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Beads and Pendants of the Pleistocene

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Abstract. – One of the most useful forms of evidence in considering the cognitive evolution of hominids are the beads we have managed to recover from Pleistocene sediments, and yet they are among the most neglected kind of material relevant in this quest. In the context of the origins of symbolism beads offer two outstanding characteristics: in contrast to other classes of evidence proffered, their status as nonutilitarian anthropogenic products is rarely challenged; and their symbolic significance appears generically self-evident. This paper surveys the distribution of Pleistocene beads and pendants in time and space, their forms of occurrence, and the implications of these empirical observations for hominid ethology. It is concluded that such symbolic artefacts were in use since the Lower Palaeolithic, i.e., for at least two or three hundred millennia, and that complex communication and social systems must be attributed to the societies concerned. *[Pleistocene, artefacts, hominid cognition]*

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Introduction

The connection between the cognitive evolution of humans and the topic of the production and use of beads and pendants during the Pleistocene may not have been afforded much attention, but such portable palaeoart objects can be much more illuminating in this respect than most other archaeological finds. Let us consider the current consensus model of cognitive evolution as held by mainstream archaeology, particularly of the Anglo-American persuasion. It perceives a massive, explosion-like development with the advent of the Upper Palaeolithic in southwestern Europe, and this is almost universally attributed to the sudden appearance of anatomically modern humans in the region (e.g., Gamble 1994; Mithen 1998). Prior to this cataclysmic change, the model predicts, the world was populated largely by primitive humans who probably lacked language, complex social structures, and culture, who created no form of "art," hunted inefficiently if at all, and may have even been carrion eaters who lacked the use of fire. They may have had no habitation structures and wandered over the landscape rather aimlessly, eking out a most precarious existence.

These claims relating to the late appearance of symbolism, art, and language, which have become so established recently that they completely dominate mainstream world archaeology, are attributable to an inadequate knowledge of scholars advocating these models. Ocean navigation and the ability to colonize new lands by sea arguably postulate the use of complex communication systems, as some of the advocates of this school readily admit (e.g., Noble and Davidson 1996), and while this does not necessarily indicate uttered language, that would seem to be the most likely explanation. The knowledge that ocean crossings by colonizing parties were successful more than 700,000 or 800,000 years ago has been available for several decades now,[1] which implies that these journeys were by *Homo erectus*. In compiling a list of finds

1 Bednarik 1997a; Bednarik and Kuckenburg 1999; Maringer und Verhoeven 1970; Morwood et al. 1999; Sondaar et al. 1994.

that may indicate the use of palaeoart or complex technology, I listed literally hundreds some years ago (e.g., Bednarik 1992, 1994a). Hominids of the Lower Palaeolithic not only created markings on portable objects of various types, they also produced the oldest petroglyphs we have found so far (Bednarik 1993a, 2001) and made extensive use of ochre or haematite.[2] Lower Palaeolithic humans created well-designed and well-made wooden artefacts[3] and they apparently produced composite weapons (fastening stone to wood) (Thieme 1995). Since there are several cases of stone walls by them that have been interpreted as parts of dwelling structures (Bednarik 1993b) it may be a little hasty to assume that they lacked habitation shelters. They certainly produced artefacts from such materials as bone and ivory, they were capable of drilling or boring (Keeley 1977), and we assume that we have evidence of their appreciation of exotic finds, such as crystals and fossil casts, which we know they collected on occasion.[4] It is also wrong to say that their lithic industries were unchanging: prismatic blades, borers, and burins occur in Acheulian deposits, and in the Amudian of North Africa and the Levant, which developed from the region's Acheulian, blade tools become a major component of the industry (McBurney 1967; Rust 1950).

Beads and pendants 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, 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 object 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). It is relevant to note that seafaring, too, is practically impossible without the use of ropes and knotting. The diachronic availability of Pleistocene remains of cordage[5] is of no relevance to the question, because that class of material evidence obviously possesses an exceptionally high taphonomic lag time (Bednarik 1994b). In short, what beads tell us about the technology of the people who used them is well in excess of deductions concerning their manufacture.

Without doubt the technological deductions beads permit us are of great interest, but of perhaps more importance 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, 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 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 name just one example: beads or pendants may function as charms, they may be a means of protection against evil spells or spirits.

Beads and Language

While none of this information is archaeologically recoverable, all of it refers to a level of cultural sophistication most archaeologists would not currently be prepared to concede to humans prior to about 30,000 years ago. Indeed, many would not even consider such possibilities. Bearing in mind the minuscule amount of testable, falsifiable information archaeology has so far provided concerning pre-Upper Palaeolithic human cognition, social systems, or even technology, such a preemptory disposition is clearly unscientific.

2 Bednarik 1990; Howell 1966: 129; Leakey 1958; Lumley 1966; Marshack 1981.

3 Belitzky et al. 1991; Biberson 1964; Bosinski 1992: 34; Howell 1966; Jacob-Friesen 1956; Mania und Mania 1998; Thieme 1996a, 1996b, 1997, 1998; Wagner 1990.

4 Bednarik 1994a, 1998, 1999; d'Errico et al. 1989; d'Errico and Nowell 2000; Goren-Inbar 1986; Goren-Inbar et al. 1991; Oakley 1973, 1981; Pei 1931: 120.

5 Leroi-Gourhan 1982; Nadel et al. 1994; Pringle 1997.

No credible evidence has so far been presented by orthodox archaeology that would indicate, for instance, that *Homo erectus* had no language. On the other hand, ample evidence is available that he quite probably did. The premature announcements and hypotheses of the "short-range" (or Big Bang) model of hominid evolution need to be tested, and one way to do this is by examining the origins of beads and pendants.

Irrespective of their cultural purpose, beads convey complex information about the wearer which it would be impossible to create a context for without the use of a communication system such as language. We have many other indicators of possible language use during the Lower and Middle Palaeolithic (e.g., other forms of symbolism, or successful ocean navigation), and the very early use of beads and pendants provides just one of the various forms of crucial evidence.

Small perforated objects of the Pleistocene may have been beads or pendants, or they could have been quangings, pulling handles, or buckles as reported ethnographically.[6] However, most of the utilitarian objects of this type are not only of a quite typical shape or design, they exhibit specific wear traces and material properties. To be more specific, small circular objects with central perforation are considered to be beads, especially where they occur repeatedly. Similarly, objects such as animal teeth, perforated near one end (near the root) are not thought to be pulling handles, nor are objects that are too fragile to function as such utilitarian equipment (e.g., ostrich eggshell beads). Evidence that a bead was drilled with a stone tool includes a distinctive biconical and "machined" section and sometimes rotation striae. The wear of pendants can often be observed on archaeological specimens, including those made of stone (Bednarik 1997c), and is also quite typical.

Hundreds of such objects are reported in the literature, although there is often no reliable evidence that the perforation is anthropogenic. Some materials can be perforated by natural processes. For instance, bones can be chewed through by animal canines or partially digested by stomach acids, while mollusc shells are commonly perforated by parasitic organisms. To acquire experience in recognizing such natural perforations I have microscopically examined hundreds of specimens of the latter type. But before hastily omitting objects with natural perforations from all consideration in this context we would do well to remember that the cultural status of such an object is not entirely contingent on whether the hole in it was made by human agency. While it is preferable to rely only on specimens bearing clear evidence of human work when dealing with a period from which bead use has not as yet been conclusively demonstrated, it is to be emphasized that the perforation of a bead or pendant certainly does not need to be man-made, as d'Errico and Villa (1997) erroneously assume. On the contrary, naturally perforated objects are commonly used in ethnographic specimens (as are perishable materials) and it seems likely that such natural beads were also used in the past. Indeed, the earliest beads ever used quite possibly had natural perforations.

In considering the origins of communication by language, several points arise immediately. Language and speech are two different abilities, and there is no doubt that communication can be by many means other than speech. It is widespread in the animal kingdom (Bednarik 1992: 31), even plants are thought to communicate. As always in anthropocentric and humanistic disciplines, the definition of what indicates characteristics such as culture or language are regularly revised in response to the threat that such characteristics might be attributed to nonhuman interloper species. This is one of the classical symptoms of a nonscientific pursuit, because in reality there can be no doubt that humans do not possess one single definable, measurable, or observable characteristic that is not shared by another species. Modern ethology demonstrates this amply. Thus the desire to maintain a clear qualitative separation between humans and nonhuman animals is attributable to the religio-cultural reality scholars exist in, and it is responsible for the extreme conservatism in mainstream archaeology concerning the cognition of hominids.

This is particularly obvious in the case of symbolic communication by hominids, be it verbal or in other forms. The presence of Broca's and Wernicke's areas on cranial endocasts of *Homo habilis* implies the very early availability of the neural hardware for language, and the hyoid Neanderthal bone from Kebara Cave indicates that the people's supralaryngeal architecture might have supported the generation of uttered language (Arensburg et al. 1989; Lieberman 1991). Nevertheless, these forms of evidence are not adequate by themselves, and ultimately language ability needs to be ascertained through archaeologically demonstrated behaviour patterns that demand the use of consciously modulated communication of adequate complexity to support such patterns. I have

6 Boas 1888: Figs. 15, 17, 121d; Kroeber 1900: Fig. 8; Nelson 1899: Pl. 17.

suggested that the most obvious candidates are seafaring and the use of beads (Bednarik 1997b, 1997c).

Beads have no possible utilitarian function that is not attributable to purely symbolic purposes. Whatever the reason for their use may be, it cannot be deduced from any archaeological evidence. Describing them as decorative, for instance, does not amount to any clarification, because it does not tell us why they are "decorative." All communicative functions of beads are culturally negotiated, the abstract values they communicate to the initiated beholder are crucial to their existence, yet for early periods they are entirely inaccessible to the cultural outsider, the researcher. The outstanding technical perfection of some particularly early specimens has prompted the proposition that these objects expressed concepts of perfection (Bednarik 1997b), and I have demonstrated via replicative experiments that such perfection was achieved through a great investment of labour and carefully applied skill: the final physical product was imbued, and quite deliberately so, with several layers of abstract values. The intentionality of perfection as well as the various intended cultural meanings of such objects would have been all impossible without the use of a "reflective" communication system of a complexity that does not seem achievable without fully consciously modulated speech. Hence beads and pendants constitute key evidence in the quest to clarify the cognitive evolution of humans – not just because they demonstrate the use of symbolisms, but because they demand social, cultural, and cognitive systems of an adequate sophistication to support such a complex aggregate of mental abstractions without which such objects simply cannot exist.

Beads of the Lower and Middle Palaeolithic

It is therefore relevant to examine the early occurrence of beads and pendants, and since the taphonomic lag times of such materials as can be assumed to have been used in their manufacture are relatively long (Bednarik 1994b), near-complete truncation of the surviving population must be expected. In other words, the number of finds beyond the taphonomic threshold of the phenomenon category must be expected to be minute. Despite this severe theoretical limitation, the actual quantity of relevant finds is rather impressive, even when seen against the immense time scale they relate to.

Middle and Lower Palaeolithic finds with both artificial and natural perforations are quite common, and many hundreds have been found since the middle of the 19th century. The earliest mention of possible beads of the Lower Palaeolithic relates to the first Palaeolithic tools ever reported, from the very type site of the Acheulian. In the famous paper by Prestwich (1859), in which he recognized the authenticity of the St. Acheul stone tools Jacques Boucher de Perthes had been collecting for many years, the occurrence of possible beads is clearly noted:

> Dr. Rigollot also mentions the occurrence in the gravel of round pieces of hard chalk, pierced through with a hole, which he considers were used as beads. The author found several, and recognized in them a small fossil sponge, the *Coscinopora globularis*, D'Orb., from the chalk, but does not feel quite satisfied about their artificial dressing. Some specimens do certainly appear as though the hole had been enlarged and completed (Prestwich 1859: 52).

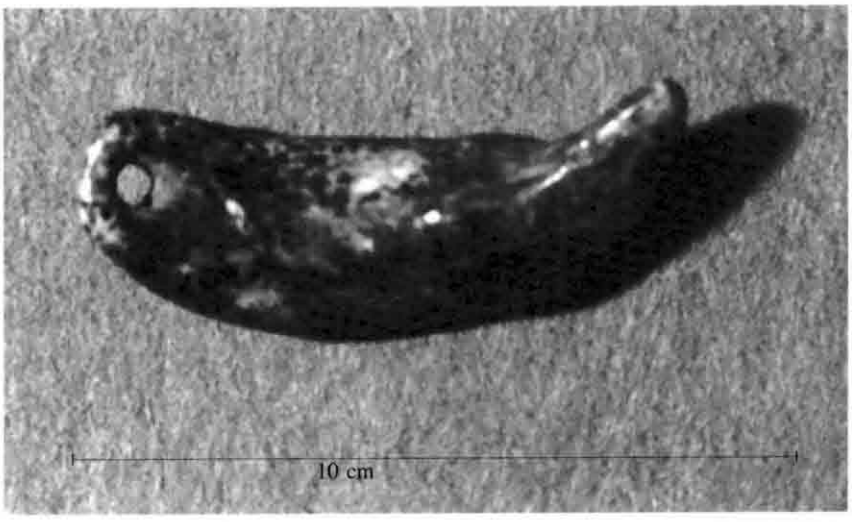

Fig. 1: Wolf incisor, perforated near its root, oldest known object of its kind in the world, at possibly 300,000 years. Repolust Cave, Austria.

These centrally perforated objects were never properly analyzed and despite prominent publication the finds were never again considered, so their status remains unknown. Much the same applies to the 200 Acheulian examples of *Coscinopora globularis* discovered by W. G. Smith in 1894 at Bedford, England, which showed an artificial enlargement of the natural orifice. Smith's opinion that the fossils had been used as beads is confirmed by the finding of Keeley who examined a number of such specimens from Bedford that "there is no doubt that some of these fossils show artificial enlargement of their natural orifices" (Keeley 1980: 164). Circular, disc-like fossil casts have since been found at other Acheulian sites, such as the crinoid columnar segments (*Millericrinus* sp.) from Gesher Benot Ya'aqov, Israel (Goren-Inbar et al. 1991), and a series of disc beads made from ostrich eggshell from the Acheulian of Libya (Bednarik 1997c).

The perhaps earliest objects with indisputably human-made perforations we know of are the two perforated pendants from the Repolust Cave in Styria, Austria. One is a wolf incisor, very expertly drilled near its root (Fig. 1), the second is a flaked bone point, roughly triangular and perforated near one corner (Fig. 2). Both objects were first published in 1951 but have received little attention since then (Mottl 1951). They were excavated with a lithic industry variously described as Levalloisian, Tayacian, and Clactonian, which is in fact an undifferentiated Lower or Middle Palaeolithic assemblage, but clearly free of Mousterian elements. The occupation deposit was found well below an Aurignacian level, separated from it by substantial clastic deposits of stadial periods. There is no reliable dating evidence available, the currently favoured age estimate of around 300,000 years is based on the accompanying faunal remains, especially the phylogeny of the bear remains (Bednarik 1997c).

The ostrich eggshell disc beads from a major Libyan occupation site are, however, safely attributable to the Acheulian (Fig. 3: d-f). They come from the El Greifa site complex at Wadi el Adjal, near Ubari. The site is located on what was a peninsula of the huge Fezzan Lake of the Pleistocene, which then occupied a large part of southwestern Libya. El Greifa provides ample evidence of Early, Middle, and Late Acheulian occupations, followed by Aterian deposits. Dating of sediments from 320,000 years to the end of the Pleistocene has been by uranium/thorium analysis.

The alkaline and calcareous sediments have provided favourable conditions that led to the preservation of ostrich eggshell beads from the Late Acheulian of El Greifa site E. Dated by the U/Th isotopes of the calcareous sediments they are from, they are in the order of 200,000 years old. The near-perfect rounded circumference and perforation of these beads demonstrate that hominids of the Acheulian possessed a well-developed technology of working this fragile medium with the greatest possible confidence and skill. These perfectly made artefacts also imply the existence of the social structures necessary to provide an ideological context for the production and use of complex body decoration.

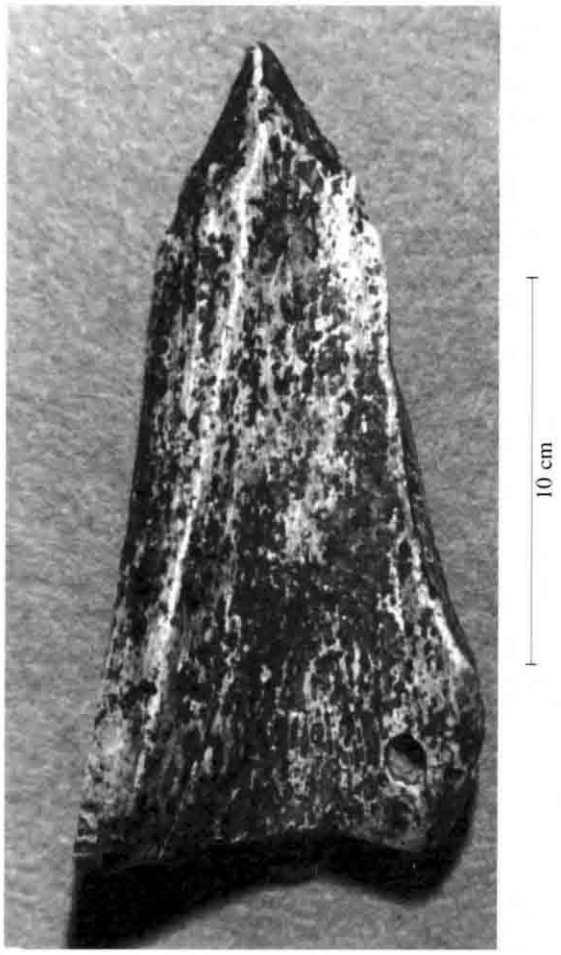

Fig. 2: Flaked bone point, perforated near one corner, excavated with the incisor in Fig. 1. Repolust Cave, Austria.

The three beads initially found (Bednarik 1997c; more specimens have since been excavated) are preserved as fragments only, but they share a similar perforation diameter of about 1.7 mm, and even their external diameter is very consistent (5.8–6.2 mm). This consistency in size and the near-perfect rounding of all preserved edges,

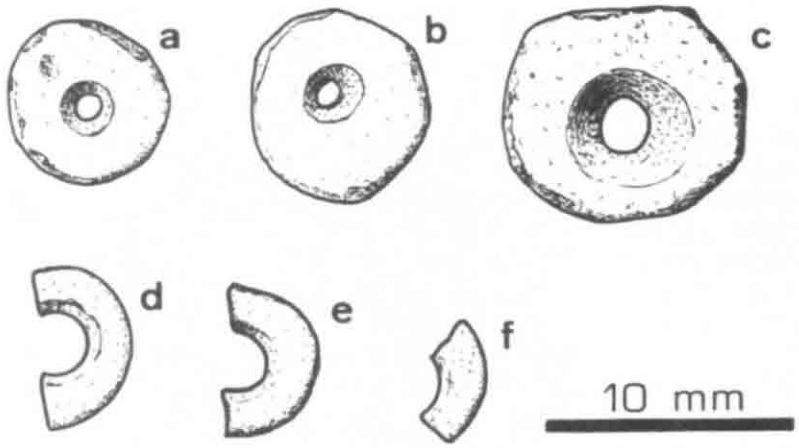

Fig. 3: Pleistocene beads drilled and ground from ostrich eggshell: a, b – Upper Palaeolithic, Bhimbetka, India; c – Upper Palaeolithic, Patne, India; d, e, f – Late Acheulian, El Greifa site E, Libya.

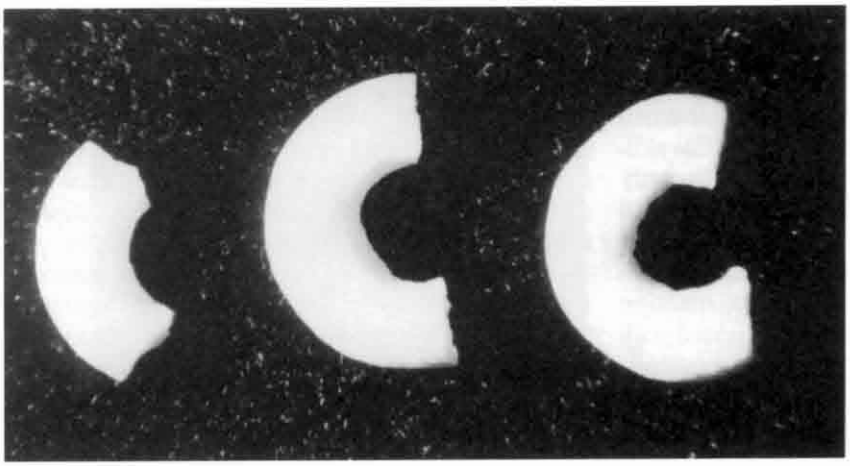

Fig. 4: According to comprehensive replication experiments with South African ostrich eggshell, it takes an experienced operator about 25 minutes to make one of the Acheulian beads from Libya, using Acheulian stone tool replicas.

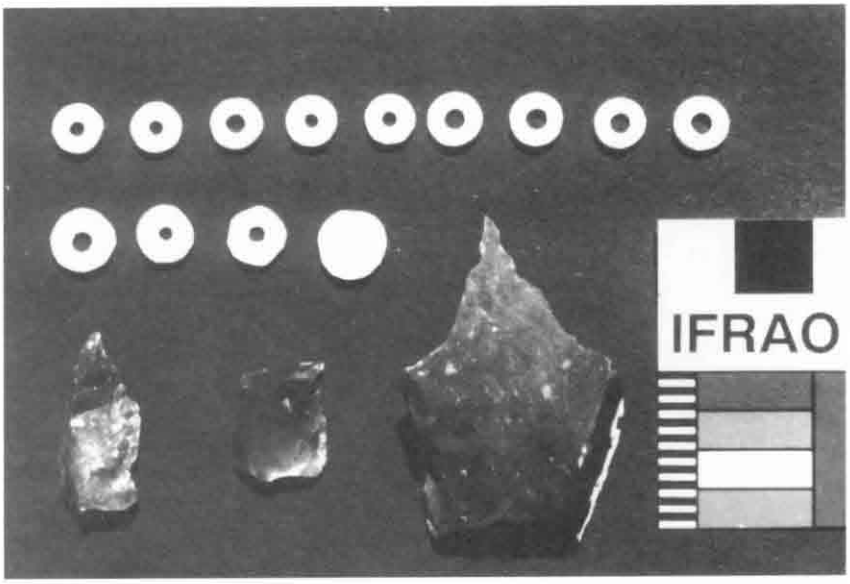

Fig. 5: Replicative ostrich eggshell beads and stone tools used in making them.

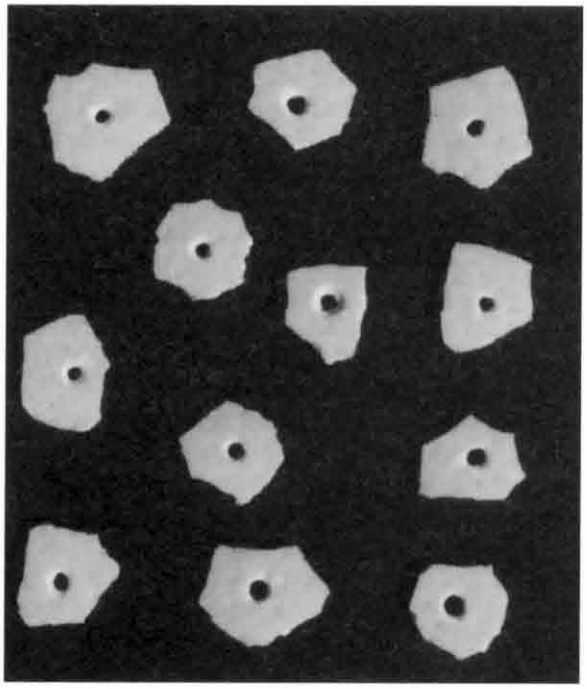

Fig. 6: Replicative ostrich eggshell bead blanks after trimming, before grinding stage.

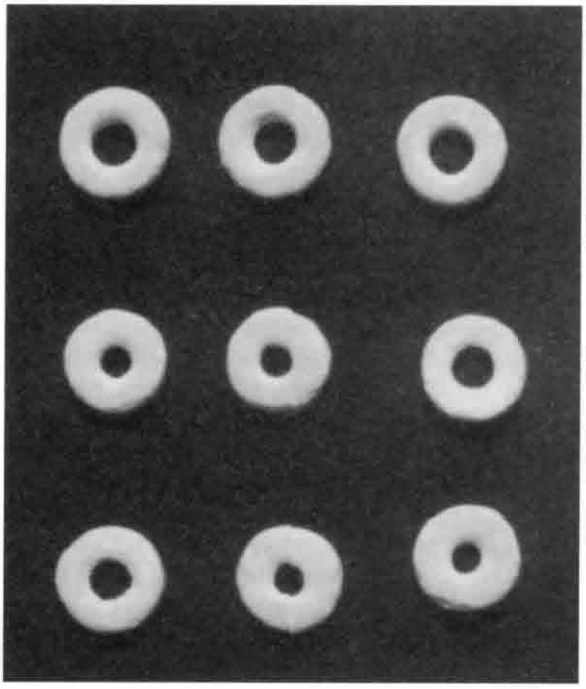

Fig. 7: Replicative ostrich eggshell beads of 6–7 mm diameter.

internal and external, suggests the use of a standardized manufacturing process, a characteristic these beads seem to share with the much later beads of the Upper Palaeolithic as well as those of various cultural traditions of the Holocene. The El Greifa beads were replicated with modern South African ostrich eggshell (Fig. 4), using Lower Palaeolithic stone tool replicas, in order to establish the circumstances of their manufacture in terms of illuminating the conceptual world of their makers (Bednarik 1997c). The near-perfect roundness of the Acheulian beads can be obtained only by constant checking of the shape during the final abrading process, using not just a developed sense of symmetry, but possessing a clear concept of a perfect geometric form. This roundness cannot be the result of chance or some "instinct" driven by a mere desire to reduce the size of the beads. It is the outcome of a very clear abstract construct of form – a concept-mediated, geometrically perfect product. Moreover, it is the result of a determined effort to produce high-quality work. To extract the full potential information offered by these few beads, I find the following point particularly illuminating, and it also demonstrates vividly the benefits of replication studies.

During my experiments I made over fifty ostrich eggshell beads with stone implements (Fig. 5, 6, 7). I found that as the beads are ground to a diameter of 8 or 7 mm it becomes increasingly difficult to hold them while grinding them, and after a time it becomes a rather painful task. The finger tips not only have to maintain a tight grip, they are also subjected to abrasion from the siliceous stone used. About 6 mm is the diameter at which it becomes uneconomical to continue reduction further, and this is precisely the size of the Acheulian bead fragments. This is the result of a deliberate decision to reduce the beads to the smallest realistically possible size. It must be considered also that at sizes of under 6 mm, the beads become increasingly fragile: with a perforation of almost 2 mm, their rim width falls to under 2 mm. Moreover, because of what remains of the biconical perforation profile, the innermost part of the rim is never of full eggshell thickness. I found that if the beads are ground to a smaller size, they become susceptible to fracture, either during manufacture or during subsequent use.

So we have two limits on minimum size imposed by practical considerations, and we need to ask: why did the makers of these beads push their technology to its practical limits? After all, a larger bead is much easier to see, yet a smaller bead represents a significantly greater effort. This observation coincides with the already mentioned geometric perfection of the form, which is most certainly deliberate. The most parsimonious ex-

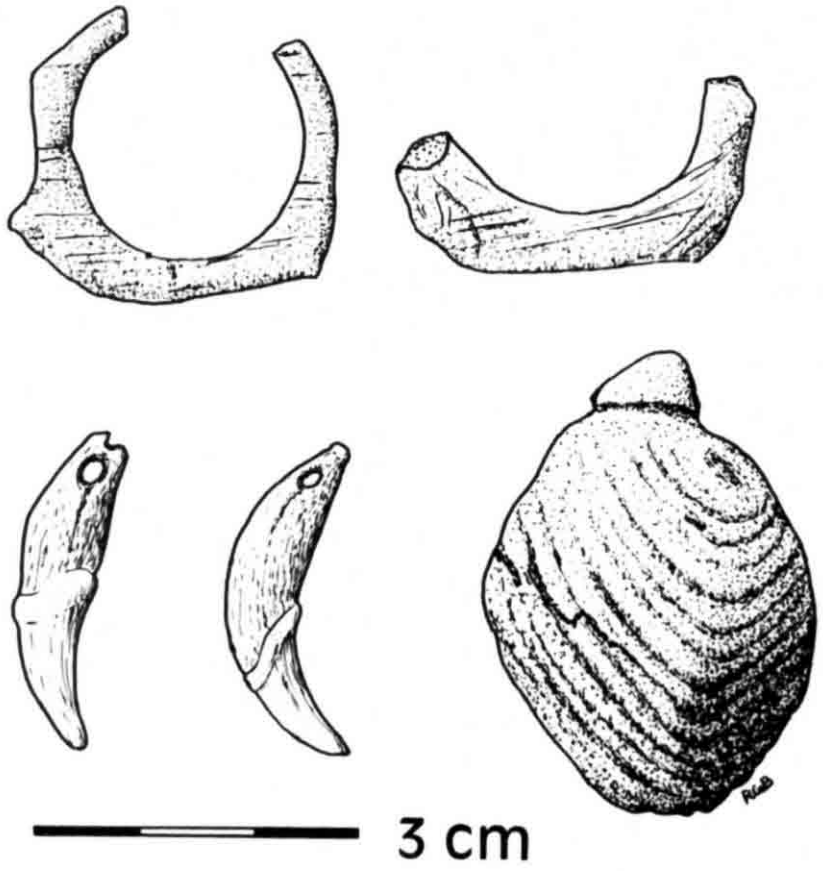

Fig. 8: Two ivory ring fragments, two perforated animal teeth, and a fossil shell cast with an artificial groove for attachment. These objects were made by Neanderthals of the Châtelperronian, Grotte du Renne, Arcy-sur-Cure, France.

planation for both the size and the form of these objects is that these characteristics reflect a highly developed abstract value system and a considerable social complexity in the society that made and used these objects. Without a cultural impetus placing value and meaning on such perfect forms, and on an utmost standard of craftsmanship, it seems simply impossible to account for the empirical characteristics of the evidence.

In addition to the few Lower Palaeolithic beads mentioned, there are numerous perforated objects also from the Middle Palaeolithic, and many of them may have served as beads or pendants. The Micoquian has yielded an artificially perforated wolf metapodium as well as a wolf vertebra from the Bocksteinschmiede, Germany (Marshack 1991; Narr 1951), while the Micoquian of Prolom 2, Crimea, produced no less than 111 perforated animal phalanges, besides four engraved palaeoart objects (Stepanchuk 1993). The Mousterian of France has yielded a partly-perforated fox canine and a perforated reindeer phalange from La Quina (Marshack 1991; Martin 1907), and another perforated bone fragment from Pech de l'Azé (Bordes 1969). The two perforated canines from Bacho Kiro, Bulgaria, too, are of the Middle Palaeolithic (Marshack 1991). As we approach the end of this technological phase, beads and pendants become increasingly common, and materials of stone are now drilled, first appearing in Russia and China. Thirteen such specimens from the lower occupation layer of Kostenki 17, found below a volcanic horizon thought to be about 38,000 years old, include not only polar fox canines and gastropod shells with perforations, but also stone and fossil cast objects (Bednarik 1995b). From an intermediate Middle to Upper Palaeolithic site in China, wenhua Shiyu, comes a broken stone pendant (Bednarik and You 1991), while the oldest beads found in Australia, from Mandu Mandu Creek rockshelter, are about 32,000 years old (Morse 1993).

More Recent Beads

With the advent of the Upper Palaeolithic in Eurasia, beads become more numerous in various regions. This includes specimens made by the Neanderthals of the Châtelperronian of the French

Upper Palaeolithic (Leroi-Gourhan 1965) (Fig. 8). Just three graves at the Russian site Sungir' – with a stone tool technology that is transitional between Middle and Upper Palaeolithic implement types, the Streletsian – contained more beads than have been found in the entire Pleistocene sites of the rest of the world (Bednarik 1995a). They yielded 13,113 small ivory beads and over 250 perforated canine teeth of the polar fox. By this time, perhaps 28,000 years ago, the art of bead making had reached an extraordinary level, in which the results of thousands of hours of labour were lavished on just three burials. In India we have only a few specimens from the entire Palaeolithic: two from Bhimbetka, south of Bhopal, and three from Patne, (Maharashtra) (Fig. 3: a-c). Two of the latter are not perforated, although one is centrally scored. Other Asian regions producing ostrich eggshell beads include Siberia (Krasnyi Yar, Trans-Baykal), Inner Mongolia (Hutouliang), and the Gobi desert in northern China and Mongolia. The ostrich, now extinct in Asia, seems to have been widely distributed to the end of the Pleistocene and even into the Holocene.

Both southern and northern Africa have produced countless finds of worked ostrich eggshell.[7] In the far north of Africa, the Capsian, dating from the first half of the Holocene, yielded not only numerous figurative and nonfigurative engravings on ostrich eggshell fragments, but also beads of snail shells, teeth, and small stones, besides ostrich eggshell. The southern African sites yielding such finds date from the Middle Stone Age right up to the proto-Historic period. Decorated specimens from the Howieson's Poort phase in Apollo 11 Cave, Namibia, may well be in the order of 70,000–80,000 years old. Diepkloof Cave in the south-western Cape, South Africa, has yielded several supposedly decorated ostrich eggshell fragments of the Middle Stone Age. Ostrich eggshell beads from Bushman Shelter near Ohrigstad, Transvaal, have been suggested to date from somewhere between 12,000 and 47,000 years ago. Beads of this material span a vast age spectrum, still occurring in much more recent periods in southern Africa. For instance they are found in the Smithfield B, a tool complex of the subcontinent's interior regions of the 14th to 17th centuries.

The use of ostrich eggshell for a variety of purposes, including the production of disc beads and as water vessels, continued to be practised by the Bushmen of southern Africa until recent times, and has been described ethnographically in numerous cases. Thus ostrich eggshell beads are among the most enduring artefacts in human history. Much the same can be said about other forms of disc beads. For instance, a publication about Palestinian jewellery of the most recent ethnographic past features a photograph of a bead described as a "fossilized sea urchin" (Helmecke 1990: Pl. 13 f), depicting in fact a crinoid fossil cast that closely resembles the crinoids recovered from the Acheulian site Gesher Benot Ya'aqov in the same region, on the River Jordan (Goren-Inbar et al. 1991). Although separated by hundreds of millennia in time, the same materials were used for the same class of symbolic artefacts in both cases: a poignant reminder that in terms of their humanness, our distant ancestors were a great deal closer to us than most archaeologists are willing to concede.

7 Baur-Röger 1987, 1988; Camps-Fabrer 1962, 1966, 1975; Cziesla 1986; Goodwin 1929; Marmier et Trecolle 1979; Marshall 1976; Sandelowsky 1971; Woodhouse 1997.

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