The living as symbols, the dead as symbols: problematising the scale and pace of hominin symbolic evolution.

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Abstract

The 'symbolic capacity' has come to be seen as a core trait of anatomically modern humans, and probably separates them cognitively and behaviourally from all other hominins. While archaeologists agree on what aspects of the archaeological record constitute evidence of symbolism, such as burials, use of pigments, and personal ornamentation, only generic concepts of 'symbolism' are invoked from these, resulting in a simplistic discourse about its origins. I try to problematise the concept of symbolism, using these archaeological categories, breaking each down into differing levels of symbolic sophistication. Following this, I try to link these to Dunbar's levels of intention, and explore how one might identify these from the archaeological record. I conclude by making a necessarily coarse comparison of Neandertals and modern humans in terms of the expression of these characteristics.

Introduction: living symbols, dead symbols

Palaeoanthropology is unique in providing insights into the long-term evolution of human behaviour. To a certain extent it should also provide unique insights into the cognitive capacities which underlie and facilitate certain behaviours. It should, at least in theory, provide middle range bridging between the modern human mind and that of our closest evolutionary relatives, the great apes. From what scholars can tell, a vast cognitive gulf separates the two; and at the heart of this difference apparently lies symbolism. If one accepts in a broad sense that religion is itself symbolic, then it is clear that a symbolic capacity and religious imperative is a fundamental part - perhaps inevitability; (Boyer 2008) - of being human. It is no surprise therefore that documenting the emergence of

symbolism has in recent years become central to palaeoanthropology. One should add it to the major events of human social development that traditionally involved broad spectrum economies, agriculture, writing and state societies. In fact, it would be difficult to conceive of these without symbolic underpinning.

Archaeologists have, however, approached the archaeological record in relatively simple ways, focussing on simple objects as being simply indicative of symbolism. Thus, the recovery of a used fragment of ochre becomes proxy evidence of symbolism. Such an approach does not take us very far, and certainly does not allow us to explore nuanced cognitive development among the later homininae. We should think of symbols as not just material cultural object or things in the mind but as ways of engaging with the world. Following on from Piercean semiotics it becomes clear that what potentially makes signs symbolic is not necessarily inherent in the object itself but is derived from its context, particularly how the sign and its signifier are regarded in relation (Schults 2009). Thus context is all-important, and as Sloane Wilson (2009) has noted, to understand the development of symbolism we must search for the context that made it adaptive. Here, I try to widen a contextual approach to the long-term evolutionary emergence of hominin symbol use, deconstructing what we mean by symbolism.

Problematising the archaeological debate: symbolic revolutions that were or were not

The emergence of 'symbolism' over the course of hominin evolution has in the past few years become arguably the most important object of archaeological study in the quest for defining what makes us 'behaviourally modern' humans. Palaeolithic archaeologists seem to agree that the 'symbolic capacity' or 'symbolically-mediated behaviour' is a defining - perhaps *the* defining - behavioural trait of *Homo sapiens,* but debate has begun in the last few years as to whether 'pre-modern' hominins possessed symbolic capacities and, if so, to what extent (see, for example, Mellars 1991, 1995; McBrearty and Brooks 2000; Wadley 2001; Henshilwood and Marean 2003; d'Errico *et al.* 2003 and particularly d'Errico 2003). Despite this, it is surprising that there is still no agreement on a definition of symbolism (Wadley 2009). Instead, the debate so far has often centred upon a 'trait

list' of behaviours that appear in the late Middle Pleistocene and Upper Pleistocene that were apparently novel to the hominin repertoire, although as d'Errico (2003: 199) has succinctly observed these traits are no more than a list of the major archaeological features that characterise the Upper Palaeolithic in Europe". Similarly, Henshilwood and Marean (2003) have rightly emphasised that the trait list is Eurocentric in origin and thus of questionable relevance to behaviours which apparently emerged first elsewhere, and have consequently proposed new traits with which to distinguish behavioural 'modernity' which has given the debate a new, at present Afrocentric, bias.

Whether African, European or, for that matter, Asian (a land mass far larger than Europe and the archaeologically explored areas of Africa put together, for which relatively little is known) (Dennell 2008), implicit in all perspectives is the progressivist notion of an *accumulation* of novel behaviours that include symbolism. As with other aspects of the palaeoanthropological record (notably the geographical dispersal of hominins) archaeologists tend to assume that from their point of emergence, hominins and behaviours were present continuously from then on; dots signifying new behaviours are placed on time charts and the dots are then joined up, creating an impression of gradually increasing behavioural complexity. This is apparent, for example, in McBrearty and Brooks' (2000) reorientation of the development of behavioural modernity to Africa and to a long-term gradualism, who see a "fitful expansion" that was "built incrementally" (*ibid*.: 531) over the long duration "since at least 250 ka" (*ibid*.: 532). With regard to symbolism they discuss special treatment of the dead (no evidence before the Upper Pleistocene and, in fact, no uncontroversial evidence for the African MSA); beads and ornaments (again no evidence before the Upper Pleistocene - see discussion below); and use of pigments (no figurative art until the LSA, the earliest date usually quoted being 26-28 ka BP for the Apollo 11 Cave plaques which are not reliably dated and may be much younger, but recovery of pigments from various African MSA sites spans the last 250,000 years). Leaving aside controversially dated examples the evidence for early use of pigments comprises less than one dozen sites, far lower than the number of European Middle Palaeolithic sites with the same.

Of the African examples, however, a small group of sites cluster around 100 ka BP; a handful of other sites may furnish much older examples; and others post-date 80 ka BP.

The earliest manifestations are few and are hampered by imprecise dating. 'Red stained earth', numerous haematite fragments, ochre and grinding stones occur in a context older than 250 ka BP at Kapthurin; Natural stone balls coloured with manganese were recovered from Olorgesailie site BOK1 dating to >340 ka BP, and at site GOK1 a stone block coloured with ochre and bearing grinding marks was recovered from a context dating to 290-493 ka BP (Brooks and Yellen 2009). At least 150,000 years later than this group, a second comprises red ochre fragments at Klasies River Mouth >100 ka (although the majority of pieces are younger than 80 ka); haematite pencils "throughout the MSA sequence at Border Cave" (McBrearty and Brooks 2000: 528), the base of which has been *estimated* at >100 ka; grinding slabs (not pigment crayons) from Porc Epic, ESR dated to 121 ± 6 ka BP; and, most remarkable of the group by far, the numerous ochre fragments in all of the main (M1, M2 and M3) levels of Blombos Cave, South Africa, at least 18 of which bear engravings which can arguably be grouped into symbolic 'traditions' (Henshilwood *et al*. 2009). It was generally agreed in the *Homo symbolicus* workshop that it is difficult to interpret the Blombos examples as anything but symbolism. This may now be considered a robust archaeological record, but we may not be justified in drawing a continuous line from Kapthurin to the Later Stone Age. Well over 100,000 years separate Kapthurin from the earliest cluster of sites ~100 ka BP, and twenty thousand years or more separate this cluster from more numerous examples <80 ka BP (Henshilwood and d'Errico 2009). 240,000 years separate the use of pigments at Kapthurin and the earliest known appearance of figurative art after (possibly well after) 40,000 years in Africa. With a burgeoning number of well-excavated MSA sites we cannot simply assume this is a factor of recovery, and I shall forward below a falsifiable hypothesis to account for this pattern.

'Time depth' is implicit in gradualist models of the emergence of human behaviour, but was it a significant aspect of symbolic behaviour? Perhaps we archaeologists implicitly assume it is. Once a novel behaviour appears, particularly one as profound as the symbolic capacity, it seems logically inconceivable to us that it might disappear again. Gaps in the chronological representation of these behaviours are written off as deriving simply from the lack of excavated sites, justifying the drawing of solid lines. But why should the appearance of these behaviours have been cumulative? Broad surveys of the

Eurasian Middle Palaeolithic and African Middle Stone Age show how the appearance and chronological trajectories of many behaviours varied considerably region to region (even within France, for example), often lacked clear trajectories and in Europe did not inevitably lead to the Upper Palaeolithic. 'Recursive change', whereby novel traits appear in a region, rise in frequency, then disappear can be observed in the Levant and may have been widely characteristic of pre-modern behaviour (see papers in Hovers and Kuhn 2006). As d'Errico and Henshilwood (2009) have noted, there is no continuity in the expression of pigment use and personal ornamentation. As this is so, then why might a recursive nature not apply for symbolism or, for that matter, religion (Pettitt in press)? Chase (e.g. 1999, 2006) has specifically drawn attention to the recursive nature of symbolism, arguing that its manifestation should vary depending upon specific behavioural contexts, and thus that we should expect its appearance in the archaeological record to vary geographically and chronologically.

If one can challenge the 'out of Africa 1' model on palaeontological and archaeological grounds (Dennell and Roebroeks 2005) there is no reason why we should not be critical of the currently favoured African model for the origins of behavioural modernity (Pettitt 2007). If regional trajectories of change and 'recursion' are characteristic of pre-LSA/Upper Palaeolithic hunter-gatherers (see papers in Hovers and Kuhn 2006) then the African MSA may not have been so critical to the emergence of modern behaviour after all (Pettitt 2007). In this light, the multiregional, multispecies model for the emergence of modern behaviour proposed by d'Errico (2003) becomes highly feasible; instead, '"modern" [behavioural] traits may have appeared in different regions and among different groups of humans, much as happened later in history with the inventions of agriculture, writing, and state society' (*ibid.* 200).

For the purposes of this paper I therefore assume a null hypothesis that there was no single centre of emergence of symbolism among hominin societies, or at least that such a single centre will not be recognisable archaeologically. Instead of trying in vain to identify origins, I shall instead attempt to deconstruct the notion of 'symbolism' as used by palaeoanthropologists, and suggest a more fragmented way in which it may have arisen among hominin groups, both in the long and short terms. I begin by elaborating an heuristic scheme using a relatively well documented and debated source of data –

personal ornamentation – and then proceed to deconstruct another aspect of behaviour seen as behaviourally 'modern' by many – the special treatment of the dead. Finally, I try to integrate these with Dunbar's suggestions about the cognitive development of levels of intention over the course of hominin evolution to show how symbolism can occur at many organisational and cognitive levels.

Material culture symbols among the living

Symbols only function as such when both a *writer* and a *reader* are in accord. In archaeology, one tends to focus on the writer (i.e. through their non-perishable creations recovered through archaeology), and assume that all persons who came into contact with these material culture creations were informed readers, i.e. could decode the intentional messages they were created to contain. This need not necessarily have been the case, and while an object can be considered as a symbol if it was created to function as such, it does not necessarily follow that it was widely or universally successful in that functioning. A shell pendant might therefore have functioned symbolically among the conspecifics of whatever erstwhile occupant of Blombos Cave made it around 80 ka BP (Henshilwood *et al*. 2004), but its status as a symbol may, or may not, have disappeared if it were viewed by other African *Homo sapiens* populations, or, for that matter, by an archaeologist eighty thousand years in the future. The only guide as to the efficiency of a symbol's agency in the past might therefore be an abundance of that symbol, not only on one site, but among several sites of the same broad time period. Until we have such an archaeological record it might be rash to argue from a handful of sites of widely different ages that symbolism was widespread among groups and geographical regions, let alone endemic to the species.

This caution might be applied to a small group of artefacts that are often forwarded as potentially very early examples of symbolism. Three examples of these *pierres figures* are known; natural stone cobbles that fortuitously resemble the human form, a resemblance which was accentuated by restricted use of deliberate engraving. Two derive from the Lower Palaeolithic (from the Levallois-rich site of Berekhat Ram, Israel, probably 350-500 ka BP; and from Acheulian deposits at Tan-Tan, Morocco, around 400

ka BP), and one from the Middle Palaeolithic (from the late Middle Palaeolithic cave site of La Roche Cotard, France ~32 ka [^{14}C] BP). Respectively, these take the form of a pebble of basaltic tuff resembling a human torso and head intentionally modified with grooves around its 'neck' and 'sides' (d'Errico and Nowell 2000), a quartzite cobble reminiscent of a human body modified with eight grooves and with the addition of red pigment (Bednarik 2003), and a flint beach cobble around the periphery of which several flakes have been removed and through which a natural perforation runs, into which a bone splinter has been wedged, the overall effect resembling a human face (Marquet and Lorblanchet 2003). While a sample of three, widely spaced in time, is hardly grounds for robust interpretation of *pierres figures* as unambiguous indicators of early symbolism, we should not write them off as casual "lithic doodles" as Dennell (2008: 285) has noted. Instead, he argues that like the appearance of precocious lithic technologies in the Lower Palaeolithic such as end-scrapers and burins at Berekhet Ram, symbolism (and by extension perhaps, ritual) drifted in and out of use. In this case "rather than dismissing these objects as non-symbolic that would be regarded as symbolic if found in later contexts, it might be advisable to consider instead why they are so rare, and under what circumstances they might occur" (*ibid*.: 285). Indeed, why are these figures not more common in the archaeological record? This cannot be due to recovery bias as one might argue for figurative art, so we may presumably conclude that their occurrence was genuinely rare, evidence of the regionally (or perhaps culturally) varied expression of early symbolic systems. But what kind of symbolism? The process begins with a reader, as the process is predicated on the initial recognition of the human form in a natural object. Thereafter the reader becomes the writer, making artificial modifications of the natural object to *enhance* its resemblance to the human form. The creative process therefore relates to the conscious removal of ambiguity in the symbol's reading. Whether or not it was subsequently 'read' by its discoverer/creator alone or by others, the object must in any general use of the term be considered to be symbolic, because it carries within itself an explicit reference to the human body. But that is all; we can infer nothing further from its message; 'I look like a human'. While we cannot of course rule out that the *pierres figures* symbolised a lot more (e.g. 'I represent my creator, his agency in the group while he is not present, and the shared social norms that keep us together') there is

a considerable conceptual gap between the two forms of symbolism. The simplest way in which these *pierres figures* may have been used (if of course they were 'used' at all) cannot be regarded as cognitively sophisticated as the latter example. We need to deconstruct what we as archaeologists mean by symbolism, and I attempt to do so here with reference to personal ornamentation. I include pigment use in this argument, for which reasons should become apparent.

Whatever our opinion of the robustness of the earliest evidence for pigment use, some have seen the recovery of pigment 'crayons' from sites such as Twin Rivers (Zambia) and Kapthurin (Kenya) as "…convincing proof of the *symbolic* use of pigments…" by 200 ka years ago (d'Errico et al. 2003: 4 my emphasis). No criteria, however, have been proposed that allow us to identify from the archaeological record exactly how pigments were used (see the useful discussion in Henshilwood *et al*. 2009 and Wadley 2005). The apparent selection of a small selection of colours from a wider variety of those available (e.g. Barham 1998) and the selection of highly saturated reds in both South Africa (Watts 1999) and in Qafzeh Cave, Israel (Hovers *et al*. 2003) does at least suggest a symbolic function, but the problem here is that archaeologists assume a broad interpretation of 'symbolism', namely that if pigments were in use, then *whatever their specific use was* it possessed a symbolic dimension. This is not simply a semantic problem; scales of symbolism vary from the simple to the complex, and archaeologists tend to assume only the latter. Simple ornaments, in the form of natural shells pierced for suspension, are known from secure contexts in Blombos Cave, South Africa for which a date of ~75 ka BP is usually cited (Henshilwood *et al*. 2004); Skhul Cave, Israel in a horizon dated to 100-135 ka BP; Qafzeh Cave, Israel around 90-100 ka BP (Vanhaeren *et al*. 2006); the Grotte des Pigeons, Taforalt, Morocco possibly around 82 ka BP (Bouzouggar *et al*. 2007: although one would like to see the OSL dates on which this is based backed up by other methods); Üçağizli Cave, Turkey around 39-41 ka BP and probably the same broad age at Ksar Akil, Lebanon (Kuhn *et al*. 2001), and >35 ka BP from Oued Djebbana, Algeria (Vanhaeren *et al*. 2006)[1]. Taking due consideration of chronometric imprecision

[1] The dates given are those generally cited in the literature. For Skhul, the ornaments were recovered from Layer B, for which ESR and U-series dates indicated an age range of 43-134 ka BP 'but recent ESR and U-series analyses, including direct dating of a [human] molar from the Skhul II skeleton, indicate ages between 100 and 135 ka' (Vanhaeren *et al*. 2006, 786). There are, however, large errors associated with the

none of these need pre-date 100 ka BP. Taking the mean ages at face value 30,000 years or more separate Blombos backwards to Skhul, and forwards to Ksar Akil and Üçağizli[1]. We should therefore be cautious about inferring that "the initial appearance of Upper Palaeolithic ornament technologies was essentially simultaneous on three continents" (Kuhn *et al*. 2001: 7641) or that these simple points in time reflect "a long-lasting and widespread beadworking tradition [that] existed in Africa and the Levant" (Vanhaeren *et al*. 2006: 1788). A simultaneous emergence and continuous tradition may, of course, eventually be demonstrated beyond reasonable doubt, but for now the archaeological record does not demonstrate this and, I suggest, we should conceive of a null hypothesis – there for elimination – that the appearance of traditions of personal ornamentation varied region to region and, like the hominin populations themselves were by no means continuous.

If discontinuity and regional variation in use was the rule, it follows that symbols need not have functioned in the same ways among different groups, or for that matter between different individuals. Assuming that pigment colourants and perforated shells and beads were used to ornament the body, one can conceive of different levels of use, from the simplest - what one might argue to be non-symbolic decoration - through to concept-mediated symbolism. Such a scheme of different symbol use need not be cumulative. I suggest, for example, that one or several of the following could be in operation at any one time or place:

Decoration: the employment of colouring/ornamentation for visual effect with no associated symbolic meaning, *or* the uninformed reading of an otherwise symbolic code ('I wear red because I like red')

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coupled ESR/U-series dates from this level (including that on Skhul II at 116 +43/-24 ka BP) and the best estimate of the age of the Skhul II and IV is 98 +19/-10 ka BP (Grün *et al*. 2005) which could therefore be as young as 78 ka BP at 2σ. Phase M1 at Blombos, from which 41 perforated tick shells derive, has been dated by OSL to 75.6 ± 3.4 ka BP and by TL to 77 ± 6 ka BP (Henshilwood *et al*. 2004, 304), thus could be younger than 70 ka BP at 2σ. With one infinite conventional radiocarbon date for the open air site of Oued Djebbana, I consider it undated even though it has an Aterian attribution (Vanhaeren *et al*. 2006). Although the age of the ornaments from Üçağizli Cave are usually cited at 39-41 ka BP, the age range of five ^{14}C dates for Layer H reported by Kuhn *et al*. (2001) could indicate an age as young as 35 ka BP at 2σ, and ages for the relevant contexts at Ksar Akil are based on poor chronometric dates and estimated sedimentation rates.

Enhancement: the use of colouring/ornamentation/modification to bring out a simple (symbolic) message by enhancing existing clues ('I wear red as I know you will read it as a sign of my strength or be impressed by it')

Accessorization: the use of colouring/ornamentation/modification to make a more subtle or specific statement than enhancement by acting as a material cultural accessory to message ('I wear red as I know you will recognise it as the regalia of our clan and infer from it that were are culturally the same')

Full symbolism: the use of colouring/ornamentation/modification to make an explicit statement by acting as a full material cultural symbol that a reader can decode complex messages from ('I wear red as, like you, I am a successful hunter and have killed an adult eland; it is my right to wear this colour and I therefore command respect from all')

Time/space-factored symbolism: the incorporation of temporal and spatial dimensions into full symbolism, e.g. beliefs, myths and stories, object biographies and histories ('I wear red only at a specific time, marking the time of the year when the ancestors created this land, in honour of the creation myths and to mark out that I am the bearer of this knowledge').

A fanciful set of examples, but the problem is real: at which of these levels were the tick shells and engraved ochre fragments from Blombos Cave functioning? One, or multiple? As d'Errico and Henshilwood (2009) have noted, pigment fragments are notoriously ambiguous as they 'do not represent the direct outcome of past symbolic behaviours'. All one can do is apply a logical approach to intuitive interpretation. One might rule out simple decoration, given that one can observe redundancy in the selection of specific shells and creation of specific engravings (suggesting that each had specific meaning) but how might we confidently infer the full symbolism or time/space-factored symbolism usually assumed by archaeologists from them? The problem is particularly acute on sites with the recovery of non-engraved pigment crayons. Leaving aside the often intractable arguments that pigments could be used for more prosaic purposes (well demonstrated by Wadley 2005 although cf. Watts 1999 and Hovers *et al*. 2003), we cannot eliminate the hypothesis that the recovery of pigment 'crayons' alone refers only to decoration or enhancement. On the other side of the coin of course a sceptic might argue that if one was

to interpret Leonardo's workshop on the grounds of his pigments alone we might reduce him to decorated dunce, but one might propose that we should only confidently interpret pigment crayons alone as being indicative of full symbolism when they occur at times and places where figurative art or artificial memory systems are also known. In this case context would be critical to the elucidation of specific symbolic systems. Interpreting the data presented by McBrearty and Brooks (2000) in this light I suggest the following (I hope falsifiable) hypothesis for the emergence of these aspects of behavioural modernity in Africa:

1. Simple pigment crayons and pigment processing found before 100 ka BP and back, perhaps, to 250 ka BP or beyond represent little more than decoration or enhancement. The recovery of large numbers of fragments and, particularly, engravings on fragments or other engraved objects in association with pigments would allow us to reject this hypothesis.

2. The floruit of personal ornamentation after 100 ka BP, including traditions of engraved designs on ochre, suggests levels of accessorisation or full symbolism was in operation around 100 ka BP and after 80 ka BP.

3. True time/space-factored symbolism, in which figurative art often plays a role, did not emerge in Africa until after 40 ka years ago.

By this argument I would also suggest that the Eurasian Middle Palaeolithic record (at least 40 Neandertal sites in Europe and a handful stretching back to the Lower Palaeolithic) (d'Errico 2003) shows that some groups of *Homo neandertalensis* and *Homo heidelbergensis* engaged in decoration or enhancement. Of interest here would be the items of personal ornamentation recovered from a Châtelperronian context in Layer X of the Grotte du Renne at Arcy-sur-Cure, given that the association of symbolic items with the body would be strong indication of symbolism of at least the level of enhancement (d'Errico and Henshilwood 2009). It should at least be obvious by now that simply referring to these examples as 'symbolic' results in the meaningless attribution of 'part behavioural modernity' to the Neandertals. Such attributions take us nowhere; we need to define symbolism by deconstructing it, and we need to develop heuristic schemes that allow us to explore how we might identify levels of symbolism from the

archaeological record (and, perhaps, primatological world – a difficult task, see McGrew 2009).

The dead as symbols

The 'trait list' approach treats burial of the dead as an aspect of 'modern' behaviour, although proponents of the importance of burial do not define why it deserves to be on the list. How, for example, does placing a corpse in a shallow grave *really* differ from a female chimpanzee carrying around the body of her dead child for several days or, in one case, an entire month (e.g. Goodall 1986; Matsuzawa 2003; Pettitt 2011)? As with personal ornamentation, there is no reason why the treatment of the dead could not have differed in its symbolic function over the course of hominin evolution. Elsewhere, I argue that the social interaction of the living with the dead has a very long evolutionary history, beginning with the intellectual interest in the corpse (which I refer to as *morbidity*) that can be observed among extant primates, and became elaborated through the deliberate deposition (*mortuary caching*) of the dead at certain parts of the natural landscape, until features for caching are deliberately created (burials) and locales were given specific symbolic meaning as places for the dead (Pettitt 2011). Three examples widely separated in time and space serve as examples, the first perhaps most controversially.

The 3-3.5ma old locality AL-333/333w at Hadar (Ethiopia) lies on a steep hill slope, and yielded >200 hominin fossils representing nine adults, two juveniles and two infants (MNI=13) assigned to *Australopithecus afarensis* within a small area (Aronson and Taieb 1981; Johanson *et al*. 1982). These stand out against a poor background of mammalian fauna at the site, and seem to have been covered by sediments fairly rapidly. The lack of palaeontology suggests that there was little activity in this point of the landscape. The site stands out from other Hadar localities as it is, as Johanson and Shreeve (1989: 87) note, "…just hominids littering a hillside". The question as to how the hominin accumulation formed has attracted considerable debate. A dynamic event such as a flood can be ruled out on sedimentological grounds, and lack of carnivore modifications of the bones rules out predation; furthermore it is difficult to see how an entire group could become bogged down on a wet plain to die together on a hill. To my knowledge, no one has advanced a hypothesis that sees australopithecines as the active agents of accumulation. I propose

that at least thirteen dead individuals came to lie on the hill within a short space of time, because they had been deliberately placed there by their conspecifics. The locale seems to have been a relatively quiet area on a dynamic and dangerous landscape, perhaps given simple meaning as bodies could be placed in the long grass, minimizing the possibility that carnivores would scavenge from them. One needs invoke no specific meaning to this further than the desire to protect corpses from scavenging or even just to remove them from sight, but it is easy to see how, at some cognitive stage in hominin evolution, such places might begin to acquire meaning, and in such a case one might see this as relatively simple symbolism.

Secondly, the accumulation of the (complete) bodies of at least 32 individuals assigned to *Homo heidelbergensis* in the Sima de los Huesos ('Pit of the Bones') at Atapuerca, Spain, offers the earliest intriguing example of the use of a particular place for mortuary disposal. Between 400-500 kaBP thousands of bones accumulated in the 13m deep pit mainly comprising bears (*Ursus deningeri* MNI=166), several felids and canids, and the hominins, the latter heavily skewed towards prime adults (Arsuaga *et al*. 1997; Bischoff *et al*. 2003). Lack of decent degrees of carnivore gnawing show that they were not responsible for the deposition of the hominin bodies, and degrees of articulation, and lack of damage and considerable mixing of the hominin bones, suggest that they are either *in situ* or have not moved far. Concensus seems to be that they were deliberately placed here, perhaps at the top of the shaft which may have been open to the air at the time (Arsuaga *et al*. 1997, 2003). The lack of any archaeology in the pit save for one Acheulian biface (*ibid.*) suggests further a non-prosaic nature of the accumulation. It is difficult to see this accumulation as anything other than the deliberate caching of the dead at this one place, and if this were so, then it *must* have been given specific meaning as a place of the dead, another example of simple association of a place in the landscape with death.

Finally, a parsimonious reading of the Middle Palaeolithic record shows that between 30-40 simple inhumations of *Homo neandertalensis* are known, with more inclusive estimates approaching 60 (see Pettitt 2002 and references therein). These burials, all without the inclusion of grave goods, span the period from 80 – 34 ka BP (possibly a little earlier), and overlap with the dates for the earliest burials of *Homo sapiens* at

Qafzeh and Skhul in Israel and Mungo, Australia. Both young and old Neandertals were buried, and examples fall into distinct regional groups, notably SW France, Germany, and the Levant. Given the relatively low number of burials known despite a rich Middle Palaeolithic record, one should not simply conclude from this that 'Neandertals buried their dead'; it may be more apposite to conclude that some Neandertals buried some of their dead, some of the time, i.e. what we might call cultural variation. While it is unclear whether these simple inhumations were emplaced for prosaic reasons, the use of sites for multiple burials and the possible use of grave markers might suggest that some underlying belief accounts for the burials. The representation of multiple Neandertals among fragmentary remains at several sites is intriguing: at least 25 individuals at Krapina; 20 at L'Hortus, France, among which young adults dominate; at least 22 at La Quina, France; seven at La Ferrassie of which two are juveniles and three foeti/neonates; at least seven at Shanidar cave, Iraq and two in the Feldhoffer cave in the Neander Valley; and in Amud and Tabun caves, Israel. At La Ferrassie, several of the grave pits – those of children seem to have been covered with large boulders, one of which bore 'cup marks' (Peyrony 1934). It is tempting to view the latter as specific grave markers, and if they are, they are at least simple symbols (message: the dead lie below here). In this light, Dunbar's inclusion of Neandertals into the 'fourth level intentionality' may further support the notion that by the Late Middle Palaeolithic at least an incipient ritual had emerged.

Three points in time, showing widely different funerary practices, which might have operated at different points on the following example scale:

1. *Simple (non-symbolic) observation*: little activity beyond morbidity (investigation of the corpse, establishment that it is dead, and renegotiation of society now that a member has dropped out: 'It is dead, I am confused').

2. *Emotive (non-symbolic) interaction*: the living interact with the dead; their emotional response affects certain simple behaviours of disposal. ('It is dead, I am mourning; hide the corpse away from activity').

3. *Associative (symbolic) interaction*: the dead is associated with a specific activity at a specific place; the place symbolizes the dead. ('He is dead; he must be disposed of at a recognized place').

4. *Time/Space-factored associative interaction*: the agency of the dead is recognized in mortuary treatment (who gets special treatment, where and when) and mortuary activity is organized in time and space according to social rules. ('He is dead; he was an elder in life and has earned the right to be buried at the place of the elders').

One must of course remember that presumably, most human mortuary activity in prehistory is invisible to archaeology, but this at least shows that even for archaeologically observable mortuary activity one cannot simply argue that it is 'symbolic' in any straightforward way. I propose that simple observation and morbidity has very deep evolutionary roots (at least back to Miocene apes); that emotive interaction with the dead might have originated in the earliest hominin communities; that associative interaction with the dead (and thus a degree of symbolism) originated at least among *Homo heidelberbergensis* populations in the Middle Pleistocene and became more elaborate with *Homo neandertalensis* and early *Homo sapiens,* but that the earliest true time/space-factored associative interaction can as yet only be recognized among European Mid Upper Palaeolithic (Gravettian) burials, which represent a highly-redundant (and often pathological) sub-section of society in which social differentiation seems to have been one of the criteria governing the disposal of the dead (e.g. Zilhão and Trinkaus 2002; Zilhão 2003; Pettitt 2006; Formicola 2007).

The evolution of *Homo symbolicus*: gradual, abrupt, or fragmentary?

Despite progressivist narratives the story of hominin evolution is in a sense largely one of failure: multiple dispersals from Africa (and one assumes elsewhere) when climatic and environmental circumstances allowed, most of which resulted in local extinctions as environments shut down in response to climatic downturns associated with Heinrich events. In the long-term context as discussed above, behavioural repertoires of the Middle Stone Age and Middle Palaeolithic waxed and waned, were situationally dependent, and beyond drawing upon general repertoires, regionally independent (see Chase 1999, 2006 and papers in Hovers and Kuhn 2006). Such attenuated and regionally-differing dispersal

and behavioural trajectories provide an appropriate context for the evolution of the symbolic capacity and its expression, which itself, I argue, should have had a recursive and interrupted developmental pattern. While I have concentrated upon specific examples to try to deconstruct what archaeologists mean by 'symbolism', a general evolutionary context has been provided by Dunbar, into which, I suggest, symbolic evolution might fit.

Dunbar (2003) has interpreted brain evolution in terms of intentional states – reflexive sequences of belief states – which range from one ('I believe that…'), through typical human functioning of three, to the normal human limit of four. Although it became apparent in the *Homo symbolicus* workshop that there is considerable debate as to whether one can pigeon hole intentional states in this way and whether such a classificatory system is of heuristic use for cognitive evolution, it at least forms a useful framework within which to conceptualise symbolic evolution. To Dunbar, Theory of mind, which in modern humans emerges between 4-5 years of age, requires level 2 intention ('I believe that you believe…'). Requiring individuals to conform to social norms requires three levels of intention ('I *want* you to *believe* that you must behave how we *want*'), whereas religion, at least as we conceive of it, requires level four intention ('I have to *believe* that *you suppose* that there are supernatural beings *who understand* that *you and I desire* that things happen in a certain way'). Dunbar has suggested that levels of intentionality increased over the course of hominin evolution, and can be equated with increasing brain size, group size and grooming time. This would grant australopithecines approaching two levels of intentionality (thus a theory of mind), archaic *Homo* such as *Homo erectus* and *Homo heidelbergensis* three levels and four levels to Neandertals and anatomically modern humans. In light of the latter it is perhaps not surprising that it is with both Neandertals and modern humans that burial of the dead was from time to time practised. Might Dunbar's conclusions be relevant to the origins of symbolism?

While systems of decoration and enhancement I introduced above could function with two levels of intentionality ('*I know* that *you will be impressed*') 'true' symbolism should require three (for a full symbol to work '*I need to know* that *you understand* this *symbol/place means this*'). By extension, however, giving symbolic integration to people and places requires four ('*I need to know*, that *you understand*, that this *place gives meaning* to *this thing/person/act*'). It follows that the evolution of the symbolic capacity

(although not always accompanied by symbolic expression of that capacity) should have paralleled cognitive evolution, and it is the task of the archaeologist to identify the explicit way in which this might have occurred. In Table 1, I try to place the examples discussed above in Dunbar's context of cognitive evolution.

Intentional level	**Hominin grade**	**Dunbar's example**	**Personal ornamentation**	**Mortuary activity**
1	Pre-australopithecines & australopithecines	I believe that…	Decoration	Simple observation (I believe that you are dead)
2	Australopithecines	I believe that you believe…	Enhancement (I know you will be impressed)	Emotive interaction (I empathise that you are dead) & simple mortuary caching
3	Archaic *Homo*	I want you to believe that you must behave how we want	True symbolism (I know that you understand that this symbol means this…)	Associative symbolic caching (I know you must be deposited at a specific place)
4	*Homo neandertalensis, Homo sapiens*	I have to believe that you suppose that there are	Time/space-factored symbolism (I know, that you	Time/space-factored associative symbolism

		supernatural beings who understand that you and I desire that things happen in a certain way	understand, that this place gives meaning to this thing/person/act)	(Because of your agency, you must be disposed of in this way, by this method, at this place, as recognised by our social rules)

Table 1. Scales of the evolution of symbolism using Dunbar's (2003) concept of evolution of the social brain and personal ornamentation and mortuary activity as examples.

The difficulty, of course, will be to develop specific predictions of the archaeological record that we have a chance of addressing. With an archaeological record that is still overwhelmingly poor, particularly for Africa, and largely non-existent for much of the Old World, all we can do for now is to adopt parsimony in our interpretations. Thus I suggest that, in situations where we have only pigment fragments we need only infer decoration or enhancement; with simple burials perhaps only indicative of emotive interactions with the dead. As symbolic systems are elaborated, and in particular when they are employed in combination, one might reasonably infer more sophisticated forms of symbolism. I try to outline a set of archaeological predictions based on this notion of parsimonious interpretation in Table 2

Pigments	**Personal ornamentation**	**Figurative art**	**Burial**	**Parsimonious symbolic function**	**Chronology**
Ochre fragments/processing				Decoration	Intermittent from the Middle Pleistocene
	Personal ornamentation			Decoration	Intermittent from >100 ka
	Personal ornamentation (selection of restricted shell taxa & colouring by burning)			Enhancement, possibly accessorisation	Intermittent from >100 ka
			Simple inhumation or deposition of the body	Emotive interaction	Intermittent (probably rare) from >100 ka
Ochre fragments/processing, selection of certain colours/saturated				Enhancement or accessorisation	Intermittent from >100 ka

hues					
Ochre fragments	Personal ornamentation			Combination suggests likelihood of enhancement or accessorisation	Intermittent from >100 ka
			Multiple inhumation	Associative interaction	Intermittent from >100 ka
Ochre fragments with engraved traditions	Personal ornamentation			Accessorisation or full symbolism	Intermittent from >100 ka
			Multiple inhumation & adjunct material culture (e.g. pigments, grave goods)	Time/space-factored associative interaction	Intermittent, probably only from ~30 ka
Ochre fragments with engraved traditions	Personal ornamentation	Art		Full space/time-factored symbolism	Intermittent, probably only from ~35 ka

Table 2. Potential archaeological signatures of developing levels of symbolism, based on various combinations of pigment use, engraving, personal ornamentation, burial and art.

One cannot, of course, rule out that sophisticated symbolic systems might underlie simple manifestations of the data of concern, after all they often do in the modern world although one can at least use such an heuristic to evaluate observable levels of symbolic sophistication, if not the symbolic capacity itself. From Tables 1 and 2 I would infer that *Homo heidelbergensis* was capable of employing emotive interaction with the dead and perhaps decorative interaction with the living; *Homo neandertalensis* and early populations of *Homo sapiens* were capable of associative interaction with the dead and decorative, enhanced and accessorized interaction with the living; and only later populations of *Homo sapiens* were capable of full symbolic interaction with the living (perhaps intermittently after 80 ka BP) and that full time/space-factored interaction with both the living and the dead emerged relatively late, i.e. after 35 ka BP and was even then intermittent, probably for the duration of the Palaeolithic.

As the cognitive and behavioural capacities of *Homo sapiens* and *Homo neandertalensis* are major research interests for current palaeoanthropology it is worth comparing the two in terms of some of the symbolic behaviours discussed above. Figure 1 shows the presence or absence of personal ornamentation and burial for each taxon, further divided into two regions, the Near East and Europe, and spanning the period 100-10 ka BP. The use of continual bars to donate the presence of these phenomena contains considerable imprecision of dating methods, and thus should not necessarily be taken to represent continuity within these periods. The figure is simply a very coarse reflection of the current state of knowledge (see Pettitt 2011 for a more contextualised discussion). A few very preliminary observations can be made from this. First, for *Homo sapiens,* there is a correlation between the presence/absence of burials in both Europe and the Near East and personal ornamentation; i.e. in periods where burial was practised personal ornamentation was produced too, and this pattern holds for populations in both Europe and the Near East. The picture for the Neandertals is not as clear, although Near Eastern burials appear around the same time as those in Europe but are truncated earlier, almost certainly because Neandertals became extinct in the region earlier than they did in Europe. A clear contrast with modern humans is the lack of personal ornamentation the sole exception

being the jewellery from the Grotte du Renne at Arcy-sur-Cure, assuming it was made by Neandertals. A final observation is that there is an inverse correlation between the two taxa: in the period that some Neandertals were burying some of their dead in Europe and the Near East, we have no examples for *Homo sapiens,* who are instead practising burial and personal ornamentation before and after the Neandertal practise of these phenomena. One would not yet want to place too much emphasis on this relatively poor record, but such regional trajectories may repay the effort of further study if and when the record improves.

Conclusion

This is by necessity a speculative paper, although I draw on the current state of knowledge for archaeological phenomena that are usually thought to be indicative of symbolic thought. It may be full of holes: the data I draw upon as examples are of course open to other interpretations; my reading of the existing archaeological record may be overly-critical, and the capacity for 'symbolism' may be heuristically divided in many other ways. It is also certain that the archaeological record will change as new discoveries are made, particularly in Africa and Asia. I hope at least, however, that the paper will stimulate discussion among Palaeolithic archaeologists as to how to develop our concepts of symbolism; after two decades of debate in which symbolism has emerged as *the* human capacity, we still use rudimentary concepts of what it is and how it is to be recognised archaeologically. These discussions began at the Cape Town workshop and, I hope, will continue to run. To be successful we have to problematise what we mean by symbolism. I've made a start here and throw down a friendly gauntlet.

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References

Aronson, J. L. and Taieb, M. 1981. "Geology and palaeography of the Hadar hominid site, Ethiopia." In *Hominid Sites: Their Geologic Settings*, G. Rapp and C. F. Vondra (eds), 165-195. Westview: Boulder.

Arsuaga, J. L., Martínez, I., Gracia, A., Carretero, J. M., Lorenzo, C. and García, N. 1997. "Sima de los Huesos (Sierra de Atapuerca, Spain), the site." *Journal of Human Evolution* 3: 109-127.

Arsuaga, J. L., Carbonell, E., and Bermúdez de Castro, J. M. 2003. *The First Europeans: Treasures from the Hills of Atapuerca.* New York: American Museum of Natural History/Junta de Castilla y León.

Barham, L. 1998. "Possible early pigment use in south-central Africa." *Current Anthropology* 39: 703-710.

Bednarik, R. 2003. "A figurine from the African Acheulian." *Current Anthropology* 44 (3): 405-412.

Bischoff, J. L., Shamp, D. D., Aramburu, A., Arsuaga, J. L., Carbonell, E. and Bermudez de Castro, J. M. 2003. "The Sima de los Huesos hominids date to beyond U/Th equilibrium (>350Ka) and perhaps to 400-500 ka: new radiometric dates." *Journal of Archaeological Science* 30: 275-280.

Boyer, P. 2008. "Religion: bound to believe?" *Nature* 455: 1038-1039.

Bouzouggar, A., Barton, N., Vanhaeren, M., d'Errico, F., Collcutt, S., Higham, T., Hodge, E., Parfitt, S., Rhones, E., Schwenninger, J.-L., Stringer, C., Turner, E., Ward, S., Moutmir, A. and Stambouli, A. 2007. 82,000 year-old shell beads from North Africa and implications for the origins of modern human behavior. *Proceedings of the National Academy of Sciences.* 104 (24): 9964-9969.

Brooks, A. and Yellen, J. 2009. Was *Homo symbolicus* also *Homo sapiens*? A palaeoanthropological perspective. Pre-circulated paper for the *Homo symbolicus* symposium, Cape Town.

Chase, P. G. 1999. "Symbolism as reference and symbolism as culture." In *The Evolution of Culture*, C. Power, R. Dunbar and C. Knight (eds), 34-49. Edinburgh: Edinburgh University Press.

Chase, P. G. 2006. *The Emergence of Culture: the Evolution of a Uniquely Human Way of Life.* New York: Springer.

Dennell, R. 2008. *The Palaeolithic Settlement of Asia.* Cambridge: Cambridge University Press.

Dennell, R. and Roebroeks, W. 2005. "An Asian perspective on early human dispersal from Africa." *Nature* 438: 1099-1104.

d'Errico, F. 2003. "The invisible frontier: a multiple species model for the origin of behavioural modernity." *Evolutionary Anthropology* 12: 188-202.

d'Errico, F. and Nowell, A. 2000. "A new look at the Berrekhat Ram figurine: implications for the origins of symbolism." *Cambridge Archaeological Journal* 10 (1): 123-167.

d'Errico, F., Henshilwood, C., Lawson, G., Vanhaeren, M., Tillier, A.-M., Soressi, M., Bresson, F., Maureille, B., Nowell, A., Lakarra, J., Backwell, L. and Julien, M. 2003. "Archaeological evidence for the emergence of language, symbolism, and music – an alternative multidisciplinary perspective." *Journal of World Prehistory* 17 (1): 1-70.

d'Errico, F. and Henshilwood, C. this volume. "The origin of symbolically mediated behaviour: from antagonistic scenarios to a unified research strategy." In '*Homo Symbolicus': The Dawn of Language, Imagination, and Spirituality*, C. Henshilwood and F. d'Errico (eds). Amsterdam: John Benjamins.

Dunbar, R. I. M. 2003. "The social brain: mind, language, and society in evolutionary perspective." *Annual Review of Anthropology* 32: 163-181.

Formicola, V. 2007. "From the Sunghir children to the Romito dwarf: aspects of the Upper Palaeolithic funerary landscape." *Current Anthropology* 48 (3): 446-453.

Goodall, J. 1986. *The Chimpanzees of Gombe: Patterns of Behaviour.* Cambridge MA: Harvard University Press.

Grün, R., Stringer, C., McDermott, F., Nathan, R., Porat, M., Robertson, S., Taylor, L., Mortimer, G., Eggins, S. and McCulloch, M. 2005. "U-series and ESR analyses of bones and teeth relating to the human burials from Skhul." *Journal of Human Evolution* 49 (3): 316-334.

Henshilwood, C. and Marean, C. 2003. "The origin of modern human behaviour: critique of the models and their test implications." *Current Anthropology* 44 (5): 627-651.

Henshilwood, C. S., d'Errico, F., Vanhaeren, M., van Niekerk, K. and Jacobs, Z. 2004. "Middle Stone Age shell beads from South Africa." *Science* 304: 404.

Henshilwood, C. S., d'Errico, F. and Watts. I. 2009. "Engraved ochres from the Middle Stone Age levels at Blombos Cave." *South Africa Journal of Human Evolution* 57: 27-47.

Henshilwood, C. and d'Errico, F. this volume. "Middle Stone Age engravings and their significance to the debate on the emergence of symbolic material culture." In '*Homo Symbolicus': The Dawn of Language, Imagination, and Spirituality*, C. Henshilwood and F. d'Errico (eds). Amsterdam: John Benjamins.

Hovers, E., Ilani, S., Bar-Yosef, O. and Vandermeersch, B. 2003. "An early case of colour symbolism: ochre use by modern humans in Qafzeh Cave." *Current Anthropology* 44 (4): 491-522.

Hovers, E. and Kuhn, S. 2006. *Transitions before the Transition: Evolution and Stability in the Middle Palaeolithic and Middle Stone Age*. New York: Springer.

Johanson, D. C., Taieb, M. and Coppens, Y. 1982. "Pliocene hominids from the Hadar formation, Ehtiopia (1973-1977): stratigraphic, chonological, and paleoenvironmental contexts, with notes on hominid morphology and systematics." *American Journal of Physical Anthropology* 57: 373-402.

Johanson. D. and Shreeve J. 1989. *Lucy's Child*, *The Discovery of a Human Ancestor*. New York: Early Man Publishing, Inc.

Kuhn, S. L., Stiner, M. C., Reese, D. S. and Güleç, E. 2001. Ornaments of the earliest Upper Paleolithic: New insights from the Levant. *Proceedings of the National Academy of Sciences*. 98 (13): 7641-7646.

Marquet, J.-C. and Lorblanchet, M. 2003. "A Neanderthal face? The proto-figurine from La Roche-Cotard, Langeais (Indre-et-Loire, France)." *Antiquity* 77: 661-670.

Matsuzawa, T. 2003. *Jokro: the Death of An Infant Chimpanzee* (DVD film with associated leaflet). Kyoto: Primate Research Insititute.

McBrearty, S. and Brooks, A. 2000. "The revolution that wasn't: a new interpretation of the origin of modern human behaviour." *Journal of Human Evolution* 39: 453-563.

McGrew, W. 2009. this volume. "Pan symbolicus: a cultural primatologist's view." In '*Homo Symbolicus': The Dawn of Language, Imagination, and Spirituality*, C. Henshilwood and F. d'Errico (eds). Amsterdam: John Benjamins.

Mellars, P. 1991. "Cognitive changes and the emergence of modern humans in Europe." *Cambridge Archaeological Journal* (1): 63-76.

Mellars, P. 1995. *The Neanderthal Legacy: An Archaeological Perspective from Western Europe*. Princeton: Princeton University Press.

Pettitt, P. B. 2002. "The Neanderthal Dead: exploring mortuary variability in Middle Palaeolithic Eurasia." *Before Farming* 2002/1 (http://www.waspress.co.uk/journals/beforefarming/journal_20021).

Pettitt, P. B. 2006. "The living dead and the dead living: burials, figurines and social performance in the European Mid Upper Palaeolithic." In *Social Archaeology of Funerary Remains*, R. Gowland and C. Knüsel (eds), 292-308. Oxford: OxBow.

Pettitt, P. B. 2007. "Trajectories before the transition and revolutions that were or were not (lead review)." *Journal of Human Evolution* 53: 755-759.

Pettitt, P. B. 2011. *The Palaeolithic Origins of Human Burial.* Abingdon: Routledge.

Pettitt, P. B. in press. "Religion and ritual in the Lower and Middle Palaeolithic." In *The Oxford Handbook of the Archaeology of Ritual and Religion*, T. Insoll and R. Maclean (eds). Oxford: Oxford University Press.

Peyrony, D. 1934. "La Ferrassie: Moustérien – Périgordien – Aurignacien." *Préhistoire* 3: 1-92.

Schults, F. L. 2009. *Homo symbolicus*: science, theology and the limits of semiotic engagement. Pre-circulated paper for the *Homo symbolicus* symposium, Cape Town.

Sloane Wilson, D. this volume. "The human major transition in relation to symbolic behaviour, including language, imagination and spirituality." In '*Homo Symbolicus': The Dawn of Language, Imagination, and Spirituality*, C. Henshilwood and F. d'Errico (eds). Amsterdam: John Benjamins.

Vanhaeren, M., d'Errico, F., Stringer, C., James, S. L., Todd, J. A. and Mienis, H. K. 2006. "Middle Palaeolithic shell beads in Israel and Algeria." *Science* 312: 1185-1188.

Wadley, L. 2001. "What is cultural modernity? A general view and a South African perspective from Rose Cottage Cave." *Cambridge Archaeological Journal* 11 (2): 201-221.

Wadley, L. 2005. "Putting ochre to the test: replication studies of adhesives that may have been used for hafting tools in the Middle Stone Age." *Journal of Human Evolution* 49: 587-601.

Wadley, L. 2009. this volume. "Complex Cognition Required for Compound Adhesive Manufacture in the Middle Stone Age Implies Symbolic Capacity." In '*Homo Symbolicus': The Dawn of Language, Imagination, and Spirituality*, C. Henshilwood and F. d'Errico (eds). Amsterdam: John Benjamins.

Watts, I. 1999. "The origin of symbolic culture." In *The Evolution of Culture*, R. Dunbar, C. Knight and C. Power (eds), 113-146. Edinburgh: Edinburgh University Press.

Zilhão, J. 2003. "Burial evidence for the social differentiation of age classes in the Early Upper Palaeolithic." In *Comportements des Hommes du Paléolithique Moyen et Supérieur en Europe: Territoires et Milieux*, D. Vialou, J. Renault-Miskovsky and M. Patou-Mathis (eds), 231-241. Liège: ERAUL 111.

Zilhão, J. and Trinkaus, E. 2002. "Social implications." In *Portrait of the Artist as a Child: the Gravettian Human Skeleton from the Abrigo do Lagar Velho and its Archaeological Context*, J. Zilhão and E. Trinkaus (eds), 519-541. Lisbon: Ministério da Cultura and Instituto Português de Arquelogia,.