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Review

Pleistocene Palaeoart of Africa

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Abstract: This comprehensive review of all currently known Pleistocene rock art of Africa shows that the majority of sites are located in the continent's south, but that the petroglyphs at some of them are of exceptionally great antiquity. Much the same applies to portable palaeoart of Africa. The current record is clearly one of paucity of evidence, in contrast to some other continents. Nevertheless, an initial synthesis is attempted, and some preliminary comparisons with the other continents are attempted. Certain parallels with the existing record of southern Asia are defined.

Keywords: rock art; portable palaeoart; Pleistocene; figurine; bead; engraving; Africa

1. Introduction

Although palaeoart of the Pleistocene occurs in at least five continents (Bednarik 1992a, 2003a) [38,49], most people tend to think of Europe first when the topic is mentioned. This is rather odd, considering that this form of evidence is significantly more common elsewhere, and very probably even older there. For instance there are far less than 10,000 motifs in the much-studied corpus of European rock art of the Ice Age, which are outnumbered by the number of publications about them. By comparison, the much greater corpus of Pleistocene rock art in Australia has been almost completely ignored (Bednarik 1986, 2010) [36,54], while only two publications exist that consider the Asian body in a pan-continental perspective (Bednarik 1992, 1994a) [37,40]. In any other academic endeavour such a severe imbalance would be decried as yielding only a hopelessly inadequate record, but in rock art studies this Eurocentric perspective seems widely acceptable. Similarly, summarising the known palaeoart of Africa has not succeeded previously. The global neglect of early rock art is reflected in the very limited knowledge available about it, and the lack of interest in this topic accounts for the often sporadic and extremely patchy record available, which contrasts so sharply with the over-exposed Franco-Cantabrian cave art. This has also led to distorted perceptions about the origins of symbolism, cognitive evolution and a variety of other related subjects.

In the case of very early African palaeoart this relative lack of interest is particularly puzzling, because most Pleistocene archaeologists believe that modern humans arose in sub-Saharan Africa and from there began to spread, replacing in their wake all other humans first in Africa, then in Asia, and finally in Europe. They also believe that this was possible because this new African species was cognitively as well as technologically superior to the humans contemporary with them, termed the Robusts. Therefore it was this new species, which could not interbreed with other humans, which gave rise to art, language and any other feature of advanced humanness. It would then be obvious to search in Africa for the roots of the Upper Palaeolithic cave art these gracile Moderns are assumed to have introduced in south-western Europe around 40,000 years (ka) ago. And yet, in comparison to the enormous research efforts lavished on the French and Spanish cave art, since its authenticity was grudgingly accepted by the gatekeepers of the human past (Carteilhac 1902) [69], the efforts to trace this art tradition back to its African source have remained decidedly modest.

However, there is no evidence available currently that could reasonably be interpreted as an African antecedent of the magnificent Franco-Cantabrian cave art, which seems to suggest that it was a local development, and not introduced from elsewhere. Nevertheless, there is no doubt a great deal of Pleistocene rock art and mobiliary art in Africa, most of which has not been found or recognised so far. Even most examples that have been reported are being ignored, in favour of a very few instances that happened to have been published prominently. For instance any recent discussion of African palaeoart features one of the engraved haematite stones from Blombos Cave, yet the much more densely decorated plaque from Wonderwerk Cave receives no mention at all, despite being of almost identical age. Also mentioned frequently are the painted plaques from Apollo 11 Cave, yet they are invariably described as being of the Middle Stone Age (MSA) when in fact they are of the Later Stone Age (LSA). Thus the veracity and quality of the readily available information about the earliest palaeoart of the entire continent is so inadequate that no conclusions should be drawn from it. The present paper is an attempt to remedy this adverse state by offering a more comprehensive review of current empirical and published knowledge on this subject. This shows not only that the production of palaeoart in one form or another has a very long history in Africa; it also demonstrates how premature it would be to base far-reaching deductions on what is essentially an extremely coarse and incomplete record. It shows poignantly that we might most profitably approach this subject by first acknowledging our rather severe lacunae of knowledge about it.

Among the encumbrances affecting discussions about the scientific understanding of palaeoart are issues about the definitions of art and symbols. For instance the standard definition of palaeoart as consisting of symbols is just as precipitate as its description as art. It is more useful to see palaeoart specimens as exograms, i.e. externalised memory traces or engrams. Externally stored memory traces can be personal (not shared with conspecifics) or they can be shared (culturally determined). The difference between symbols and exograms can be illustrated by the symbol systems and communication devices primatologists use to communicate with non-human primates. These are always humanly created, whereas externally stored memory presupposes the creation of exograms. In contrast to symbols (referrers), exograms do not necessarily have referents. Whereas engrams probably do not exist (Lashley 1950) [137], exograms can be permanent, unconstrained and reformatable entities; they can be of any medium, have virtually unlimited capacity and size, and can be subjected to unlimited iterative refinement (Bednarik 2011a: 157) [55]. The concept of external engrams was first applied to non-figurative Australian cave art (Bednarik 1987) [35], before the neologism exogram was invented to name them (Donald 2001) [94]. Indeed, rock art and other palaeoart forms the only archaeological evidence available of exograms, and therefore they provide the only indices in effectively estimating the cognitive state of the hominins that used them (Bednarik 2012, 2013) [57,58].

The Pleistocene exograms known from Africa understandably resemble those of other continents, because their composition is determined by the same three factors: the faculty of hominins to store memory traces externally, the effects of taphonomy on these remains, and the aptitude of researchers in recognising them. Broadly speaking the earliest surviving exograms comprise petroglyphs, rock paintings, engraved or notched portable objects, beads and pendants, figurines, probably most instances of pigment use, and manuports. The latter category refers to natural objects that are not modified by human hand, but were collected and carried because of some inherent properties attracting the attention or curiosity of hominins. They include crystals, fossil casts and unusual or brightly coloured stones, all found in sediments where they cannot occur naturally.

2. Earlier Stone Age (ESA) and Lower Palaeolithic

The oldest such manuport so far reported is the jasperite or jaspilite cobble from the australopithecine-bearing grey breccia (Partridge 1979) [164] of the dolomite cave of Makapansgat, northern South Africa (Eitzman 1958; Bednarik 1998) [95,43]. This deposit is in the order of 2.95 million years (Ma) old (McFadden 1980; Cooke 2005) [149,79]. The cobble had been carried many kilometres to the cave, ostensibly because of its conspicuous face-like markings and red colour (Figure 1). Although a completely natural object whose geological history has been determined (Bednarik 1998, 1999) [43,44], its presence implies that the australopithecines or contemporary hominins detected its pareidolic properties, which presupposes apperceptive capability. Certainly self-awareness (Gallup 1970, 1998; Mitchell 1993, 1997, 2002; De Veer & Van Den Bos 1999; Keenan *et al.* 2003) [100,101,159,158,161, 92,133] and developed theory of mind (Premack & Woodruff 1978; Baron-Cohen 1991; Happé *et al.* 1996; Heyes 1998; Jacques & Zelazo 2005) [171,6,110,122,130] were available to these primates, be they australopithecines or early *Homo* (Bednarik 2013) [58]. A "conscious" awareness of one's appearance or that of one's conspecifics is all that is required to detect meaning in what is merely a chance product of nature. From the time it was deposited in the cave, no human ancestors are known to have existed outside of Africa, but as the stone was apparently imbued with meaning, i.e. a proto-exogram, it implies that exograms originated in Africa.

Nevertheless, this find remains very isolated, as no similar discoveries have been reported until well into the Pleistocene. In Africa, palaeoart seems to begin with beads, proto-sculptures and extensive evidence of pigment use of the Acheulian. The absence of any pigment finds in the 9-m-deep Canteen Koppie, central South Africa, despite the presence of many tens of thousands of stone tools of the early and middle Acheulian (Beaumont 2004a; McNabb & Beaumont 2011) [20,152], may well indicate that during the period covered by these sediments, from ~1.25–1.9 Ma (Helgren 1978; Gibbon *et al.* 2009; Beaumont 2011) [111,102,24], pigments were not used. Among the earliest examples are those from Mashwening 1 and Kathu Pan 1, both in central South Africa. At the first site, specularite rubble with a few flakes and a refined cleaver (Beaumont 1990a) [11] has been related to the ~0.8-Ma-old occupation at the nearby Kathu Townlands site (Beaumont 1990a, 1999a, 2004a) [11,18,20]. At Kathu Pan 1 half a dozen haematite manuports were found with a rich Acheulan assemblage (Beaumont 1990a, 2004b) [11,21] and faunal elements thought to be in the order of 0.8–1.3 Ma years old (cf. McBrearty & Brooks 2000) [148]. Of similar age, according to the associated fauna, might be a haematite fragment and a 60-mm spheroid with red staining over much of its surface (Clark *et al.* 1947; McBrearty & Brooks 2000) [77,148] from Kabwe at Broken Hill, Zambia, although a lower age has been suggested by Clark *et al.* More secure is the dating of the pigment fragments, mostly of haematite, from the Acheulian of Major Units 6 and 7 of Excavation 1 in Wonderwerk Cave, central South Africa, which on the basis of palaeomagnetic data extend back to ~1.1 Ma ago (Beaumont 1990b, 1999b, 2004c, 2011) [12,19,22,24]. Finally, the microscopic traces of red pigment detected on the Tan-Tan proto-figurine (see below) represent the world's earliest available evidence of applied pigment (Bednarik 2001, 2003b) [45,50].

Figure 1. The Makapansgat cobble, South Africa, carried to a cave and deposited almost 3 million years ago.

In contrast to the comprehensive early appearance of pigment use, mostly from the continent's south, Acheulian beads are so far limited to those of one site in the north. The ostrich eggshell beads from the Late Acheulian of El Greifa, Libyan Sahara, are about 200 ka old according to Th/U dating and other evidence (Ziegert 1995, 2007; Bednarik 1997) [212,42]. Initially only three fragmentary beads were recovered, but in 1995 the site yielded forty more specimens, found with well-preserved other organic materials, such as plant remains and snail shells, on the shore of the extensive Fezzan Lake that covered much of the region in the Pleistocene.

Figure 2. The Tan-Tan proto-figurine, Morocco, a natural object that was modified to emphasise its human form during the middle Acheulian.

The Tan-Tan proto-sculpture from a fluvial terrace deposit on the north bank of the River Draa in southern Morocco is from a rich assemblage of middle Acheulian lithics, which in this region are in the order of between 300 and 500 ka old (Figure 2). The quartzite object is of natural form, but has been modified. Five of symmetrically located eight grooves that emphasise its human form were made by careful impact, and traces of haematite suggest that it was once coated in red colour (Bednarik 2001, 2003b) [45,50]. It is one of only two known proto-sculptures of the time, the second being the probably slightly younger late Acheulian specimen from Berekhat Ram, Israel (Goren-Inbar 1986; Goren-Inbar & Peltz 1995) [104,105]. That period has also yielded a manuport from Morocco, the Triassic *Orthoceras* sp. cast from Erfoud site A-84-2 in the Sahara near the eastern border of the country (Bednarik 2002a) [46]. This fossil cast resembles a human penis closely and was found in the remains of a stone-walled dwelling or windbreak, together with Acheulian tools (Figure 3). Although such fossils are very common in northern Morocco, they do not occur naturally in this region.

Acheulian dwelling remains are found elsewhere in the Sahara (see below) and also known from India and Europe.

Figure 3. Fossil cast from Erfoud in Morocco, a late Acheulian manuport.

3. Early Middle Stone Age (EMSA)

Following on from the ESA or Acheulian pigment finds listed above, mostly from the continent's south, such evidence becomes even more numerous from the subsequent period, which is characterised by prepared cores, convergent points and usually smaller bifaces. At Kathu Pan 1 a middle Fauresmith (EMSA) assemblage yielded a number of sometimes smoothed haematite and scraped specularite manuports, brought from at least 20 km (Beaumont 1990a, 2004b; Porat *et al.* 2010) [11,170]. The stratified sediment dates from about 540 ka ago, by U-series and electron spin resonance (ESR) analyses. Pniel 6, also in central South Africa and with a middle Fauresmith industry, has produced half a dozen haematite fragments, some of which are slightly smoothed. The age of this horizon was determined through faunal remains and is believed to be in the order of 500 ka (Beaumont 1990c, 1999a, 2004d). A 4-cm-long haematite fragment with one striated face comes from a layer thought to be of similar age, at the site Nooitgedacht 2, on the Vaal River in central South Africa. This item is also from the middle Fauresmith (Butzer *et al.* 1973; Beaumont 1990d, 1999b) [65,14,19], as are the pigment manuports from three more sites in central South Africa: Biesiesput 1, Canteen Koppie and Wonderwerk Cave.

At the first of these, largely unmodified low-grade haematite fragments were excavated from ~500-ka-old occupation sediments in 1983 (Beaumont 1990e; Beaumont & Richardt 2004) [15,31]. Canteen Koppie provided an isolated cluster of three jaspilite blades and three unmodified specularite lumps, all of which were carried for at least 100 km (Beaumont 1990f, 2004a; Beaumont & McNabb 2000; McNabb & Beaumont 2011) [16,20,29,152]. This is thought to have been a cache, deposited also about 500 ka ago. The magnificent repository of Wonderwerk Cave, already listed above, has yielded over a dozen haematite and specularite pieces, some of which are smoothed or grooved. They are from EMSA occupation layers dated by U-series analysis to between 280 and >350 ka ago (Beaumont

1990b, 2004c, 2011; Beaumont & Vogel 2006) [12,22,24,34]. Again, these manuports travelled at least 50 km.

The bedded tuff layer of the Kapthurin Formation in western Kenya, between 284 and 509 ka old according to argon dating, has provided 70 red ochre pieces, over 5 kg in weight, from site GnJh-15. This material occurred together with an industry of points, blades and small handaxes of the EMSA (Cornelissen *et al.* 1990; McBrearty & Brooks 2000; McBrearty 2001: 92) [80,148,147]. More than 400 pigment pieces, mainly specularite and haematite manuports but including limonite, ochrous sandstone and manganese dioxide, come from Twin Rivers Kopje in central Zambia (Clark & Brown 2001; Barham 2000, 2002) [76,4,5]. About 3% of them show signs of modification by grinding or rubbing, and they are between 270,000 and 170,000 years old. Another two dozen pigment manuports, including specularite, haematite and limonite, were excavated in the EMSA of Zombepata Cave, northern Zimbabwe (Cooke 1971) [78]. Although undated, this material is believed to be in the order of 200 ka old. Bambata Cave and Pomongwe Cave, in south-western Zimbabwe, have also provided relevant evidence, in both cases probably older than 200 ka (Klein 1978; Walker 1987) 134,201]: a 4-cm-long haematite fragment with two smoothed sides, one deeply scored from Bambata (Armstrong 1931; Jones 1940) [2,131]; and eight pigment pieces from Pomongwe. Pigment pieces were also present in several levels of Bushman Rock Shelter, north-eastern South Africa, undated but thought to be of the EMSA (Watts 1998) [204]. The Lower Sangoan deposit of the Sai Island site in Sudan, ~200 ka old, has produced several red and yellow ochre lumps, found with a portable slab bearing cupules (van Peer *et al.* 2003) [191]. Finally Clark (1974) has reported unspecified pigment from the Acheulian site of Kalambo Falls, Zambia, which is in the order of 200 ka old.

Besides the remains identified as pigment, the EMSA of sub-Saharan Africa has also provided several other forms of manuports. These may be stones of pareidolic qualities or crystals. They are exemplified by the clusters of small water-worn pebbles and quartz crystals in the ~276 to 500-ka-old Fauresmith levels of Wonderwerk Cave, materials that have been collected a considerable distance from the site. Another feature provisionally attributed to the Fauresmith industries are the oldest currently known rock art sites of Africa, at Potholes Hoek and Nchwaneng in the southern Kalahari, South Africa (Beaumont & Bednarik 2012a, 2013) [25,27]. The Phase 1 petroglyphs at both sites, located on fully metamorphosed quartzite, are much more weathered than the adjacent Phase 2 petroglyphs, which are considerably older than the ~50 ka lower limit of the microerosion dating technique. While the Phase 2 motifs at Potholes Hoek include circles, those of Phase 1 are limited to cupules. At Nchwaneng this earliest cupule phase is provisionally attributed to an adjacent ~540-ka-old Middle Fauresmith tool scatter but this requires further substantiation. However, it is relevant that the earliest rock art in the world, at two sites in central India, also features 99.5% cupules, but is securely attributed to Mode 1 industries (pre-Acheulian). The earliest cupules credibly dated in Africa are those of Sai Island, Sudan, which are of the Lower Sangoan, ~200 ka old. Seven small cupules and one large grinding hollow or cupule occur on a 60-cm-long, fractured Nubian Sandstone slab that was found together with red and yellow ochre lumps as noted above (Van Peer *et al.* 2003) [191]. The artificially grooved and pecked phonolite cobble from Floor FLK North 1 in Bed 1, Olduvai Gorge, Tanzania, is significantly older (Leakey 1971: 269) [138], but the percussion depressions on both of its sides may well be utilitarian. Cupule-like features have been produced by chimps and other primates, resulting from such activities as cracking nuts (McGrew 1992: 205, 1993) [150,151], and Joulian (1995: Figure

5) [132] presents a *percuteur* made by chimps that resembles Leakey's specimen. Bearded capuchin monkeys (*Cebus libidinosus*) at Boa Vista, Brazil, have produced hollows and groups of mortar-like, quite deep percussion pits on horizontal rock surfaces through their skilled use of rock mauls in cracking palm nuts. These panels can closely resemble groups of mortars or large cupules (Bednarik 2011a: 66) [55], therefore the secure identification of cupules requires considerable relevant experience.

An important series of southern African palaeoart finds of the EMSA are the incised lines and notches on stone objects reported from several sites. The tabular lower grindstone with incised lines on it from Twin Rivers Kopje, central Zambia, has been dated by U-series analysis of sedimentary speleothems to greater than 400 ka (Clark & Brown 2001; Barham 2000, 2002) [76,4,5]. There is, however a possibility that this early find served utilitarian ends, which might be less likely for another lower grindstone, from Blind River Mouth, south-eastern South Africa (Laidler 1933; 1934) [135,136]. It bears a series of natural sedimentation lines that has been crossed at right angles by humanly incised or chipped lines, perhaps in reacting to the natural pattern. The age of the accompanying late EMSA assemblage has been estimated at between 270 and 540 ka (cf. Beaumont & Vogel 2006; Porat *et al.* 2010) [34,170]. The earliest unequivocal engraved plaque from Africa comes again from Wonderwerk Cave (Figure 4), where it was excavated in Major Unit 3, U-series-dated to >276 (probably ~300) ka (Beaumont & Vogel 2006) [34]. The stone plaque bears seven sub-parallel lines, which have been shown to have been made deliberately with stone tools (Bednarik & Beaumont 2012) [59]. Several very weathered engraved dolomite fragments from Bushman Rock Shelter, north-eastern South Africa, appear to be of similar age (Watts 1998; Beaumont & Vogel 2006) [204,34]. The best-preserved specimen bears numerous sub-parallel lines of V-shaped profiles. Once again the African record resembles that of Eurasia, because these objects are very similar to engraved bone and ivory plaques of closely comparable ages excavated in Europe (Bednarik 1992a, 2003a) [38,49].

Figure 4. Stone plaque bearing seven engraved lines from Wonderwerk Cave, South Africa, c. 300,000 years old.

4. Middle Stone Age (MSA)

Characterised by prepared cores, convergent points and an absence of bifaces, the MSA is ubiquitous across Africa and has provided a considerable amount of palaeoart evidence. Again, pigment manuports are listed first, and roughly in order of decreasing age. Over a dozen red ochre fragments, some abraded, occur in the lower deposits of Border Cave (Beaumont 1978; Watts 2002) [9,205]. The dates from these horizons range from 175 to 230 ka (Avery 1992; Beaumont *et al.* 1992; Grün & Beaumont 2001; Herries 2011) [3,17,108,121], and some of this material seems to originate from a large quarry at Lion Peak, about 120 km away. Ochre was excavated in the Charama levels in Bambata Cave, Zimbabwe, which are about 125 ka old (Klein 1978) [134]. Evidence suggestive of an ochre-processing workshop, comprising abalone shells, grindstones and hammerstones has been excavated in Blombos Cave, southern South Africa, and is 101 ± 4 ka old (Henshilwood *et al.* 2011) [117]. At Pinnacle Point, southern South Africa, 380 manuport ochre fragments have so far been excavated (Marean *et al.* 2007; 2010; Jacobs 2010) [143,144,126] from a level OSL-dated to ~100 ka (Watts 2010) [206]. Two small granite plaques bearing well-defined patches of ochre pigment come from Pomongwe Cave, Zimbabwe (Walker 1987) [201]. Stratum 2 in Excavation 5 of Wonderwerk Cave has yielded a haematite fragment with an abraded facet on which a series of curved lines was incised. A U-series date of 73 ka ago was secured from an immediately underlying stalagmite (Vogel 2001) [194]. From Hollow Rock Shelter, southern South Africa, come two haematite fragments, one with a series of notches on a concave ground edge, and the other thin and roughly rectangular with notches around much of the periphery (Evans 1994) [96], and thought to be around 77 ka old.

Over 1200 metric tonnes of pigment have been extracted from the haematite quarry Lion Cavern in western Swaziland (Dart 1969) [85]. Among the thousands of MSA lithics on its floor were numerous mining tools, and the minimum age of the mining activity is about 46 ka, but on the basis of tool typology it could be up to twice as old (Dart & Beaumont 1967, 1968, 1971; Beaumont & Boshier 1972; Beaumont 1973) [83,84,86,28,8]. Other evidence of pigment use of the period comes from Nswatugi, Zimbabwe, in the form of three stone slabs with ochre, >40 ka old (Walker 1987) [201]. Singer & Wymer (1982) have reported several ochre pieces with facets and striations at various MSA levels, Klasies River Mouth, southern South Africa. Ochre crayons and other pigments occurred on various levels of the MSA deposit in Apollo 11 Cave, Namibia (Wendt 1974) [207]. Undated ochre crayons with facets come from the MSA level of Kisese II, Tanzania (Inskeep 1962) [125], and more wear facets were observed on haematite from Porc Epic, Ethiopia (Clark 1988) [75].

The MSA of southern Africa has also provided cupules from a few sites. At Potholes Hoek, as mentioned above, the Phase 2 petroglyphs, featuring cupules and circles, are attributed to that technological period (Beaumont & Bednarik 2012b) [26]. Microerosion analysis suggests that they are >50 old, when calibrated via values for the climatically comparable Spear Hill site in Western Australia (Bednarik 2002b; 2002c) [47,48]. Similarly, at the Nchwaneng site (Rogers 1908; Fock & Fock 1984) [180,99], where some 640 cupules occur among iconic and non-iconic percussion petroglyphs, a small number of the cupules are being attributed to the MSA (Beaumont & Bednarik 2012b) [26]. Klipbak 1, like Potholes Hoek, is located in the Korannaberg hills on the southern fringes of the Kalahari. At this hilltop site, about 570 cupules, 40 outline circles, 30 rubbing areas, and five meandering lines also belong to the Phase 2 petroglyphs of the region, being over 50 ka old (Beaumont

& Bednarik 2012b) [26]. There are more than 300 cupules and grooves on the south wall of Rhino Cave, north-western Botswana, some of which have been linked to a rich MSA layer below via an excavated rock fragment bearing a petroglyph (Coulson et. al. 2011) [81]. The occupation deposit is undated, but it has been suggested to be of similar age as the nearby Gi site (Helgren & Brooks 1983; Brooks *et al.* 1990) [112,64], whose assemblage is between 65 and 85 ka old. Another site in north-western Botswana, Corner Cave, also features cupules linked to an MSA occupation predating 50 ka (Walker 2008, 2010; cf. Brook *et al.* 2008) [202,63].

Incised lines of portable objects, already reported from the EMSA, occur in greater numbers in more recent MSA assemblages of southern Africa. The series begins with two of the approximately 100-ka-old ochre fragments from Pinnacle Point, mentioned above (Watts 2010) [206]. One ground specimen bears an engraved chevron, the second features three notches on an edge. Several decorated items have been recovered in the Klasies River Mouth Caves: a bone shaft piece with four parallel incised lines on one face, two rib fragments with notches along edges (Singer & Wymer 1982) [185], a fractured ochre pebble with a series of sub-parallel incised lines, another piece with a single deep groove (d'Errico *et al.* 2012a) [89], and a sandstone slab with one surface largely covered by an engraved lattice pattern (Watts 1998) [204]. The MSA levels these palaeoart objects are from are approximately dated, by U-series analysis, to between 77 and 101 ka ago (Vogel 2001) [194]. Two haematite fragments from Hollow Rock Shelter, from an MSA industry estimated to be between 71 and 80 ka old (Evans 1994; Jacobs *et al.* 2008) [96,128], are also of interest. One features a series of small notches on a concave ground surface, the other is thin and roughly rectangular, bearing notches around much of its periphery. Border Cave has yielded a 3.8-cm-long rib fragment with 13 notches on an edge, 55 to 69 ka old (Miller *et al.* 1999; Grün & Beaumont 2001; Bird *et al.* 2003) [153,108,61]; a bone fragment with incised lines from Stratum 5BS, possibly 170 ka old; and a bone fragment with parallel incisions from Stratum 4BS.LR, 82 to 118 ka old (Grün & Beaumont 2001) [108].

Major Unit 2 of Excavation 5 in Wonderwerk Cave produced an engraved haematite plaque with complex engraved arrangements covering six of its seven surface facets (Bednarik & Beaumont 2012; Figure 5) [59]. This level has been dated to ~70 ka BP by U-series analysis. Several engraved items come from various MSA layers in Apollo 11 Cave. Two ostrich eggshell fragments bearing incised lines and traces of red ochre on their outer surfaces are from Layer F (Wendt 1974, 1976; Vogelsang 1998) [207,209,195], which is dated by ^{14}C to before 48 ka (Wendt 1976) [209] and by AAR to before 63–69 ka ago (Miller *et al.* 1999) [153]. Three bone (two rib) fragments that show up to 26 notches along edges are from Layer G (Wendt 1974, 1976; Vogelsang 1998; Miller *et al.* 1999; Watts 1998; Vogelsang *et al.* 2010) [207,209,153,204,196], dated by ^{14}C to before 50.5 ka (Wendt 1976) [209] and by amino acid racemisation (AAR) to before 83 ka ago (Miller *et al.* 1999) [204]. Also from an MSA context in Namibia is a small cobble from Palmenhorst/Rössing, bearing a cross-hatched engraved design closely resembling the famous Blombos Cave specimen SAMAA 8938 (Wendt 1975: 180) [208]. Two conjoining ochre fragments with cross-hatched incised lines from Klein Kliphuis Shelter, south-western South Africa (van Rijssen 1992; Mackay & Welz 2008) [192,141], are 55–66 ka old (Mackay 2006; 2010) [139]. Diepkloof Cave in south-western South Africa has furnished a total of about 270 engraved ostrich eggshell fragments (Poggenpoel 2000; Parkington *et al.* 2005; Rigaud *et al.* 2006) [169,163,176], dated by TL (thermoluminescence) and OSL (optically stimulated luminescence) to 55–65 ka BP (Feathers 2002; Tribolo *et al.* 2005; Jacobs *et al.* 2008) [98,189,128]. The patterns found on them, hatched band motif and sub-parallel lines, are among the dominant graphic forms of the world's Mode 3 traditions.

More engraved finds of the MSA include a ~60–65-ka-old trihedral fragment of red ochre with 18 notches along its three edges from Howieson's Poort Shelter, southern South Africa (Stapleton & Hewitt 1928) [186]; and a series of portable engravings excavated in Blombos Cave. These are a 2.8 cm long bone fragment with sub-parallel incised lines on it (Henshilwood & Sealy 1997; Henshilwood *et al.* 2002) [116,119], 72–77 ka old (Jacobs *et al.* 2006) [127]; and a total of 15 engraved ochre fragments, bearing parallel lines, cross-hatched designs, right-angled juxtapositions and convergent lines motifs. Three engraved pieces have been reported from Sibudu Cave in eastern South Africa: a 3.5-cm-long stone flake with five notches along an edge and six curved incised lines on the dorsal surface, from a layer dated by OSL to 33–35 ka and by ^{14}C to ~42 ka ago (Wadley 2005; Wadley & Jacobs 2004) [198,199]; a long bone fragment with five notches, dated by OSL to ~48 ka ago (Cain 2004; Wadley 2005; Jacobs & Roberts 2008) [66,198,128]; a small bone fragment with a single notch, and a 2.2-cm-long rib fragment with ten notches, both >57 ka old (Wadley & Jacobs 2004; Cain 2004, 2006) [199,66,67]. Two more engraved MSA stones from eastern South Africa are the 8.5-cm-long hornfels flake with reticulate patterns from Muden (Malan 1956) [142], and the similarly engraved 7.0-cm-long hornfels flake from Mkomanzi River (Beater 1967) [7]. This long list of hundreds of incised or notched objects of the southern African MSA is completed by a small sandstone slab with evenly spaced incised lines around much of its periphery, from the open site Caimbunji, north-eastern Angola (Clark 1963) [72], which is undated but assumed to predate 44 ka.

Figure 5. Stone plaque almost completely covered by engravings, Wonderwerk Cave, c. 70,000 years old.

Before discussing the final class of palaeoart objects, beads and pendants, one unusual object is to be considered. An anthropomorphous dolomite piece from Mumbwa Caves, Zambia, is the only proto-figurine so far proposed for the MSA (Barham 2000) [4]. Deposited during the OIS5e interval, i.e.

~120 ka ago, no modification evidence has been reported, and the probably naturally shaped stone was found in the debris associated with windbreak foundations.

Whereas the earliest ostrich eggshell beads are from Libya, those of the MSA are exclusively from the continent's south. On the other hand, the few roughly contemporary perforated objects known from northern Africa are of other materials. These are all of the early Late Pleistocene and comprise a perforated shell from Oued Djebanna, Algeria (McBrearty & Brooks 2000) [148]; a bone pendant from Grotte Zouhra, Morocco (McBrearty & Brooks 2000) [148]; and four deliberately-drilled quartzite flakes from Debenath, Nigeria, early Late Pleistocene (McBrearty & Brooks 2000) [148]. Another discovery from northern Africa is not of perforated objects, but a cairn of spheres found in the Mousterian of El Guettar, Tunisia (Gruet 1955, 1959) [106,107].

The earliest known ostrich eggshell beads in southern Africa are a few specimens from Stratum 3 of Kathu Pan, found with MSA lithics (Beaumont 1990a) [11]. The OSL date of ~290 ka for this deposit (Porat *et al.* 2010) [170] remains provisional, however. The broken 3 cm ostrich eggshell disc with central perforation from Cave of Hearths, north-eastern South Africa, is dated more realistically, at ~70 ka ago (Mason 1962, 1988; Miller *et al.* 1992; Jacobs *et al.* 2008) [145,146,154,128]. Similar beads were excavated from three different levels in Bushman Rock Shelter (Plug 1982) [168], the middle one of which is ^{14}C dated to >57 ka BP (Vogel 1969; Plug 1981) [193,167]. One single ostrich eggshell bead comes from a MSA horizon in Boomplaas Cave, southern South Africa (Deacon 1984; 1995) [87,88], that has been dated to 42–44 ka ago by ^{14}C, AAR and U-series analyses (Fairhall *et al*. 1976; Miller *et al.* 1999; Vogel 2001) [97,153,194]. Two more ostrich eggshell beads as well as several fragments of them were found in an undated MSA deposit in Loiyangalani River valley, in the Serengeti National Park, Tanzania.

Beads made from shells have been reported from three sub-Saharan MSA deposits. Blombos Cave has yielded 41 perforated *Nassarius kraussianus* seashells from a layer dated by OSL and TL to between 72 and 77 ka ago (Henshilwood *et al.* 2001, 2004, 2009; d'Errico *et al.* 2005; Jacobs *et al.* 2006) [114,115,91,127]. Two *Conus* seashell pendants come from Border Cave, one from an infant's burial (Beaumont *et al.* 1978, 1992) [9,17]; AAR, ^{14}C and ESR readings of >69 ka, >62 ka and ~74 ka, respectively refer to their age (Miller *et al.* 1992, 1999; Grün & Beaumont 2001; Bird *et al.* 2003; Grün *et al.* 2003) [154,153,108,61,109]. Klasies River Mouth Cave 1 yielded a perforated *Patella oculus* specimen (Voigt 1982; Watts 1998) [197,204], dated by ^{14}C and OSL to between 22 and 58 ka BP (Deacon 1995; Jacobs *et al.* 2008) [88,128]. Finally, there are also a few presumed stone pendants recorded in sub-Saharan Africa, although not of quartzite, like the Debenath specimens, but of much softer schist. These three stone pendants from Zombepata Cave, northern Zimbabwe, are minimum dated to 44 ka BP by ^{14}C via their deposit (Cooke 1971; d'Errico *et al.* 2005) [78,91].

5. Later Stone Age (LSA)

Evidence of the use of pigments is so common during the period of LSA technologies that it is not listed here. However, the continuation of the production of cupules, incised lines and notches on portable objects, and the production of beads and pendants is of interest, because it illustrates the continuity between the MSA and LSA traditions. Similarly, the creation of cupules at the Nchwaneng site, begun probably in the EMSA and enduring in the MSA was resumed in the LSA, to which most of the 640 cupules there are attributed (Beaumont & Bednarik 2012b) [26]. Cupules of the LSA have also been reported from Chifubwa Stream Shelter, north-western Zambia, where they occur with long and short vertical grooves and inverted U's, the latter often with a central vertical line (Clark 1958) [71]. The covering sediments provided minimum dating via ^{14}C to 13–25 ka BP (Miller 1971; Sampson 1974) [155,181].

Incised lines and notches have been reported from four sub-Saharan sites. Border Cave has yielded several such specimens: a bone point bearing a red pigment-filled incised spiral (d'Errico *et al.* 2012b) [90], a small partial bored stone with eight incised lines, and a baboon fibula with 29 notches are all about 42–43 ka old (by ^{14}C and ESR); whereas fragments of a wooden stick from the same site covered by short incised lines were directly ^{14}C dated to ~24 ka ago (d'Errico *et al.* 2012b) [90]. At White Paintings Shelter, north-western Botswana, two small bone point fragments from the lowest LSA level were covered by incised marks, and are about 35–37 ka old (Robbins *et al.* 2000a, 2012) [177,178]. A ~24-ka-old small broken bored stone (6 cm across) with incised lines radiating out from both sides of the perforation comes from Matupi Cave, north-eastern Democratic Republic of Congo (van Noten 1977) [190]. One of the bone harpoons from Ishango, far eastern Democratic Republic of Congo, has notches along one edge (~20 ka old), and a bone handle with hafted stone flake from the layer below it (~22 ka) is covered by sets of short incised lines (Clark 1970) [73].

Reports of beads and pendants increase markedly after about 20 ka, and therefore only those apparently predating that time are considered here. Mumba Shelter in central Tanzania produced numerous ostrich eggshell beads from various LSA horizons, beginning with the six lowest specimens, one of which gave an AAR age of ~52 ka (McBrearty & Brooks 2000; Diez-Martín *et al.* 2009) [148,93]. Further up, with ^{14}C, AAR and OSL dates to ~34–37 ka ago (McBrearty & Brooks 2000; Gliganic *et al.* 2012) [148,103], numerous such beads were recorded. The 17 complete or fragmentary ostrich eggshell beads found in the LSA deposits of Border Cave are, according to numerous ^{14}C and ESR determinations, 42–44 ka old (Beaumont *et al.* 1992; Grün & Beaumont 2001) [17,108], and one of them was directly dated to ~42 ka (d'Errico *et al.* 2012b) [90]. The same two layers also yielded three perforated *Nassarius krausianus* seashells. The ostrich eggshell bead-making evidence in the form of 25 finished or partly made beads in Enkapune Ya Muto Shelter, central Kenya, is ^{14}C dated to between ~41 and 44 ka ago (Ambrose 1998) [1]. A few finished beads and some preforms from White Paintings Shelter occurred in a deposit dated to 30–37 ka, but when two of them were directly dated, one yielded an age of 35 ka, the other 42 ka BP (Robbins et al. 2000b) [179]. At Kisese II Shelter, central Tanzania, ostrich eggshell beads occurred at all LSA levels subsequent to 35 ka ago (Beaumont & Vogel 1972) [33]. Kathu Pan 5 also produced such beads from throughout its LSA occupation evidence (Beaumont 1990a) [11]. At Heuningneskrans Shelter, north-eastern South Africa, four beads are ~43 ka old, another one derives from the ~23-ka-old stratum (Beaumont 1981; Miller *et al.* 1992) [10,154]. And Sehonghong Shelter in eastern Lesotho relinquished two ostrich eggshell beads from the lowest LSA level, ^{14}C dated to ~21–24 ka ago (Carter & Vogel 1974; Mitchell 1995, 1996) [70,156,157].

Iconic palaeoart of the Final Pleistocene, or painted rock art of that period generally, so common in other parts of the world, is lacking almost entirely in Africa. Clearly the elaborate Franco-Cantabrian cave art has no antecedents in Africa. The seven painted stone plaques from Apollo 11 Cave (Wendt 1974; 1976; Vogelsang 1998) [207,209,195] were traditionally attributed to the MSA, but as this industry extends back to 44 ka BP at the site (Miller *et al.* 1992; 1999) [154,153], the roughly 32-ka-old plaques are of the LSA (Beaumont & Bednarik 2012a) [25]. A stone slab excavated in Pomongwe Cave bears a painted shape that could depict the dorsal line and rump of an animal (Walker 1987; Watts 1998) [201,204], but the dating is problematic (Beaumont & Vogel 1972; Mitchell 1997) [33,158] and the specimen could be from 20 to 40 ka old. However, 16 exfoliated spalls from a wall bearing iconographic paintings in Cave of Bees, south-western Zimbabwe, were excavated in sediments dating from 12.5 to 15 ka ago, which thus provide minimum ages for the rock art above (Walker 1980, 1987) [200,201]. The only other figurative rock art in Africa so far shown to be of the Pleistocene are some bovid petroglyphs at the Qurta site in Egypt (Huyge 2009; Huyge *et al.* 2011) [123,124]. These were minimum dated by OSL to between 10±1 ka and 16±2 ka BP and have been suggested to be in the order of 15 ka old. At the Nchwaneng and Klipbak sites in the southern Kalahari, figurative petroglyphs occur in Phase 3, but they all appear to be of the Holocene. Those dated at the first site by microerosion range from E1900–E6060 years in age, while one quadruped image at Klipbak 1 is about E1600 years old (Beaumont & Bednarik 2012b) [59]. Non-iconographic paintings of the Pleistocene have only been recorded at one site, Apollo 11 Cave, where 14 ostrich eggshell fragments show well-defined lines of ochre application (Watts 1998) [204]. They are attributed to the early LSA tradition, which at this site places them between 30 and 43 ka BP (Vogelsang *et al.* 2010) [196].

6. Discussion

This wealth of Pleistocene palaeoart so far found in Africa permits some initial pronouncements about the course of these developments. The most obvious observation is perhaps that there is far more evidence in the south, although some very early finds have come from the north. This apparent imbalance is probably attributable to the intensity and priorities of regional research more than to any other factor. However, taphonomic factors are very powerful in determining the composition of any surviving archaeological record, so they certainly also need to be considered. They are proportionally greater the older the material is. Taphonomic logic (Bednarik 1994b) [41] would suggest that most exograms of hominins were of a nature that would either leave no archaeologically detectable evidence, or whose taphonomic threshold occurred during the Holocene. In either case most of the finds listed here are attributable to fluke preservation conditions. If one adds to this important factor the tendency of many if not most archaeologists to reject what they call the use of symbols prior to the appearance of *Homo sapiens sapiens*, the above list looks rather impressive. It shows that despite the taphonomic effects, adverse research bias and archaeological preconceptions, a sizeable sample of such material has been presented, and more will come to light in the future.

The nature and temporal distribution of this large corpus is precisely as taphonomic logic would predict it to be. The further one proceeds into the past, the sparser the record becomes. Similarly, the older evidence shows a distinctive bias in favour of the most deterioration-resistant classes of finds. The earliest evidence is exclusively of minerals, especially jaspilite, quartzite, haematite, specularite and quartz crystal. Materials such as bone, ostrich eggshell or shell are in no instance older than a few hundred millennia, even though they would have been much easier to work. Wooden artefacts or rock paintings are only a few tens of millennia at the most, and remain very rare from the Pleistocene. This distinctive pattern is not a cultural variable; it illustrates the distinctive effects of taphonomy. This means that the truncation of any of the material classes of evidence is a taphonomic phenomenon, and therefore such classes as wooden palaeoart objects or pigment markings should be assumed to have been produced in earlier periods as well, even if not a single specimen is found. Anything else is illogical.

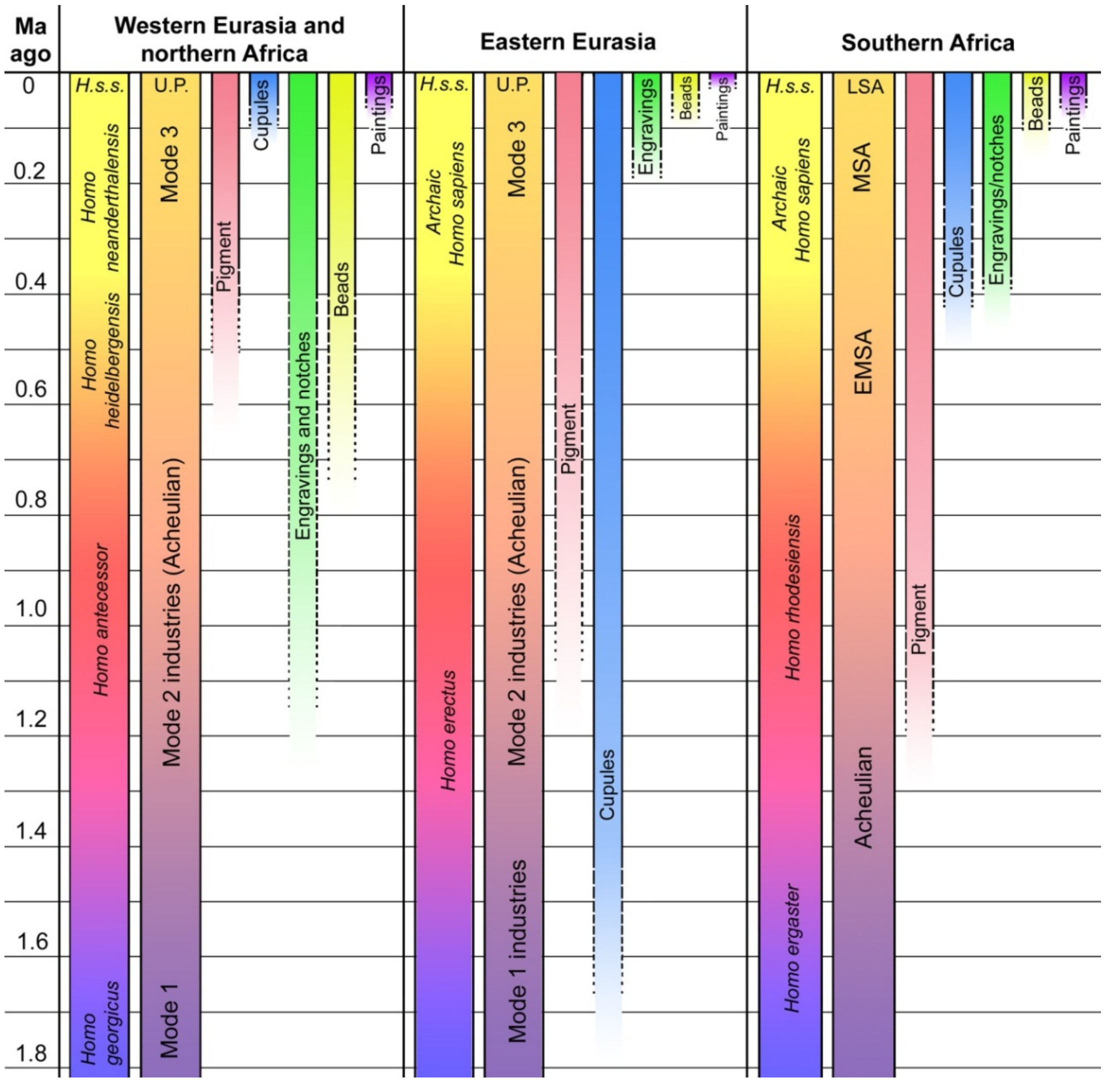
These considerations also show that to interpret the available record as representative of the cultures in question, which archaeology tends to do, must lead to misinterpretation. The record is never a representative sample, and if it is to form the basis of any interpretation it must first be seen as having been distorted by various factors. This is perhaps the main reason for the misinterpretation of hominin cognition, and for the difficulties many archaeologists have with the notion that Lower Palaeolithic societies were capable of maritime colonisation, language and exogram production, among other things (Bednarik 2012, 2013) [57,58]. Another reason relates to the archaeological notion that the available record is representative for the respective populations at the times in question. This is another logical fallacy, because more than half of the world's population of these times must be assumed to have lived along coasts, in deltas and along the lower reaches of major rivers. Rather than following the inland herds, these people were able to live in greater densities, had much greater reliability of food resources, and would have been far more sedentary. However, because the many massive fluctuations in sea level during the entire Pleistocene obliterated every single trace of these near-coastal populations, absolutely nothing is known of their cultures, technology, physiology or genetics. In other words, Pleistocene archaeology can only provide one half of the story, and even this is done inadequately.

There would be solutions to overcome these issues. For instance, to determine the differences between coastal and hinterland populations, one could examine very early occupation evidence from the shore of a lake that existed then, but disappeared because of a subsequent fall in aquifer level. Such former lakes did exist, especially in the Sahara, and such evidence is in fact available, but it is being ignored by mainstream archaeology because it is unacceptable. Budrinna, one such site, was located on the vast Fezzan Lake of the Pleistocene in Libya. Ziegert (2007, 2010) [211,212] reports that the Acheulian population on this former lake had established a village of stone huts 400 ka ago and that they buried their dead. He excavated an entire cemetery as well as a latrine, and suggested that the settlement was permanent or semi-permanent. Yet orthodox archaeology claims sedentary settlements only begin with the Neolithic, hundreds of millennia later. Because Ziegert's findings contradict the mainsteam dogma he is denied funds to continue his important work and he finds it hard to get his results published. And yet his evidence is not unique; Acheulian dwelling remains have also been reported from Morocco, elsewhere in Libya (El Greifa), Ethiopia (Melka Konture), France (Nice) and India (Bhimbetka, Daraki-Chattan).

Indeed, the palaeoart evidence from Africa is also quite consistent with that of Eurasia, at least in its broad characteristics. As in Africa, cupules form the earliest known rock art in both Asia (Bednarik *et al.* 2005) [60] and Europe (Peyrony 1934) [166]. As in Africa, there is ample Acheulian evidence of pigment use in Europe (Bednarik 1992b, 2003a) [39,49], and there are a few instances in Asia (Bednarik 1994a). The earliest engraved plaques of Africa and Europe are of almost identical ages, being around 300 ka old. Painted rock art appears only towards the end of the Pleistocene in all three continents, and except in caves remains very rare still — another taphonomic effect. In both Africa and

Asia, anthropomorphous proto-figurines appear during the Acheulian. All three continents feature very early manuports, such as quartz crystals. Although some of these consistencies can be attributed to taphonomic processes, they also reflect cultural factors. The similarities in the forms of exograms during the Early and Middle Pleistocene, and even during the first two thirds of the Late Pleistocene, are astonishing, with many stylistic conventions found over distances of tens of thousands of kilometres. It is only during the final Pleistocene, beginning about 40 ka ago, that with the rise of the Franco-Cantabrian palaeoart western Europe diverges from the rest of the Old World in this one respect. There is almost no known graphic palaeoart of figurative properties from the Pleistocene of both Africa and Asia, yet the nonfigurative traditions especially of the Mode 2 and 3 industries is consistent from southern Africa to eastern Asia (Figure 6). And there is no discernible trend in these innovations spreading from one specific centre: some occur first in Asia (e.g., petroglyphs), others are first in Europe (beads, portable engravings), some are first found in northern Africa (e.g., proto-figurines), while others again can be detected first in sub-Saharan Africa (pigment use).

Figure 6. A comparison of hominin evolution and technology in the three main regions of the Old World, showing the relative durations of the use of the major palaeoart forms in the Pleistocene. Although there are differences in the durations of some of the indices, none of the regions can be regarded as a source area for the general use of exograms.



Therefore what a comparison of palaeoart development in the various parts of the Old World shows is that innovations or stylistic memes must have travelled widely in the Pleistocene, and that most populations of humans were in contact with other groups. The notion of the replacement advocates, the believers in "African Eve", that human groups travelled through largely unpopulated expanses of land and settled wherever it suited them is fundamentally naive. By the end of the Middle Pleistocene, the entire Old World, including numerous islands, were so densely occupied by hominins that they had even been forced into the Arctic region (Norrman 1997; Schulz 2002; Schulz *et al.* 2002; cf. Pavlov *et al.* 2001) [162,182,183,165], living in temperatures below -40º. To assume, without evidence, that there were any unoccupied areas other than in deserts and high altitudes, is ingenuous. Therefore the model of wandering tribes in empty landscapes that eventually ran into the "Neanderthals" in Europe, implicit in the replacement hypothesis based on the African hoax (Protsch 1973, 1975; Protsch & Glowatzki 1974; Protsch & Semmel 1978; Henke & Protsch 1978; Bräuer 1984; Cann *et al.* 1987; Stringer & Andrews 1988) [172,173,174,175,11362,68,187], is simply unrealistic, and contradicted by all the empirical evidence (Terberger & Street 2003; Schulz 2004; Bednarik 2007, 2008a, 2008b, 2011a, 2011b) [188,184,51,52,53,55,56].

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