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The origins of symboling

Abstract:
The archaeological data traditionally utilized in considering the beginnings of symbol use by humans are described here as inadequate for this purpose. It is contended that Pleistocene finds of several types imply the use of symboling for at least several hundred millennia. Such empirical evidence includes the maritime colonization of various landmasses up to one million years ago, which is thought to demand the use of language and relatively complex technology; and the temporal distribution of first pigment use, beads and pendants, as well as engravings and proto-figurines during the Middle Pleistocene. The introduction of iconic referrers is chronologically placed into the same period. It is argued that the cognitive evolution of hominins has been neglected in favor of less suitable indicators of humanness, such as cranial shape and perceived stone tool typology. This paper presents an alternative approach to reviewing the evolution of human cognition and symbol use.

KEYWORDS: Cognitive evolution, Symbol, Iconicity, Bead, Engraving

Introduction

During the course of the late 19th and the entire 20th century, palaeoanthropology has made great efforts in illuminating the history of the physical evolution of hominins. By comparison, relatively little effort has been directed towards learning about their cognitive and cultural evolution, and yet it would seem to be self-evident that it is not skeletal architecture or genetics that so much separates us from other primates, but the proliferation of our cultural and cognitive capacities. It is therefore quite right to say that the reasons for humanization and the processes involved have so far not been considered in adequate depth, and they have not been clarified. Indeed, the preoccupations of the disciplines of archaeology (which in the particular area of 'cognitive archaeology' is focused on a variety of relatively trivial issues) and palaeoanthropology have led to research orientations that are so skewed that it

would be unrealistic to expect them to be able to address the topic of cognitive evolution in a balanced fashion.

Any thoughtful person will, upon reflection, arrive at the opinion that humans became human not through natural processes that modified their skeletal structures, but by processes that enabled them to develop culture, cognition and technology on a scale removing humans far from all other primates in those areas. Archaeologists, on the other hand, have instead developed models that define stone tools or their assemblages as 'culture'. In traditional archaeology, a sediment layer containing some charcoal is often described as a 'cultural layer' (sometimes even when the charcoal in question has no demonstrated anthropic origin), and several horizons containing utilitarian finds are called a 'cultural sequence'. 'Culture', defined scientifically, is the passing on of practice by non-genetic means (Handwerker 1989), therefore many animal species possess culture. Thus the archaeological notion of what culture is may be in need of revision, as well as the way concepts of culture are applied. For instance, all the 'cultures' of the so-called Paleolithic period have been defined almost exclusively on the basis of subjective and untestable determinations of stone implement categories. Apart from the obvious fact that this taxonomy cannot be falsified, tools do not define cultures: we have no screwdriver, knife or spear cultures. Tools and artifact types can be and often are used across many cultures; hence they are not a primary variable defining cultures. In short, the 'cultural sequence' archaeology has given us of the Pleistocene should not be expected to be a sequence of real cultures, or a taxonomy of peoples, tribes or ethnic entities. Moreover, taphonomic logic, an axiomatic law that determines the merits of archaeological theories on the basis of their compliance with the canons of exponential data loss as a function of time (Bednarik 1994a), renders the quantitative, qualitative and distributional record of Pleistocene archaeology largely invalid as a basis of interpretation.

In all fields, not only in archaeology, the dominant and the hegemonic can be both sustained and subverted by narratives (Ewick and Silbey 1995: 200).

Narratives frame the world in a struggle for authority; they create ontologies. The dominant narratives of the Lower and Middle Paleolithic periods of human history, the periods we are concerned with here, are more far-fetched and probably more invalid than those of any other period of our existence as a species. Over the past few decades, the dominant dogma developed for these periods perceives little or no cultural change or evolution throughout the Lower Paleolithic, roughly from 2.5 million years ago to 180,000 years ago. It defines this time as static, and sees little change even in the subsequent Middle Paleolithic, which ends 40,000 BP in much of Eurasia, 20,000 BP in Africa and only a few thousand years ago in Australia. Then, with the advent of the Upper Paleolithic, the dogma perceives a cataclysmic 'bottleneck', a 'quantum jump', an 'explosion': all the typically human characteristics that distinguish us from other animals appeared suddenly and at once — and, of course, in western Europe: art, language, complex social systems, self-awareness, forward planning and *symboling*.

This model is rejected here on the basis of the hard evidence, according to which the development of human cognition was a gradual process that occurred throughout the Pleistocene period. This evidence consists of indications of complex pre-meditated human behavior (such as the colonization of land only accessible by sea crossings) and the cognition (e.g. language) and technology demanded by it; the use of coloring materials; the use and making of beads and pendants; the production of engravings; and the introduction of the concept of iconicity (of referrer and referent, i.e. signs). Since the last-named is perhaps the one most directly related to the origins of symboling I begin my presentation of the evidence with this crucial generic factor.

Iconicity

Iconicity is the property of a marking or shape that provides visual information recognized by most contemporary humans as resembling the form of an object. A marking or object (referrer) is considered iconic when most modern people

tend to see it as resembling a different object (referent). However, iconic resemblance of a referent is not self-evident, its detection requires an appropriate perceptual mechanism. Visual ambiguity, from which this facility probably developed (Bednarik 2003a), is a property widely experienced by species throughout the animal kingdom, but it is thought that only hominins developed a cultural use of this feature. The experience of perceiving, for an instant, a snake on a forest path when in fact there is only an exposed tree root is an example of visual ambiguity, which seems to prompt an alert-reaction caused by a neuronal template. Such visual misidentification, my theory predicts, could in an organism capable of 'conscious' reflection lead to perceiving a connection between referent and referrer (or the signified and the signifier). In this theory, the actual production of iconographic forms becomes the cultural and intentional creation of features prompting visual responses to a signifier; *it induces visual ambiguity intentionally*. This definition of art is perhaps crucial in effectively understanding the nature and origins of iconographic art, but it is also crucial in understanding hominin cognition and symboling.

In iconic symbolism, the connection between referent and referrer is via iconicity. This is a relatively simple form of symboling, in the sense that an organism capable of cognitively perceiving visual ambiguity detects at least some meaning without any cultural faculties coming into play. The cognition involved is deeply rooted in mental processes found in numerous animal species, such as flight reactions to the silhouette of a bird of prey or to eyes on the wings of a butterfly, i.e. facilities encoded in DNA. Rats retrieve any suitably sized object bearing three dots resembling eyes and a nose and hide it, as if it were an infant rat: they react automatically to the 'face' pattern. The relevant cognition is even related to the effect of camouflage, which is just as widespread in natural systems. Some animal species master iconic recognition, in the sense that they recognize a likeness in a photograph or film. Thus symbolism based on iconicity is cognitively much more rudimentary than a symbolism requiring the link between referent and referrer to be negotiated culturally. For instance, a bead is an object

that has exceedingly complex symbolic roles; it stores a wealth of cognitive information outside the human brain (Gregory (1970: 148; Donald 1991: 124–161), yet its meaning is only accessible to an organism possessing the 'software' of the cultural conventions concerned.

The acoustic or phonetic equivalent of iconicity is onomatopoeia, which refers to the formation of words by imitating a sound associated with the referent. Typical onomatopoeic words are 'cuckoo' or 'buzz'. With them the meaning is either obvious, or detecting it requires only minimal cultural (learnt) faculties.

In much the same way there are forms of modified iconicity: natural forms whose iconic qualities have been emphasized by anthropic modification. This observation leads to a fundamental differentiation between three forms of symbolism in palaeoart: iconic, modified iconic, and non-iconic. The most direct is by iconicity of purely natural, i.e. unmodified forms. It occurs when an object of the natural world offers sufficient visual clues to prompt the mental bridge to be made between referent and referrer. In palaeoart we have two typical representatives: manuports such as the Makapansgat cobble or the Erfoud Site A-84-2 cuttlefish fossil cast (see figure 2 below), which are of such effective iconic properties that they were noticed by hominins up to three million years ago.

Figure 1. The Makapansgat jasperite cobble, earliest palaeoart find known, 2.5 to 3 million years old, South Africa (Bednarik 1998).

Figure 2. The Erfoud manuport, from a Late Acheulian dwelling in Morocco (Bednarik 2002).

Such objects attracted sufficient curiosity to be collected and taken back to occupation sites. The ability of detecting such levels of iconicity is certainly not

very much beyond the capability of chimps or bonobos, so it is reasonable to expect them in australopithecines and subsequent hominins, such as *Kenyanthropus platyops* (3.5 Mya). The second early representative of possible direct iconographic symbolism is via fossil casts, of both floral (e.g. ferns) and faunal specimens (Feliks 1998). Fossils, such as shells, are a prime example of a class of natural forms offering many, if not most, of the visual characteristics of the referent (the live organism, in this case). It seems possible that hominins benefited cognitively from making the connection between referrer and referent in such obvious cases, which might explain why they seem to have 'curated' such objects, as well as quartz crystals. This could have prompted the establishment of neural pathways permitting the understanding that one thing can stand for another, as well as the appreciation that the objects of the object world can be grouped into classes on the basis of taxonomic criteria. These two abilities were among the most important cognitive milestones in human evolution, therefore they need to be investigated more thoroughly. In my view, both appeared in the Early Pleistocene, and it is hardly a coincidence that their appearance was followed by an evident quantum jump in technological capacities.

Symboling of the Lower Paleolithic

The most crucial steps in 'becoming human' occurred not, as the 'short range' archaeologists postulate, about 40,000 years ago, some become first evident between one million and 800,000 years ago and the others appear during the Middle Pleistocene period (780,000 to 127,000 years ago). Around 800,000 years ago hominins apparently began to discriminate between 'exotic' articles (crystal prisms, fossil casts) and 'ordinary' ones (Bednarik 1990a). It is also then that they left the very first evidence of one of the most important indicators of symboling, the use of pigment (Bednarik 1990b, 1992, 1994b). This may roughly coincide with the expansion of humans into Europe (agreement on the timing of this event is still elusive, however), possibly via the Strait of Gibraltar (Bednarik 1999a); it probably coincides with the skilled domestication of fire, and certainly

does so with the introduction of seafaring in Wallacea, Indonesia (Bednarik 1999b, 2003b). The last-mentioned, in particular, tells us a great deal about the developing symboling ability of humans, and in more ways than one. One of the most sophisticated symbol systems developed by our lineage is of course language, and it is widely agreed that maritime navigation and colonization of lands by seagoing vessels presupposes fairly complex communication forms, almost certainly of the verbal kind. Since Pleistocene seafaring necessarily involved forward planning and coordinated community efforts (Bednarik and Kuckenburg 1999), it is almost impossible to account for it in the absence of 'reflective' language (Davidson and Noble 1989). But there are even more relevant incidental effects. Seafaring is the earliest example we have in hominin history of the domestication of multiple natural systems of energy. It harnesses the combined effects of waves, currents, wind and buoyancy, and it remains the most complex utilization of energy systems throughout the Pleistocene period (see figure 3):

Figure 3. Paleolithic seafaring experiment. This bamboo raft was built with stone tools and sailed across the Timor Sea in December 1998 (Bednarik 2003c).

Until the inventions of wheel and sledge it also remained the only mode of assisted locomotion used on this planet ('assisted' in contrast to autonomous

locomotion, as in walking, running, crawling or swimming). It would have promoted the formation of new neural structures on a scale not seen hitherto, such as those supporting 'conscious' awareness of cause-and-effect relationships. This, too, has neurobiological implications for symboling abilities.

Still other abilities seem to be evident from these developments. For instance, the need for forward planning implies that concepts of time were a shared social reality, probably reified in some communicable form. Other technologically suggested variables refer to the need for cordage, and thus for knotting, without which no form of simple watercraft (almost certainly types of bamboo rafts were involved) can effectively be constructed.

Cordage is of course also necessary for other, more complex indicators of symbolism, beads and pendants. But before we move on to such non-iconic symbols, we need to consider an intermediate mode. Subsequent to the recognition that some natural forms can resemble other objects so closely that they can be symbolic for them, a hominin with tactile skills and a good deal of experience in tool use would eventually be tempted to modify such iconic objects to emphasize their iconicity. The oldest finds we have currently of such evidence are the proto-figurines of Tan-Tan (Bednarik 2003a) and Berekhat Ram (Goren-Inbar 1986), thought to be roughly 400,000 and 300,000 years old respectively (see figure 4):

Figure 4. The Tan-Tan proto-figurine, c. 400,000 years old, is the earliest find of its kind, and also the earliest evidence of the application of pigment (Bednarik 2003b).

The practice of modifying natural objects to emphasize some iconic quality has persisted ever since, it can be found through the succeeding periods of the Paleolithic and it can still be found today. In a scientific sense it is a subtle management of visual ambiguity: the defining characteristics of an iconographically already ambiguous object are intentionally accentuated.

This is not to say that symboling and intentionally modulated communication were the result purely of the factors so far visited. Others are likely to have contributed, and here I would especially like to emphasize the possible involvement of re-enactment, or what is called theatre. To appreciate

the role of its symbolism we can easily imagine the return of a successful hunter who revisits his triumph by re-enacting how he stalked the prey, how he slew it. His narrative behavior in camp would have elicited only bewilderment among his band if they had not shared with him the appropriate neurobiological structures enabling the comprehension of the symbolism he relied upon. In other words, his audience had to possess the facility of discriminating between referrer (his performance) and referent (the hunt he attempted to recreate), while at the same time understanding the symbolic bridge between the two. One could further speculate that symboling by re-enactment is likely to have originated from neuronal pathways facilitating deceptive behavior, which of course has been observed in chimps (e.g. Byrne and Whiten 1988). Once again we see that symbol use is based on neuronal circuits that may well have their antecedents in those of other primates. It is therefore inappropriate to expect finding a specific development or event that would mark the beginning of symboling. Rather, this should be assumed to be an incremental process, with its origins deep in unconnected neuronal structures that existed even before humans appeared (Fiedler 2003). It was apparently during the Lower Paleolithic that, in a sequence of developmental events that still need to be better identified, various strands or fragments of behavioral traits came together in such a way that what we call 'consciousness' became possible. The extremely fragmentary evidence of some of these developments has been hinted at above, but some important components of the archaeological data have yet to be described.

About beads and engravings

The possible existence of Acheulian beads has been known for as long as evidence of a Paleolithic period has been detected. Boucher de Perthes (1846) discovered not only the co-existence of Pleistocene fauna and humans (for which he was ridiculed and attacked by archaeologists for decades), he also noticed the occurrence of *Coscinopora globularis* fossils together with the handaxes of the Acheulian of the Abbeville region of northern France. He and Marcel-Jérôme

Rigollot as well as later Prestwich (1859) recognized that on many of these fossils, the central tunnel was apparently widened with stone tools. Yet their discovery, as well as the similar observations by Smith (1894: 272–6), remained almost ignored for the entire 20th century. Locating 325 specimens from Lower Paleolithic deposits in northern France and southern England in 2003, I subjected them to detailed microscopic examination and, to my amazement, found that several dozen of them bear distinctive wear facets around their perforations (Bednarik 2005). These wear traces are unmistakable evidence that these beads were worn on strings, and many of them were so extensively worn that they must have been used in this fashion for many years, even decades in some cases. Moreover, many of the specimens bear, as Boucher de Perthes had correctly noted, traces of flaking where the blocked central tunnel opening had been enlarged. However, these fossils fashioned into beads are actually of the species *Porosphaera globularis* PHILLIPS 1829, a Cretaceous sponge (Figure 5).

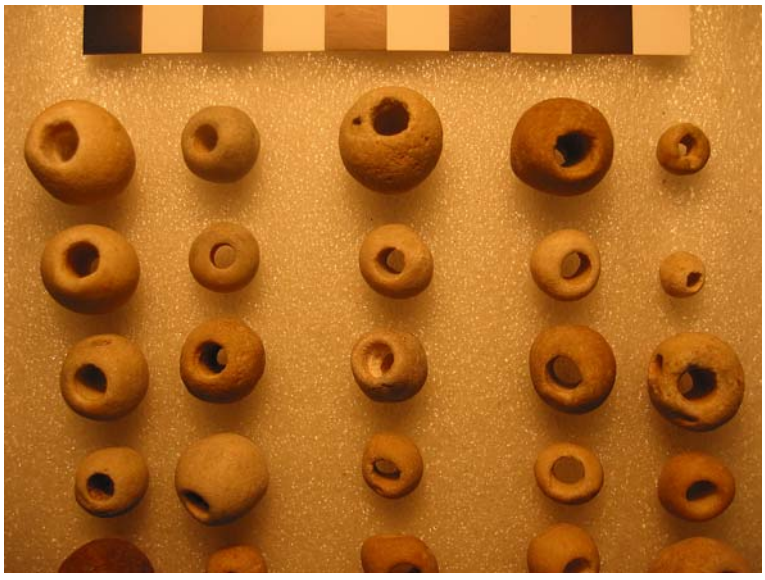

Figure 5. These *Porosphaera globularis* fossil casts are among the earliest beads known in the world. They are from the Acheulian of St Acheul in France (Bednarik 2005).

This evidence is crucial to understanding not only the cognitive capacities of Acheulian people, but also to considering the beginnings of symboling. Beads and pendants are among the most obviously symbolic objects we can ever expect to find from the Pleistocene. They tell us a great deal about both the technology and the culture of their makers and users. Technologically they illustrate not only the ability to drill through brittle or very hard materials, such as teeth, but also they imply the use of cordage. The very essence of a bead or pendant is to be threaded onto a string; it would simply be pointless to perforate a small and often brittle object (such as an ostrich eggshell bead) for another purpose but to pass a string though it. However, the use of cordage also suggests the use of knots, because a string needs to be closed to form a loop to be effective. Although the ends of a string may be joined by means other than a knot, e.g. by the use of adhesive or by plaiting, these alternative means are either impracticable or they are technologically even more complex than the use of knotting (Warner and Bednarik 1996). The diachronic availability of Pleistocene remains of cordage (Leroi-Gourhan 1982; Nadel et al. 1994; Pringle 1997) is of no relevance to the question, because that class of material evidence obviously possesses an exceptionally high taphonomic lag time (Bednarik 1994a). In short, what beads tell us about the technology of the people who used them is well in excess of deductions concerning their manufacture.

More important are the cultural and cognitive deductions they make possible. Beads can be used in a number of ways or for several purposes: they may be emblemic, for instance, and provide various forms of information about the wearer and his or her status in society. Availability for marriage, political status and state of mourning might be such possible symbolic meanings. At one level one might believe that beads indicate simply body adornment, but this is almost certainly an oversimplification. Even if ‘vanity’, a social construct, were the motivation for wearing such items, stating this explains not why such items are perceived as ‘decorative’. The concept itself is anthropocentric; we do not

assume that other animals perceive the information imparted by the beads as meaningful. In human culture, however, various forms or levels of meaning may be encoded in such objects, as well as in other kinds of body adornment (tattoos, body painting, cicatrices, infibulation, anklets, armbands etc.). In ethnography, beads sewn onto apparel or worn on necklaces may signify complex social, economic, ethnic, ideological, religious or emblemic meanings, all of which are only accessible to a participant of the culture in question. To illustrate with just one example: beads or pendants may function as charms; they may be a means of protection against evil spells or spirits.

Such explanations are of course not archaeologically recoverable, but the specimens themselves proving symboling ability are. Beads of the Lower Paleolithic are available not only from the French and English Acheulian, but also from sites in Austria (See figure 6), Libya and Israel (Bednarik 1992, 2001, 2003c).

Figure 6. One of the two oldest pendants known in the world, a perforated wolf's canine from Repolusthöhle in Austria, c. 300,000 years old (Bednarik 1992).

Of particular interest are the forty ostrich eggshell beads of the Acheulian at El Greifa, Libyan Sahara, whose superb workmanship implies the application of constructs of perfection (Bednarik 2001). It is therefore inexcusable that Middle Pleistocene beads have been consistently ignored by archaeology for more than one and a half centuries.

Yet there are still three more types of evidence to be considered here.

They are graphic iconic depiction, non-iconic surface markings and the use of coloring material. Oddly enough, the last-mentioned, which is the weakest of the three, is the one that has attracted the most sustained attention (for recent review, see Hovers et al. 2003). Evidence of pigment use, especially of iron oxides and hydroxides, has been tendered for several decades in the support of symbol use, but it needs to be cautioned that it is not necessarily conclusive proof. Mineral pigments such as hematite, goethite and ochreous materials could conceivably be used for utilitarian purposes, although this not common ethnographically and unlikely for the Lower Paleolithic. The likelihood that these pigments were used for symboling activities (body painting, coloring of artifacts, coloring of rock surfaces) is much greater. In some cases it has been demonstrated the Acheulians applied hematite pieces crayon-like to rock surfaces (Bednarik 1990b). Nevertheless, in proposing symboling we are on safer ground with intentional engravings, be they on portable objects such as those of bone, ivory or stone, or in the form of petroglyphs on rock.

Concerning the latter, the most outstanding candidates are cupules — hemispherical depressions hammered into sometimes very hard rock surfaces, usually in groups, sometimes occurring in huge numbers (Bednarik 2008a). This archaic form of rock art is found in all continents except Antarctica, accounting in each of them for the oldest known kind of rock art but also occurring in numerous more recent cultural traditions. The oldest examples currently known date from the Lower Paleolithic (Bednarik 1993, 2008a; Kumar 1996; Bednarik et al. 2005). They occur in a few Indian quartzite caves or rock shelters, notably Auditorium Cave and Daraki-Chattan (see figure 7):

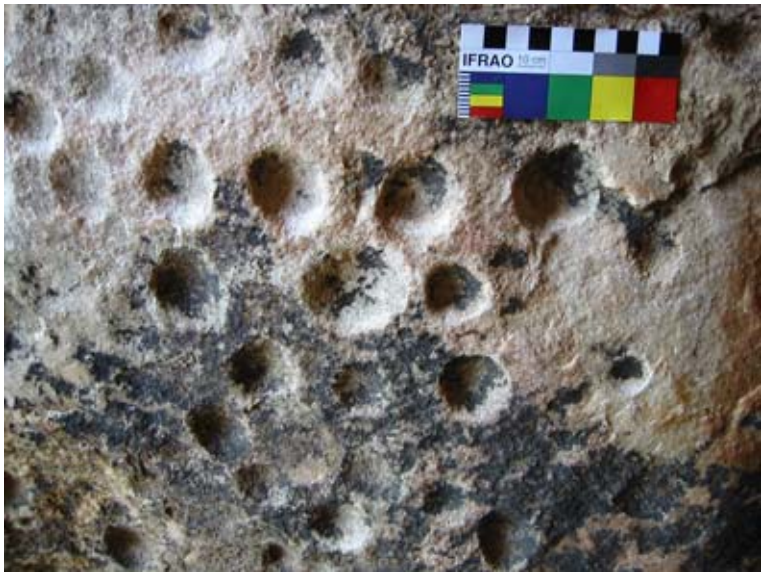

Figure 7. Some of the earliest rock art in the world, cupules in the Daraki-Chattan Cave, India, of a chopping tool tradition (Bednarik et al. 2005).

At the latter site they have been conclusively associated with an occupation layer of chopping tools, well below a layer of Acheulian artifacts. However, there is a good possibility that similar material in South Africa might be of a similar Lower Paleolithic antiquity (Bednarik 2003c). Also from Africa are the Lower Sangoan cupules on a sandstone slab from Sai Island, Sudan, which are believed to be in the order of 200,000 years old (Van Peer et al. 2003). The domination of very early rock art by these cupules is very probably a taphonomic phenomenon, therefore it tells us not much about these palaeoart traditions or their range of expressions. Nevertheless, they are important to the origins of symboling because there can be no question about either their intentionality or their semiotic function. Their manufacture was highly labor intensive and they have no utilitarian roles whatsoever.

Not so free of controversy is the issue of the portable non-iconic engravings found in many pre-Upper Paleolithic contexts. The 'short-range' protagonists have consistently sought to reject individual finds by questioning the intentionality of engraved grooves, or by repudiating that they had been

made with stone tools. In a number of cases their skepticism was indeed justified, but the tendency of extrapolating from them has stifled the study of symbol origins. The two main objections were that among the many examples of pre-Upper Paleolithic engravings, there were no recognizable motif templates, and that there were no repeated patterns. Both of these objections have now been refuted, in fact at a single site. Oldisleben 1, of the Eem geological period north of Weimar, Germany, belongs to the eastern Micoquian tool industry. Together with a distinctive stone tool tradition dating broadly from between 135,000 and 80,000 years ago, three engraved bone fragments were recovered (Bednarik 2006). Two of them bear series of sub-parallel grooves made with such precision and under such conditions that their intentionality cannot realistically be questioned (see figure 8):

Figure 8. Portable engraving on bone, from Oldisleben 1 in Germany, of the early Late Pleistocene (Bednarik 2006).

The third, on the fragment of a shoulder blade, bears the engraving of an iconographic image. This is the oldest picture found so far, and it destroys a cornerstone of the archaeological dogma, according to which iconic graphic art older than 35,000 years would not be found (see figure 9):

Figure 9. Apparently iconographic engraving on bone, from Oldisleben 1, Germany, from a Micoquian context (Bednarik 2006).

The largest assemblage of Lower Paleolithic, much earlier engravings is that from Bilzingsleben (Mania and Mania 1988; Bednarik 1988, 1995; Steguweit 1999). Other examples are the finds from Sainte Anne I, France (Raynal and Séguy 1986; Crémades 1996); Whylen in Germany (Moog 1939); Kozarnika Cave in Bulgaria; and Wonderwork Cave in South Africa (P. Beaumont, pers. comm.). Middle Paleolithic engravings are numerous in Europe, southwestern Asia and southern Africa. They include those from Schulen, Belgium (Huyge 1990); Bacho Kiro and Temnata Cave, Bulgaria (Marshack 1976; Crémades et al. 1995); Tata, Hungary (Bednarik 2003c); La Quina and La Ferrassie, both France (Martin 1907-10; Marshack 1976, 1991; Capitan and Peyrony 1912, 1921), as well as Grotte Vaufrey (Vincent 1988), Abri Suard (Duport 1960; Debénath and Duport 1971; Crémades 1996), Peyrere 1 Cave (d'Errico and Allard 1997), all in France; Tagliente Shelter, Italy (Leonardi 1988); Cueva Morín, Spain (Freeman and Gonzalez Echegaray 1983); Prolom 2, Ukraine (Stepanchuk 1993); Kebara Cave (Davis 1974), Quneitra (Goren-Inbar 1990; Marshack 1996) and Qafzeh Cave (Hovers et al. 1997), all three in Israel; and in South Africa Howieson's Poort Shelter (Stapleton and Hewitt 1928), Apollo 11 Cave (Wendt 1974, 1976;

Vogelsang 1998), Diepkloof Shelter (Poggenpoel 2000), Border Cave (Grün and Beaumont 2001), Klasies River Mouth (Singer and Wymer 1982; Grün and Beaumont 2001) and Blombos Cave (d'Errico et al. 2001; Henshilwood et al. 2002). In all we have well over one hundred such engraved specimens, which provide ample evidence of non-iconic palaeoart traditions of the period from roughly 200,000 to 35,000 years ago. Moreover, we should not overlook that *all* of the tens of thousands of Pleistocene petroglyphs in Australia are by people of Middle Paleolithic technology (cf. Foley and Lahr 1997) and therefore need to be considered also.

Discussion

To summarize this brief presentation of relevant evidence, the occurrence of finds demanding the use of symbolisms such as language, bead use and palaeoart can be traced back well into the Lower Paleolithic. Without consideration of this material we can only arrive at false models of the origins of symboling.

The paradigm placing the 'invention' of signs around thirty to forty millennia ago draws its inspiration from the 'African Eve' or replacement model, according to which all living humans are the descendants of one single female. Her progeny lived somewhere in sub-Saharan Africa, and for unknown reasons became genetically so different that they could no longer breed with other humans. Once they had asserted their perceived intellectual and other superiorities over the neighboring peoples they began to expand, rapidly taking over the world as they eradicated or displaced all resident populations in Africa, Europe and Asia. Upon reaching Southeast Asia around 60,000 years ago they promptly started building seaworthy watercraft to continue on to Australia. By 35,000 years ago they colonized Europe, where they wiped out the resident Neanderthals completely and suddenly began painting in caves.

This model has not one iota of archaeological evidence in its favor, and it is based simply on the speculations of some geneticists, opposed by other

geneticists. The genetic divergence times are derived from unknown mutation rates and population sizes, as well as dubious assumptions about first and unique colonization events, and alternative interpretations of genetic data are more plausible (for them, see Barinaga 1992; Templeton 1993, 1996, 2002, 2005; Ayala 1996; Brookfield 1997; Pennisi 1999; Strauss 1999; Hardy et al. 2005; Garrigan et al. 2005; Green et al. 2006; Martinón-Torres et al. 2007; concerning the reliability of genetic data from museum specimens, see Pruvost et al. 2007). The replacement model was initially derived from Bräuer's (1984) Afro-Eropean *sapiens* model, which in turn was based on the numerous datings by R. Protsch that were recently all exposed as fraudulent (Terberger and Street 2003; Schulz 2004). Today the replacement or Eve model is entirely devoid of archaeological evidence, and it has not produced any evidence supporting its notion that Aurignacians, or any other humans of the Early Upper Paleolithic, were fully anatomically modern (Bednarik 2007). All pre-27,700 BP human Late Pleistocene remains in Europe are either Neanderthaloid or robust, and the processes of gracilization and foetalization that led to anatomically modern humans are universal and gradual, occurring in all four continents then settled. They are most probably the result of *cultural selection* of genetic traits ('unintended self-domestication'), and what were replaced were perhaps genetic features of appearance, not populations (Bednarik 2008b).

In asking questions about the capacities of early hominins, such as those concerning the origins of symboling, one therefore has had to contend with an unsatisfactory archaeological record. A great schism has in recent decades developed in our concepts of hominin evolution. It concerns the antithetical positions of the 'long range' and the 'short range' theories of the cognitive development of humans. Sometimes called the 'gradualist' and 'discontinuist' models (d'Errico and Nowell 2000), these two diametrically opposed conceptions perceive two entirely different paths of non-physical human evolution. The *short-range model* rejects all evidence of symbol use prior to 40,000 years BP, insisting that it commenced as part of the claimed cognitive revolution at the

beginning of the Upper Paleolithic. In the last few years the resolve of its protagonists has begun to wane as they have made first concessions in response to a few African finds indicating the use of paleoart around 75,000 years ago, and of red pigment even earlier. Yet these concessions are minor when the full implications of hundreds of long-available relevant finds of much greater ages are considered.

The *long-range model* perceives a gradual evolution of language, art-like productions, advanced hunting methods, shelter building, garment making, social complexity, and the symbol use that drove most of these developments. This gradual evolution occurred over vast time spans well before 40,000 years ago, and some of it was already underway around a million years ago. The evidence for the long-range model consists of a panoply of material finds which, sadly, the short-range protagonists are uniformly unfamiliar with (Bednarik 1992, 2003c). When confronted by individual finds that challenged their model they tried to explain them away, or regarded them as a 'running ahead of time' (Vishnyatsky 1994), or pronounced them as untypical, or challenged their dating or the scholarly competence of their promoters. This is a familiar pattern in Pleistocene archaeology, dating back to the times of Boucher de Perthes and Pengelly, the 'incompetent amateurs' who discovered the Paleolithic in the early 1800s — as well as to the later, similarly 'incompetent' discoverers of fossil man, Pleistocene art and *Homo erectus*, and many more scholars since.

In examining the very beginnings of symboling we therefore have to make an initial choice: to follow either the long-range or the short-range model. With the latter, the answer is relatively simple: there is no use of symbolism before the advent of the Upper Paleolithic. According to Davidson and Noble (1989), the answer lies in the introduction of figurative or iconographic imagery. The transference of the meaning of a word was only possible after a picture of the object had been drawn. So in a nutshell, the process was like this: one drew a bison (icon), pointed to it (index) and said 'bison' (symbol), and that is how language began. Clearly, then, depiction had to precede language, and symboling

began with it. Davidson was so encouraged by the reception of this model that he soon announced that all humans prior to fully modern man should be placed with the apes rather than hominins (Davidson and Noble 1990). The question to be asked here is this: in investigating the origins of symboling, should we consider the possibility that the short-range theory could have gotten it right, or should we simply move on?

I have arrived at a position diametrically opposite to that of the 'short-range' advocates. Symboling did not commence with the advent of the Upper Paleolithic in Europe, but at least twenty times as long ago. Even the traditional sequence of emerging symbolic capabilities is to be discarded. Apart from the need to become much more circumspect in our pronouncements about this sequence, nothing seems quite as straightforward as a simplistic Darwinist model of gradually increasing complexity would predict. What we can say with some level of credibility is that precursors of symbol use that helped to prime the neural system of hominins did so already more than two million years ago. A number of developments occurred perhaps a million years ago or soon after, which imply that symbolic systems had a massive impact on the lives of hominins. They led to significant cognitive and social changes facilitating colonization across sea barriers, and to other forms of domesticating natural systems. These included fire use, probably modification of domestic environments by shelter construction, and no doubt use of clothing by a tropical primate colonizing temperate and eventually, much later, even extremely cold regions (the Arctic Circle by about 135,000 years ago; Pavlov et al. 2001; Schulz 2002; Schulz et al. 2002). It is also during the final Early Pleistocene and the first part of the Middle Pleistocene that hominins can be shown to have started to collect rock crystals and fossils, and used red pigments (Bednarik 1992). Most certainly by that time, around 900,000 or 800,000 years ago, language-like communication was used effectively. A few hundred thousand years later, still in the Lower Paleolithic, symbolic objects began to be modified. Proto-figurines and engraved plaques occur, as well as beads and pendants. Markings were now

produced on various types of surfaces, including on rock, and a very few of them managed to survive to the present, under particularly fortunate preservation conditions. At this stage, we have to expect a kind of culturally very differentiated society, no less complex than some of those observed ethnographically. It was a society that stored symbolic information outside the brain, in a range of objects and markings: it had circumvented the need for continued brain growth by holding information in a more reliably stable and relatively permanent form. It was therefore cognitively modern. But this is still long before *Homo sapiens sapiens* emerged, it is still during the reign of the archaic *sapiens* hominins, whose perhaps most extreme form are the Neanderthals. By the advent of the Upper Paleolithic, a mere 40,000 years ago, it was all over. The complexity of symboling, social systems and cognitive faculties was then essentially identical to what is available to us today. By that time, people wove textiles and created master paintings we stand in awe of. The most impressive of their art works were apparently not created by what we call anatomically modern humans, but by Neanderthaloid artists (Bednarik 2007). This finding alone would render the 'African Eve' model refuted.

According to the evidence as it currently stands, this is the kind of scenario we need to consider if we seek the origins of symboling. The most crucial period, the time when hominins commenced a trajectory delivering them to where they are today, was the late part of the Early Pleistocene. By the time of its end, 780,000 years ago, the course had been set for our species, at least in terms of its fundamentals. More cannot be said at this stage, because the conditions for making more confident pronouncements simply do not exist. They are lacking because archaeology, in looking for these developments, has failed to come to terms with its past errors, having looked essentially in the wrong places and in the wrong era of human history.

The ability of creating arbitrary relationships between referrer and referent is one of the most defining characteristics of humans. Archaeology has consistently focused on its invented tool categories, on differences in cranial

architecture, and has therefore profoundly failed in providing a cultural history of humans. Symbols are the most powerful driving force that made hominins human. They are abstract, society-specific constructs of reality aspects, they determine human constructs of reality at the most fundamental levels. Especially those detectable visually are physical fragments of human interpretation of the physical world. Their full meanings are only interpretable within the social contexts that created them, even in the case of iconographic symbols, but most especially in those that lack iconographic reference points. The *systematic* study of this vast body of evidence, called paleoart, has not yet begun. Perhaps it will begin in this century. And perhaps it will, at some distant future time, lead to an understanding of how humans created their realities out of chaos.

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