea of its form, i.e. without a prior mental construct or template of what this symbol was to comprise (as is also the case with the Mousterian Tata nummulite; Bednarik 1992a, 1995). There can be no question that such a deliberate construction had a symbolic meaning, that it stood for something other than itself.

The Oldisleben engravings are not the only Micoquian paleoart objects known from the specific region. A further bone fragment with about twenty-five sub-parallel engraved lines has been found in the same sediment facies at Wiehe, only some 18 km east of Oldisleben. The large late Micoquian occupation site at Neumark-Nord near Merseburg is said to have yielded a tooth with notches (T. Laurat, pers. comm.). However, I have yet to examine this find of November 2003; a previously reported horse canine with engravings from that site has been rejected by me as bearing only heat stress fractures. Of particular interest is the close similarity between the engraved patterns on Oldisleben 1 and those on the much older Bilzingsleben 1 paleoart object (Mania, Mania 1988, Bednarik 1992a, 1995, cf. Bednarik 2003a: Fig. 29). In both cases the sub-parallel grooves are responses to the geometry of the available surface facet and they consist of two distinctive sets. One of them is perpendicular to an edge, the other is oblique. This distinctive marking strategy seems indicative of a cultural convention of considerable longevity.

In considering the geochronological position of the Oldisleben finds it is obvious that they are from a horizon that is separated from the lowest Weichselian by substantial deposits. It is therefore a physical impossibility to attribute them to an Upper Paleolithic tradition. These finds are from the Saale drainage basin, i.e. from the region where Pleistocene geochronology is better established than anywhere else in the world, and I regard the relevant pronouncements of local specialists as being beyond reproach. Moreover, the markings on two of the objects are of typical Lower or Middle Paleolithic character, found at numerous other European sites (Bednarik 2003a), but not one of the three is of typical Upper Paleolithic appearance.

There are two important lessons to be learned from the Oldisleben objects:

1. The long-held view that iconicity is entirely absent in pre-Upper Paleolithic graphic paleoart is now apparently refuted. Oldisleben 2 is currently the only specimen that suggests this, but it must be appreciated that the very concept of iconicity is culturally formulated, and that we may need to consider alternative conventions of "iconographic" two-dimensional depiction that may

have existed and may resist our perceptive processes of decoding (consider, for instance, Fiedler and Humburg in press).

2. The equally dominant dogma in archaeology that pre-Upper Paleolithic paleoart lacks recognizable and repeated patterning is also invalidated, and such patterning does exist at a level not detectable by simplistic archaeology, but susceptible to morphological analysis.

In summary, the three Oldisleben specimens demolish unequivocally the construct of a Middle Paleolithic period devoid of symbolism – a time when hominins were mute and too primitive to manage any level of symboling. The archaeologists who have a habit of seeing markings similar as those from Bilzingsleben and elsewhere on their own kitchen cutting boards can continue to do so as their model of cognitive human evolution passes its use-by date, but others can now move on and continue to ask serious questions about the origins of our cognition.

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