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CHAPTER ONE

OUTLINING THE ISSUES

Introduction

Although palaeoart of the Pleistocene occurs in at least five continents (Bednarik 1992a, 2003a), 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 in Asia and Africa. For instance there are far less than 10,000 iconographic motifs in the much-studied corpus of European rock art of the Ice Age, and they are even 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), while almost no publications have considered the corresponding Asian body in a pan-continental perspective (Bednarik 1992b, 1994a). In any other academic endeavour that needs to review a global body of evidence to arrive at a balanced perspective such a severe imbalance would be decried as yielding only a hopelessly inadequate record. But in rock art studies this Eurocentric viewpoint is so widely evident that it seems universally acceptable. The arrant neglect of non-European early global rock art is in turn reflected in the comparatively limited knowledge available about it, and the lack of interest in this topic accounts for the often sporadic and extremely patchy record available; it contrasts sharply with the attention lavished on 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 still 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 other humans contemporary with them, termed the Robusts. Therefore it was this “new species”, unable to interbreed with other humans, which gave rise to art, language and any other feature of advanced humanness. It stands to reason that 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 ka (kilo-annum, i.e. thousand years) 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), 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 fifteen engraved haematite stones from Blombos Cave, yet the much more densely decorated plaque from Wonderwerk Cave, also in South Africa, receives no mention at all, despite being of almost identical age and so much more informative about the marking tradition in question. Also mentioned frequently are the painted plaques from Apollo 11 Cave in Namibia, yet they are invariably described as being of the Middle Stone Age (MSA) when in fact they are of the Later Stone Age (LSA) (Beaumont and Bednarik 2013). 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 book is an attempt to remedy this adverse state by offering a more comprehensive review of current empirical and published knowledge on this subject, first from Africa, then also from the Americas, Asia and Australia, before focusing on Europe. This shows not only that the production and use of palaeoart in one form or another has a very long history; 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.

There are thousands, indeed tens of thousands, of publications on the Pleistocene “art” of western Europe, but only a handful of academic papers about the vastly greater body of Pleistocene palaeoart about Africa, Asia, Australia or the Americas. Since it is this incredible imbalance that this book addresses, it needs to be given particular attention. The severely distorted record resulting from this significant imbalance has been a major contributor to the slanted model of early global “art” development that has been promoted for over a century, which in turn has discouraged serious attempts to examine the available data found outside of Europe. This distortion is reflected in the listing of dozens of European sites of “Ice Age rock art” on UNESCO’s World Heritage List, where not a single such site from any other continent is listed. Some of these listed European sites, such as those in the Côa valley of northern Portugal or Siega Verde in western Spain, are not even of the Pleistocene (Bednarik 1995a, 2009). It is therefore legitimate to search for the reasons for this state of profound disparity. It feeds the illusion that “art was invented in Europe”, subconsciously reinforcing the European fantasy of cultural primacy. This is just one major effect of this imbalance, another being the unrealistic dogma of hominin cognitive evolution held by orthodox archaeology. For instance the “African hoax” (the “African Eve” model which ultimately derives from fraudulent claims; Bednarik 2008a, 2011) derives much support from this misconception.

To appreciate the magnitude of the consequences of the distortion it could be considered how credible the discipline of, for example, plate tectonics would be if 99% of its attention were focused on France and Spain alone—or indeed how any scientific field would be viewed if it held such a massive bias. That is precisely the way most current Pleistocene palaeoart studies need to be seen, and this book represents an effort to remedy a state that is detrimental not only to pre-Historic “art” studies, but more importantly to our understanding of human origins, of the beginnings of the human ability to store memory traces outside the brain, and ultimately the processes that led to the establishment of our constructs of reality. These matters are far more important to our understanding of us than the issue of “art origins”, and they simply cannot be comprehended by commencing from a severely misconstrued corpus of relevant evidence.

The nature of palaeoart

In a small effort to remedy a situation that is clearly detrimental to the credibility of the discipline and to its usefulness, the currently available evidence of Pleistocene art-like practices in all continents except Antarctica is comprehensively reviewed in this volume. Traces of human behaviour of that period that are archaeologically defined as “art” are probably not art in the modern Western sense, which is why the term "palaeoart" is preferable in defining them collectively. The term "art" derives from an ethnocentric concept: "the status of an artefact as work of art results from the ideas a culture applies to it, rather than its inherent physical or perceptible qualities. Cultural interpretation (an art theory of some kind) is therefore constitutive of an object's arthood" (Danto 1988). Westerners cannot even establish the status of recent ethnographic works with any objective understanding (Dutton 1993), because interpretation is inseparable from the art work (Danto 1986: 45). The term "palaeoart" is not intended to imply that it is a form of art; it is no more art than a peanut is either a pea or a nut, being the seed of a legume of the family *Leguminosae*. Just as we have no problem with the use of the humble peanut's name, the term palaeoart does not necessarily imply the concept of art; it merely refers to the art-like nature of palaeoart.

Another misunderstanding of ethnocentric commentators concerns the symbolic function of palaeoart (i.e. involving referent and referrer). It is perfectly possible that palaeoart was indeed symbolic, or that some of it was, but this has not been demonstrated so far and is unlikely to be determined. A much more viable alternative would be to treat palaeoart as the surviving manifestations of exograms: externalised memory traces akin to engrams (Bednarik 1987, 2014a; Donald 1991). This places a very different epistemological framework on the evidence, one that is not governed by a Eurocentric construct of reality. The question, is anything art or not, then becomes as irrelevant as it should always have been, having no scientific merit.

"Palaeoart" simply defines traces or objects that would in contemporary traditions be interpreted as manifestations of art, but whose real role is much more appropriately described as external storage of memory traces, i.e. as *exograms*. The concept of external engrams was first applied to non-figurative cave art (Bednarik 1987). Engrams, or memory traces in the human brain, have long been predicted to exist (Semon 1904, 1921) but have never been detected (Lashley 1950; Thompson 1967, 1986, 1990; Thompson et al. 1976; Steinmetz and Thompson 1991; Steinmetz et al. 1987, 1992; Christian and Thompson 2005). An engram is a hypothesised memory trace, a persistent protoplasmic alteration of neural tissue that was thought to occur upon stimulation of the brain, and accounting for memory in all animal brains. It is now assumed that there is no single biological locus of memory, but rather that there are many.

Penfield (1952, 1954) and others had managed to reactivate memory traces by stimulating the temporal lobes, but the reported episodes of recall occurred in less than 5% of subjects and could not be replicated by later neurosurgeons (e.g. Jensen 2005). However, Penfield's work has led to the concept of storage of memory traces external to the brain, at least in humans, first formally proposed by Gregory (1970: 148). The notion of such a “surrogate cortex” was then developed by Goody (1977) and Carruthers (1990, 1998), but its essence had been understood significantly earlier, by Plato. In *Phaedrus* (274e–275a), Plato noted that the use of writing fosters forgetfulness, because people were “calling things to remembrance no longer from within themselves but from external marks”. The effect of external storage, just like the storage of computer memory in an external drive, is that it can potentially increase available memory volume indefinitely, relieving the primary device of its restraints.

The first tangible proposal identifying phenomena as engram-like, externalised, “permanent” forms to which the human intellect of the creator as well as his conspecifics could refer, is in Bednarik (1987). We sought to explain very early rock art as externalisations of cognitive reference frames expressed in sensuously perceptible materials (1987: 223), as projections of neural structures (1987: 226) and as sensuously perceptible projections of neural systems (1987: 225). This paper also emphasised the significant communication potential of such engram-like phenomena, proposing that other hominins would have possessed “resonating” cerebral systems capable of response. Our subsequent assessments of the cognitive development of hominins derived from these insights (Bednarik 1990, 1992). Donald’s (1991: 308–333; 2001: 305–315) coining of the neologism “exogram” to define the concept was a welcome development, even if he was apparently unaware of both the author’s and Semon’s earlier work.

Human culture as it developed over millions of years would have been unthinkable without such external memory traces; today it is largely based on them (modern mobile telephones can be viewed as today’s ultimate exogrammatic device). But what is of particular relevance in the present context is that certain forms of exograms are readily identifiable on the archaeological record. They provide the most comprehensive indices in estimating the cognitive complexity of hominins. For instance items of personal decoration such as beads and pendants are exograms capable of conveying a large number of messages about their wearer or producer. It is clear that the faculty of self-awareness in a social animal would logically lead to strategies of consciously expressing individualism. Most such evidence is of a nature possessing very low taphonomic thresholds (Bednarik 1994b; but see McGrew and Marchant 1998 and McGrew 2004 for apparent “self-decoration” of a chimpanzee), but beads and pendants are notable exceptions (Bednarik 1997a, 2005, 2008b), providing glimpses of very early self-adornment. The several animal species indicating degrees of self-awareness (Gallup 1970, 1998; Gallup et al. 2002; Mitchell

1993, 1997, 2002; Heyes 1998; De Veer and Van Den Bos 1999; Keenan et al. 2003) are much the same as those shown to possess von Economo neurons (Seeley et al. 2006; Butti et al. 2009; Hakeem et al. 2009). These neurons seem to occur in relatively large species with large brains and extensive social networks (Bednarik 2011), and it may be that constructs of individuality evolved in tandem with these networks.

It is difficult to see how social complexity could have developed beyond that of social insects without some level of self-awareness. Since self-awareness can safely be assumed to have been present in all hominin species (because it exists in extant non-human primates), it helps account for the earliest known find implying recognition of iconic resemblance, the Makapansgat cobble (Bednarik 1998). Clearly, the pareidolic detection of human features presupposes apperceptive capability, in this instance more than 2.5 million years ago. The lack of subsequent, more direct indications of self-awareness for much of the remaining history of hominins is apparent, but in view of the generic coarse resolution of the available record as well as the relevant taphonomy (not to mention systemic archaeological neglect of such evidence) it is to be expected. Taphonomic logic (Bednarik 1994b) thus facilitates the theoretical reconstruction of the "missing" component of the archaeological record.

About this book

The purpose of this volume is to provide the first relatively comprehensive catalogue of the various types of palaeoart that have been recorded from the Pleistocene. This geological epoch, also known as the Ice Age, began about 2.588 million years ago, although up to 2009 its commencement was traditionally placed 1.8 million years ago. The Pleistocene ended 11,700 years before the present; previously its end was set at 10,500 years BP (before the present, this being the year 1950 CE). In its earliest phase this period witnessed the appearance of the first human species, and then the rise of hominins to the top of the food chain and their emergence as the major niche-creator on the planet. During the final thirty or so millennia of the Pleistocene, humans domesticated themselves, unintentionally, as cultural choices in mate selection gained momentum (Bednarik 2008c, 2011). The last 11,700 years of the Earth's history comprise the Holocene, marking the time during which the humanly caused extinction catastrophe on the planet accelerated and the human species changed the face of the Earth as well as the composition of its atmosphere.

Clearly, then, in order to understand any fundamental characteristic of humans, or the trajectory of their evolution or development, it is essential to pay close attention to the Pleistocene period. The Holocene witnessed large-scale plant and animal domestication and expanding areas of cultivated land, but the *biological* and *cognitive* nature of human beings was essentially established by the time that epoch began. To understand the origins and development of such phenomena as language ability, technologies, colonisation (including maritime colonisation), art-like production, cognition and cultural systems it is essential to delve into the origins of these developments during the Ice Age. Any phenomenon relating to humans can only be properly interpreted by recourse to its aetiology. Therefore humanistic disciplines, like psychology or psychiatry, which have no understanding of aetiological origins because they only deal with symptoms—with present-day effects rather than with causes—are not hard sciences. Sciences, in the strict sense of that description, deal with causes of effects—in addition to being limited to testable and falsifiable propositions.

This is the crux of the matter: if we are to comprehend the reasons for the human condition as it manifests itself today (Bednarik 2011)—in the way our cognition works, in the neuropathologies we suffer from, in the concepts of reality the human brain has created, in the strengths and shortcomings of our species—we need to have reliable information about certain aspects of hominin societies of the Pleistocene. More than anything else, we need dependable and scientifically based constructs of what happened in the human past, what has shaped the way we experience, the way our brain processes information. There is precious little available from the archaeological record that might help us in that quest, and the most important part of it by far are data referring to the cognitive state of our early ancestors: how did they perceive, how did they make sense of the sensory information they were capable of receiving? Clearly the only significant source of such information could come from the traces of exograms surviving on the archaeological record. But it is unfortunately true that mainstream archaeology, for the greater part, lacks an understanding of this intricate subject. Moreover, it trivialises exogrammatic data as entities comprehensible in a naive construct of reality, essentially as “art” or “symbols”, and it reports them in the cavalier fashion of an exceedingly simplistic epistemology. Instead of a cognitive archaeology it has served up myths (Bednarik 1992a, 2016), and facile fads of shamanism and the rise of that perceived crown of evolution, *Homo sapiens sapiens*. To make matters worse, archaeology has distorted the available record of palaeoart in several directions by its interpretations of it. For instance mainstream archaeology has an inadequate understanding of taphonomic logic, which is a form of logic translating raw archaeological data into propositions about the living system they refer to (Bednarik 1994b). It also selects from the available data those that tend to support preconceived dogmas, such as the "African Eve" model; or strenuously promoted fads such as the various claims relating to shamanism, religion and pseudo-psychology. Finally, because of the selectiveness in what has been reported *effectively*, many practitioners are even unaware of the bulk of the available relevant record, and form their opinions on the basis of narratives by spin doctors such as popular science writers (who according to evolutionary biologist Michael R. Rose are the "intellectual lumpenproletariat" of science; Rose 2016: 70) rather than comprehensive knowledge of what has really been reported.

This is the point of departure for the present book: the palaeoart of the Pleistocene period is the principal source available to us, of information about the cultural, cognitive and intellectual development of hominins. The fragmented nature of the way this material has been presented, and more often than not the biased consideration of it have rendered it difficult to appreciate, comprehend and consider it in a balanced fashion. What is clearly needed is a single repository of all known material that is likely to have had exogrammatic relevance to hominins of the Pleistocene. One of the greatest impediments to such a balanced assessment is that when protagonists are confronted with material they were unaware of, they inevitably try to discount it to preserve their reputations as scholars. Testing of propositions is very important to science, but rejection due to ignorance—so common in discussions about palaeoart—does not help in furthering knowledge. Therefore what is needed is a single archive of all such material that warrants consideration. The present book seeks to provide such a summary of all archaeological finds of the Pleistocene that can reasonably be assumed to have served as exograms. An attempt is made to render it comprehensive, but if we have missed any credible items we apologise in advance. However, what does make this collection particularly useful is that we have personally examined most of the key finds, having travelled the world to see specimens, collections and find sites. We have microscopically analysed most of the objects we have seen, and we have not had to rely on the judgements of others about their credibility. This means that the examples listed in this book have been subjected to precisely the same standards of rigorous proof. Moreover, a good number of the finds recorded here have been first reported by this author.

The underlying rationale of this volume is our belief that Pleistocene archaeology has fundamentally and systematically misconstrued the scientific role of palaeoart and its function in human evolution. It has regarded palaeoart as art, and forced it into the teleological straightjacket of its basically false concept of evolution. Evolution is totally dysteleological, and palaeoart does not “evolve”. Evolution does not yield “more advanced” humans any more than it produces more advanced other life forms. Subconsciously, archaeology subscribes to a religious concept of ascending development, when the human genome has in fact deteriorated rapidly for tens of millennia (Bednarik 2011, 2012, 3013, 2014b). In other words, our take on recent hominin development differs very significantly from that of all mainstream archaeologists. We believe that the cultural rise of humans had little to do with increasing intelligence or cognitive competence; rather, it is the outcome of growing competence in employing and exploiting exograms, which became the primary selecting factor in maximising cognitive fitness in the hominin species. Because of their misinterpretation of palaeoart, archaeologists have been baffled by some quite specific findings. For instance, that the iconographically most sophisticated rock art of the Upper Palaeolithic is also the earliest, when in accordance to their teleological thinking it should be the most recent, is impossible to reconcile with their thinking (Pettitt and Bahn 2003). Therefore it is essential that palaeoart be studied within an understanding of its exogrammatic role, and not by cherry-picking those specimens of it that seem to support one dogma or another.

This volume is intended to present the baseline for such an approach.

About Eve

Before presenting such a benchmark for future consideration of hominin palaeoart production it is requisite to clear up certain related misconceptions. To begin with, the palaeoart *record* currently available to us is a very different thing from the palaeoart *production*. In fact the two are separated by a veritable abyss, determined by inadequate records and, most importantly, by taphonomy. Concerning the first factor, it is self-evident that the current record is a transient state that will inevitably change in the future, when much more palaeoart has become available for consideration. The second factor is of equally fundamental effects: nearly all of the exogrammatic evidence of the Pleistocene (very probably more than 99.9%) has been lost due to deterioration processes that are all highly selective. So for instance rock art that could never survive in the open can be perfectly preserved in deep caves; or many types of portable palaeoart materials cannot survive in low pH sediments, others can survive very well in them; and most exogrammatic materials cannot survive at all for tens of millennia, except in fluke conditions. So the surviving evidence presents a grossly distorted picture, not remotely resembling the “living system” that created it. There is a tool available to compensate for this distortion, called taphonomic logic, but although it was developed more than a quarter of a century ago (in 1992; Bednarik 1994b), archaeologists have chosen not to avail themselves of it. When we add to this the effects of the second factor just mentioned—the fact that very little of what actually has survived has so far been found—the distortion increases manyfold. And when we then add to these cumulative impediments the fact that most of the known finds of Pleistocene exograms are being ignored by armchair archaeologists commenting on the cognition or palaeoart of hominins, we realise the enormity of the impairment to arriving at a credible understanding of how humans became human.

But there are other, more pernicious distorting factors contributing to this perilous state: those attributable to false but dominant dogmas in mainstream archaeology. For example there is the replacement hypothesis, better known as the "African Eve" theory. It depends greatly on ignoring the palaeoart evidence of most of the Pleistocene, because it cannot admit any evidence of cultural complexity prior to the "arrival" of what it calls "anatomically modern humans" in Europe. Its advocates therefore strive to disallow all instances of palaeoart prior to the Upper Palaeolithic. So for instance any bead or bone flute that would be universally accepted if it came from an Upper Palaeolithic context will be rejected if it was Middle Palaeolithic, simply because such finds are "forbidden" by the dogma that states the earlier people were too primitive to have such things. Alternatively, their dating may be rejected, or the competence of their presenters questioned. It has even been contended that such finds contradicting the dogma may indicate "a running ahead of time" (Vishnyatsky 1994), a particularly malignant argument. But whatever pretext is used, the objective is not to learn or to falsify; it is to preserve the dogma.

This raises the question, what is so precious about the dogma of the African Eve that it needs to be defended at the cost of disallowing a huge volume of evidence? When it is closely examined it simply dissolves in a puff of smoke. The model derives from the hoax of Professor Reiner Protsch "von Zieten" who proposed that modern humans evolved in sub-Saharan Africa (Protsch 1973, 1975), presenting subsequently a series of false datings of fossil specimens (e.g. Protsch and Glowatzki 1974; Protsch and Semmel 1978; Henke and Protsch 1978). In 2003 it was demonstrated that all his radiocarbon dates were invented (Terberger and Street 2003; Schulz 2004) and he was sacked from his university. However, in the meantime his idea had been elaborated into several derivative hypotheses, including the "Afro-European *sapiens*" model (Bräuer 1984); the "African Eve" complete replacement scenario (Cann et al. 1987; Stringer and Andrews 1988; Mellars and Stringer 1989; Vigilant et al. 1991; Tattersall 1995; Krings et al. 1997); the Pennisi (1999) model; the "wave theory" (Eswaran 2002); and the Templeton (2002) model; followed by the "assimilation theory" (Smith et al. 2005).

Of these proposals, the Eve model was promoted most vigorously by the spin doctors, despite showing major methodological flaws right from the start. Cann et al. (1987) had botched their computer modelling and its haplotype trees were irrelevant. Its arbitrarily selected haplotype tree was one of 10^{267} alternative and equally credible trees. A re-analysis could produce 10,000 haplotype trees that are more parsimonious than the one chosen by Cann et al. (Maddison 1991). Their assumptions of exclusive maternal transference of mitochondria and constancy of mutation rates of mtDNA were both false (Rodriguez-Trelles et al. 2001, 2002). In fact there is no reason why the most parsimonious haplotype tree result should even be expected to be the correct tree (Hartl and Clark 1997: 372). The entire logic is without justification and as Gibbons (1998) observed, by using the modified putative genetic clock, Eve would have lived 6000 years ago, not 200,000 years ago as Cann et al. had contended. Not surprisingly, according to all these empty speculations, the hypothetical split between these "moderns" and other humans occurred anywhere between 17,000 to 889,000 years ago (Vigilant et al. 1991; Barinaga 1992; Ayala 1996; Brookfield 1997). All of them are contingent upon purported models of human demography and the timing or number of colonisation events, and yet nothing secure is known about these factors. The same applies to the contentions referring to Y-chromosomes ("African Adam"; Hammer 1995). The divergence times projected from the diversity found in nuclear DNA, mtDNA and DNA on the non-recombining part of the Y-chromosome differ so much that a time regression of any type is extremely problematic. Contamination of mtDNA with paternal DNA has been demonstrated in extant species (Gyllensten et al. 1991; Awadalla et al. 1999; Morris and Lightowlers 2000; Williams 2002), in one recorded case amounting to 90% (Schwartz and Vissing 2002). The issues of base substitution (Lindhal and Nyberg 1972) and fragmentation of DNA (Golenberg et al. 1996) have long been known, and the point is demonstrated, for instance, by the erroneous results obtained from the DNA of insects embedded in amber (Gutierrez and Marin 1998). Other problems with interpreting or conducting analyses of palaeogenetic materials are alterations or distortions through the adsorption of DNA by a mineral matrix, its chemical rearrangement, microbial or lysosomal enzymes degradation, and lesions by free radicals and oxidation (Geigl 2002; Carlier et al. 2007).

Certainly there was never unanimous support among geneticists for the African Eve hoax (e.g. Barinaga 1992; Hedges et al. 1992; Maddison et al. 1992; Templeton 1992, 1993, 1996, 2002, 2005; Brookfield 1997; Klyosov and Rozhanskii 2012a, 2012b; Klyosov et al. 2012; Klyosov and Tomezzoli 2013). The central claim of the Eve lobby, that "Neanderthals" (Robusts) and "Moderns" (Graciles) were different species has been under review at least since Gutierrez et al. (2002) demonstrated that the pair-wise genetic distance distributions of the two human groups overlap more than claimed, if the high substitution rate variation observed in the mitochondrial D-loop region (see Walberg and Clayton 1981; Zischler et al. 1995) and lack of an estimation of the parameters of the nucleotide substitution model are taken into account. The more reliable genetic studies of living humans have shown that both Europeans and Africans have retained significant alleles from multiple robust populations (Hardy et al. 2005; Garrigan et al. 2005; cf. Templeton 2005). After the Neanderthal genome yielded results that seemed to include an excess of Gracile single nucleotide polymorphisms (Green et al. 2006), more recent analyses confirmed that Robust genes persist in recent Europeans, Asians and Papuans (Green et al. 2010). Robusts are said to have interbred with the ancestors of Europeans and Asians, but not with those of Africans (Gibbons 2010; cf. Krings et al. 1997). The African alleles occur at a frequency averaging only 13% in non-Africans, whereas those of other regions match the Robusts in ten of twelve cases. "Neanderthal genetic difference to humans must therefore be interpreted within the context of human diversity" (Green et al. 2006: 334; but note the taxonomic travesty of limiting the term "humans" to Graciles, when in reality all members of the genus *Homo* are of course humans). Sankararaman et al. (2012) report that comparisons of DNA sequences between "Neanderthals" and present-day humans have shown that the former share more genetic variants with non-Africans than with Africans. Further evidence of interbreeding, from a 40-ka-old *Homo sapiens sapiens* fossil, implies a 10% contribution of "Neanderthal" genes, suggesting "interbreeding" occurred just four generation previous (Viegas 2015). Sankararaman et al. (2014) report finding "Neanderthal" haplotypes in the genomes of 1004 present-day humans. Prüfer et al. (2014) demonstrated several gene flow events among Neanderthals, Denisovans and early modern humans, possibly including gene flow into Denisovans from an unknown archaic group. Kuhlwilm et al. (2016) analysed the genomes of a Neanderthal and a Denisovan from the Altai Mountains in Siberia together with the sequences of chromosome 21 of two Neanderthals from Spain and Croatia. They believe that a population that diverged early from other Moderns in Africa contributed genetically to the ancestors of Neanderthals from the Altai Mountains roughly 100 ka ago. They did not detect such a genetic contribution in the Denisovan or the two European Neanderthals. Therefore they concluded that in addition to later interbreeding events, the ancestors of Neanderthals from the Altai Mountains and early modern humans met and interbred many thousands of years earlier than previously thought. Finally, Vernot et al. (2016) have reported the occurrence of "Neanderthal" and "Denisovan" DNA from present Melanesian genomes.

What all this suggests is that gracile Europeans and Asians evolved largely from local robust populations, which had long been obvious from previously available evidence. For instance Alan Mann's finding that tooth enamel cellular traits showed a close link between Neanderthaloids and present Europeans, which both differ from those of Africans (Weiss and Mann 1978), had been ignored by the Eve protagonists, as has much other empirical evidence (e.g. Roginsky et al. 1954; Yakimov 1980). Cavalli-Sforza et al. (1988) considered that the phylogenetic tree separates Africans from non-Africans, a view reinforced by Klyosov et al. (2012). But whereas the first authors interpreted this as placing the origin of "modern humans" in Africa, Klyosov et al. showed that this separation continued for 160±12 ka since the split of the haplogroups A from haplogroups BT (Cruciani et al. 2002); therefore Africans and non-Africans evolved essentially separate. Contrary to Chiaroni et al. (2009), haplogroup B is neither restricted to Africa, nor is it at 64 ka remotely as old as the haplogroups A are (some of these may be older than 160 ka). In short, Graciles, "Neanderthals" and "Denisovans" were all variations of one species, *Homo sapiens*, and there is genetic continuity among them for well over 100 ka, with minimal or no African inflow. The multiple species hypothesis simply has no genetic foundation, and humans appear to have been a single breeding population for the entire Late Pleistocene.

Another flaw of the replacement model was that Cann et al. had also mis-estimated the diversity per nucleotide (single locus on a string of DNA), incorrectly using the method developed by Ewens (1983) and thereby falsely claiming greater genetic diversity of Africans, compared to Asians and Europeans. This oft-repeated claim (e.g. Hellenthal et al. 2008; Campbell and Tishkoff 2010) is false: the genetic diversity coefficients are very similar, 0.0046 for both Africans and Asians, and 0.0044 for Europeans. Even the premise of genetic diversity is false, for instance it is greater in African farming people than in African hunters-foragers (Watson et al. 1996), yet the latter are not assumed to be ancestral to the former (see e.g. Ward et al. 1991). Similarly, the contention that genetic diversity of extant humans decreases with increasing geographical distance from Africa (e.g. Atkinson 2011) is doubtful, and has no bearing on the questions of the origins of Graciles. Certainly such diversity diminishes markedly in regions first occupied in the Final Pleistocene or Holocene, which is only to be expected.

Klyosov et al. 2012, who demonstrate genetically that recent human evolution in Eurasia must have occurred in situ, list no less than 24 papers asserting that "AMHs" (see Tobias 1996 for a cogent rejection of this concept; also Latour 1995) entered Europe between 27 and 112 ka ago. Most of these nominate 40 to 70 ka as the time of the "African invasion". It would seem that these untenable propositions simply reflect archaeological estimates of a phenomenon that never actually occurred (Bednarik 2008a, 2008c, 2011, 2012, 2013).

The original impetus of the African Eve notion derived not from genetics; this field was only recruited to prop it up after the failure of palaeoanthropology to support it. Initially the model derived its momentum from the false datings of numerous hominin remains, especially in Europe. Among them were the four Stetten specimens from Vogelherd, Germany, widely claimed to be about 32 ka old (e.g. Churchill and Smith 2000a, 2000b), when in fact their Neolithic provenience had long been noted (Gieseler 1974; Czarnetzki 1983: 231) and they are between 3980±35 and 4995±35 carbon-years old (Conard et al. 2004). The Hahnöfersand calvarium, the "northernmost Neanderthal specimen found" and dated to 36,300±600 BP or 35,000±2000 BP (Bräuer 1980) by Protsch, is actually a Mesolithic "Neanderthal", at 7470±100 BP or 7500±55 BP (Terberger and Street 2003). The Paderborn-Sande skull fragment, purportedly 27,400±600 years old (Henke and Protsch 1978), is only 238±39 carbon-years old (Terberger and Street 2003). The Kelsterbach skull, dated to 31,200±1600 years BP (Protsch and Semmel 1978; Henke and Rothe 1994), is probably of the Metal Ages (Terberger and Street 2003) but has mysteriously disappeared from its safe. And the cranial fragment from Binshof, dated by Protsch to 21,300±20 BP, is in fact only 3090±45 years old.

These German finds are not the only misdated fossils from the crucial period of the "Early Upper Palaeolithic" in Europe. The "modern" Robust specimen from Velika Pećina, Croatia, is now known to be only 5045±40 radiocarbon years old (Smith et al. 1999). Those from Roche-Courbon (Geay 1957) and Combe-Capelle (originally attributed to the Châtelperronian levels; Klaatsch and Hauser 1910) are now thought to be Holocene burials (Perpère 1971; Asmus 1964), as probably is the partial skeleton from Les Cottés (Perpère 1973). The "type fossils" of early "modern" Europeans, the "Aurignacian" Crô-Magnon specimens, are not at all of modern skeletal anatomy; especially cranium 3 is quite robust. Moreover, at about 27,760 carbon-years (Henry-Gambier 2002) they are of the Gravettian and not of the Aurignacian. A similar pattern pertains to the numerous relevant Czech specimens, most of which are intermediate between robust and gracile. This includes the Mladeč sample, dated to between 26,330 and 31,500 BP (Wild et al. 2005); the very robust specimens from Pavlov and Předmostí (both between 26 and 27 ka); Podbaba (undated); and the slightly more gracile and more recent population from Dolní Věstonice. The same pattern of "intermediate" forms continues in the specimens from Cioclovina (Romania), Bacho Kiro levels 6/7 (Bulgaria) and Mießlingtal (Austria).

The earliest liminal "post-Neanderthal" finds currently available in Europe are the Peştera cu Oase mandible from Romania (Trinkaus et al. 2003), apparently in the order of 35 ka old, and the partial skull subsequently found in another part of the same cave (Rougier et al. 2007). Both lack an archaeological context and are not "anatomically modern". The six human bones from another Romanian cave, Peştera Muierii (~30 ^{14}C ka BP), are also intermediate between robust and gracile types (Soficaru et al. 2006). In fact literally hundreds of Eurasian specimens of the last third of the Late Pleistocene are intermediate between robust *Homo sapiens* and *H. sapiens sapiens*, or imply that a simplistic division between "Moderns" and "Neanderthals" is false. They include the finds from Lagar Velho, Crete, Starosel'e, Rozhok, Akhshtyr', Romankovo, Samara, Sungir', Podkumok, Khvalynsk, Skhodnya, Denisova and the older Narmada specimen, as well as several Chinese remains such as those from the Jinniushan and Tianyuan Caves. The replacement advocates ignored this obvious obstacle to their model, of numerous intermediate or liminal forms contradicting their belief that robust and gracile populations were separate species. Moreover, they failed to appreciate that not a single fully gracile specimen in Eurasia can credibly be linked to any Early Upper Palaeolithic tool tradition, be it the Aurignacian, Châtelperronian, Uluzzian, Proto-Aurignacian, Olschewian, Bachokirian, Bohunician, Streletsian, Gorodtsovian, Brynzenian, Spitzinian, Telmanian, Szeletian, Eastern Szeletian, Kostenkian, Jankovichian, Altmühlian, Lincombian or Jerzmanovician (Bednarik 2008a, 2011). Therefore their proposition that these industries were introduced from sub-Saharan Africa is without basis, especially as there are no geographically intermediate Later Stone Age finds from right across northern Africa until more than 20,000 years *after* the Upper Palaeolithic had been established in Eurasia. Similarly, the African Eve advocates ignored that at least six Early Upper Palaeolithic sites have yielded human skeletal remains attributed to Neanderthals: the

Châtelperronian layers of Saint Césaire (~36 ka) and Arcy-sur-Cure (~34 ka) in France, the Aurignacian of Trou de l'Abîme in Belgium, the Hungarian Jankovichian of Máriaremete Upper Cave (~38 ka; Gábori-Csánk 1993), the Streletsian of Sungir' in Russia (which yielded a Neanderthaloid tibia from a triple grave of "Moderns"; Bader 1978), and the Olschewian of Vindija in Croatia (Smith et al. 1999, 2005; Ahern et al. 2004). The Neanderthals at the latter site are the most recent such remains reported so far (28,020±360 and 29,080±400 carbon years BP). Like other late specimens they are much more gracile than most earlier finds—so much so that many consider them as transitional (e.g. Smith and Ranyard 1980; Wolpoff et al. 1981; Frayer et al. 1993; Wolpoff 1999; Smith et al. 2005).

The replacement paradigm is not even supported by the palaeoanthropological finds from Africa, which generally mirror the gradual changes in Eurasia through time. It is often claimed that African Graciles date from up to 200 ka ago, yet no such specimens exist. The skulls from Omo Kibish offer some relatively modern features as well as substantially archaic ones; especially Omo 2 is very robust indeed (McDougall et al. 2005). Their dating, also, is not secure, and Omo 2 is a surface find. The much more complete and better dated Herto skull, BOU-VP-16/1, is outside the range of all recent humans in several cranial measurements (White et al. 2003)—and is just as archaic as other specimens of the late Middle Pleistocene, in Africa or elsewhere. The lack of "anatomically modern" humans from sub-Saharan Africa prior to the supposed Exodus is glaring: the Border Cave specimens have no stratigraphic context; Dar es Soltan is undated; and the mandibles of Klasies River Mouth lack cranial and post-cranial remains. The Hofmeyr skull from South Africa, about 36 ka old, features intermediate morphology (Grine et al. 2007, 2010) comparable to that found in Europe at that time, e.g. in Romanian specimens. Similarly, extant Australians, with their average cranial capacity of 1264 cc (males 1347 cc, females 1181 cc, i.e. well within the range of *Homo erectus*), possess molars and other indices of robusticity matching those of Europeans several hundred millennia ago, yet they are Graciles. Their tool traditions were of Mode 3 types (Middle Palaeolithic) until mid-Holocene times, and remained so in Tasmania until European colonisation. Clearly, the guiding principle of the replacement advocates, that Mode 4 technologies were introduced together with "modern" anatomy is false, in Europe as well as elsewhere.

The scarcity of African fossils of the African Eve "species" prompted the replacement advocates to turn to the Levant for help, which would be on the route the Exodus would have presumably taken, and the Mount

Carmel finds from Qafzeh Cave and Skhul Shelter were recruited as "Moderns" (Stringer et al. 1989; Grün and Stringer 1991; Stringer and Gamble 1993; McDermott et al. 1993). Yet all of these skulls present prominent tori and receding chins, even Qafzeh 9, claimed to be of the most modern appearance. The distinct prognathism of Skhul 9 matches that of "classic Neanderthals", and the series of teeth from that cave has consistently larger dimensions than Neanderthaloid teeth. Supposedly much later "Neanderthal" burials in nearby Tabun Cave as well as the Qafzeh and Skhul material are all associated with the same Mousterian tools, and the datings of all Mount Carmel sites are far from soundly established, with their many discrepancies. The TL dates from Qafzeh, for instance, clash severely with the amino racemisation dates (ranging from 33 to 45 ka), and are in any case plagued by inversion: the lower layer 22 averages 87.7 ka, the middle layer 19 is 90.5 ka, while the uppermost layer 17 averages 95.5 ka (Mercier et al. 1993; cf. Bada and Masters Helfman 1976). Therefore the claims of 90-ka-old "modern" humans from Mount Carmel, a cornerstone in the Eve model, are unsound, and this population is best seen as transitional between robust and gracile forms, from a time when gracilisation had commenced elsewhere as well.

Turning next to the Early Upper Palaeolithic tool traditions of Eurasia, claimed to indicate the arrival of Eve's progeny there, we find that they all evolved locally. They first appear fairly simultaneously between 45 ka and 40 ka BP, even earlier, at widely dispersed locations from Spain to Siberia (e.g. Makarovo 4/6, Kara Bom, Denisova Cave, Ust'-Karakol, Tolbaga, Kamenka, Khotyk, Podzvon-kaya, Tolbor Dorolge; Bednarik 1994a). The earliest carbon date for Upper Palaeolithic stone tools was provided by Senftenberg, Austria, at >54 ka BP (Felgenhauer 1959). The Aurignacian of Spain commences at least 43 ka ago (Bischoff et al. 1994; Cabrera Valdés and Bischoff 1989). Early Upper Palaeolithic variants such as the Uluzzian (Palma di Cesnola 1976, 1989), the Uluzzo-Aurignacian, and the Proto-Aurignacian (43–33 ka BP) have been reported from southern Italy (Kuhn and Bietti 2000; Kuhn and Stiner 2001). The montane Aurignacoid tradition of central Europe, the Olschewian (42–35 ka BP), clearly developed from the region's final Mousterian (Bayer 1929; Kyrle 1931; Bächler 1940; Zotz 1951; Brodar 1957; Malez 1959; Vértes 1959; Bednarik 1993). The Bachokirian of the Pontic region (>43 ka BP), the Bohunician of east-central Europe (44–38 ka BP; Svoboda 1990; 1993), and various traditions of the Russian Plains complete the picture to the east. Some of the latter industries, such as the Streletsian, Gorodtsovian and Brynzenian derived unambiguously from Mousteroid technologies, whereas the Spitzinian or Telmanian are free of Mode 3 bifaces

(Anikovich 2005). The gradual development of Mode 3 industries into Mode 4 traditions can be observed at various sites along the Don River, in the Crimea and northern Caucasus, with no less than seven tool assemblages coexisting between 36 and 28 ka ago: Mousterian, Micoquian, Spitzinian, Streletsian, Gorodtsovian, Eastern Szeletian and Aurignacian (Krems-Dufour variant). A mosaic of early Mode 4 industries began before 40 ka BP on the Russian Plain and ended only 24–23 ka ago. In fact in the Crimea, the Middle Palaeolithic is thought to have ended only between 20–18 ka BP, which is about the same time the Middle Stone Age ended across northern Africa. In the Russian Plain, the first fully developed Upper Palaeolithic technocomplex, the Kostenkian, appears only about 24 ka ago.

The Russian succession of traditions connecting Mode 3 and 4 technocomplexes is repeated in the Szeletian of eastern Europe (43–35 ka BP; Allsworth-Jones 1986), the Jankovician of Hungary; and the Altmühlian (~38 ka BP), Lincombian (~38 ka BP) and Jerzmanovician (38–36 ka BP) further northwest. Similarly, the gradual development from the Middle Palaeolithic at 48 ka BP (with "Neanderthal" footprints of small children) to the Upper Palaeolithic is clearly documented in Theopetra Cave, Greece (Kyparissi-Apostolika 2000; Facorellis et al. 2001). Thus there is a complete absence of evidence in the presumed eastern or southeastern entry region of Europe, of an intrusive technology arriving from the Levant. Nor should it be expected, considering that in the Levant both Mode 3 and Mode 4 industries were used by robust as well as more gracile populations: the replacement advocates' notion that their "Moderns" introduced Mode 4 in Europe is refuted by all archaeological evidence. The Mousteroid traditions of the Levant developed gradually into blade industries, e.g. at el-Wad, Emireh, Ksar Akil, Abu Halka and Bileni Caves, and that region's Ahmarian is transitional. This can be observed elsewhere in southwestern Asia, for instance the Aurignacoid Baradostian tradition of Iran clearly develops in situ from Middle Palaeolithic antecedents. The late Mousterian of Europe is universally marked by regionalisation (Kozłowski 1990; Stiner 1994; Kuhn 1995; Riel-Salvatore and Clark 2001), miniaturisation and increasing use of blades, as well as by improved hafting technique. This includes the use of backed or blunted-back retouch on microliths set in birch resin in Germany, almost as early as the first use of microlithic implements in the Howieson's Poort tradition of far southern Africa. Therefore the notion that a genetically and palaeoanthropologically unproven people with a Mode 4 tool set travelled from sub-Saharan Africa across northern Africa is completely unsupported, while there is unanimous proof that these traditions developed in situ in many Eurasian regions long before they reached either northern Africa or the Levant.

Precisely the same applies to palaeoart. The replacement advocates relied considerably on the unassailability of their belief that the EUP traditions, especially the Aurignacian, were by "AMHs" (Graciles). As mentioned above, there are no unambiguous associations between "AMHs" and any of the many identified EUP tool traditions, including the Aurignacian. These "cultures", as they are called, are in any case merely etic constructs, "observer-relative or institutional facts" (Searle 1995); as "archaeofacts" or "egofacts" (Consens 2003) they have no real, emic existence. They are entirely made up of invented (etic) tool types and based on the misunderstanding in Pleistocene archaeology that tools are diagnostic for identifying cultures. The authentic cultural variables of Pleistocene archaeology have never been employed in creating the period's cultural nomenclature. Cultures are defined by cultural variables, but Pleistocene archaeology as it is conducted relegates the cultural information available (such as rock art and portable "art") to marginal rather than central status, forcing it into the false technological framework it has created.

One of the effects of this misunderstanding has a direct bearing on the "African Eve hypothesis". Among the EUP traditions its advocates attribute to AMHs, the Châtelperronian was in 1979 discovered to be the work of Neanderthals. But the Châtelperronian of Arcy-sur-Cure in France had produced numerous portable palaeoart objects, including beads and pendants (Figure 1). So the Eve supporters argued that the primitive Neanderthals, incapable of symbolling, must have "scavenged" and used these artefacts (White 1993; Hublin et al. 1996). They failed to explain, however, why such primordial creatures would possibly scavenge symbolic objects and what they would do with them. This is one of numerous examples of the accommodative reasoning of the replacement advocates; others can be found in d'Errico (1995), d'Errico and Villa (1997) and Rigaud et al. (2009); or in the assertion that Early Pleistocene seafaring colonisers (Bednarik 1997b, 1999, 2003b) might have drifted on vegetation. After it was first observed that there is no evidence linking early Aurignacian finds to the purported Moderns (Bednarik 1995b), it was proposed that no such link exists to any EUP industry (Bednarik 2007, 2008a). The contention that the Aurignacian rock art (e.g. in Chauvet Cave, l'Aldène, Baume Latrone, Zarzamora Cave, El Castillo) and portable palaeoart (e.g. in Hohlenstein), arguably the most complex and sophisticated of the entire Upper Palaeolithic, is the work either of "Neanderthals" or of their direct descendants (Bednarik 2007, 2008a, 2011; Sadier et al. 2012) has demolished the last vestiges of support for the “African Eve hypothesis”. It now stands thoroughly refuted. The record shows unambiguously that the Upper Palaeolithic of Eurasia developed in situ, that the hominins in question evolved in situ, and that introgression can account fully for the genetic observations. “Modern” or gracile humans derive from archaic *H. sapiens* in four continents; the two forms of the same species interbred no more than grandchildren breed with their grandparents.

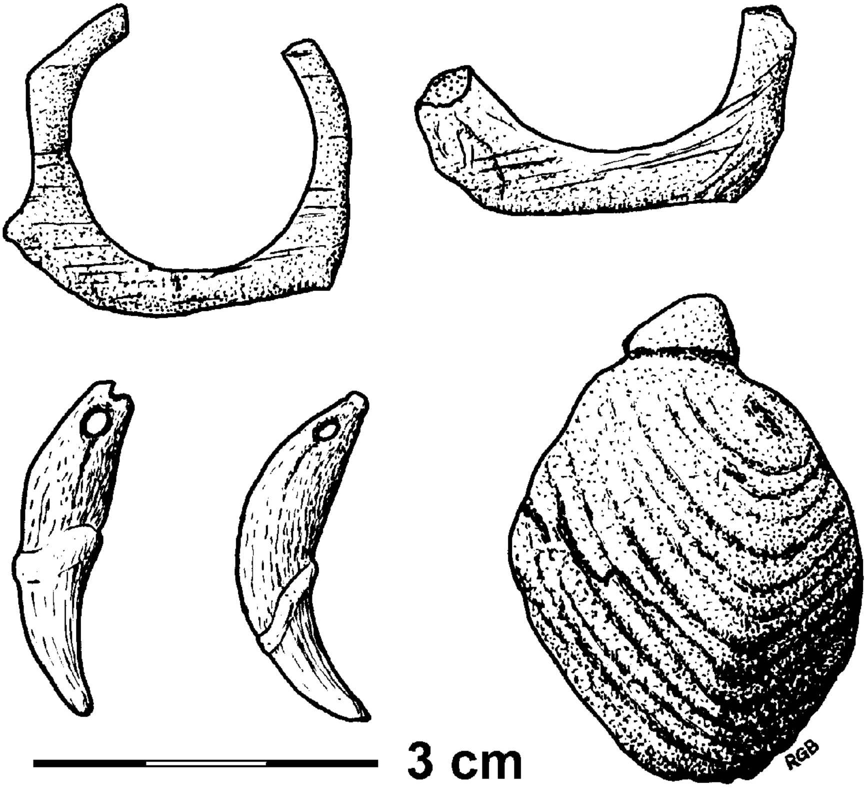

Figure 1. *Some of the jewellery from the Châtelperronian of Grotte du Renne, Arcy-sur-Cure, Yonne, France, made by “Neanderthals”.*

Summing up

The collapse of the replacement or African Eve hypothesis, still strongly resisted by its most ardent supporters (Mellars 2005; Stringer 2014), comes as no surprise. It was originally based on an academic scam, developed by scholars with inadequate understanding of the investigative tools they used and promoted by academic interests capable of silencing dissent through “peer review”. The history of this model provides a classic study of the hegemonic operation of the disciplines of palaeoanthropology and Pleistocene archaeology, controlled by their “high priests” (Thompson 2014) or “mob capos” (Kohl and Fawcett 2000). It is not just a matter of these disciplines having been misled by their high-ranking operatives; what is more startling is that most of the information contradicting their paradigm has long been available. The potential argument, that the genetic counter-evidence has become available only most recently, does not stand up, because the sum total of all other relevant data has to a large extent been obtainable for decades. The simple truth of the matter is that the African Eve advocates were inadequately aware of it, and on that basis have prevented its effective publication in many cases.

This will become evident throughout this book. Some of the most important indications of the replacement model’s falseness are the Early Pleistocene maritime colonisation evidence (Bednarik 1997b, 1999, 2003b, 2015) and the early appearance of palaeoart, which is being presenting in this volume. This material shows starkly that the ancients could not have been as primitive as African Eve’s apostles have always maintained. But importantly, the evidence presented on these pages is unambiguous on one issue: this has been known for a long time. It simply had never before been summarised effectively.

References

Ahern, J. C. M., I. Karavanic, M. Paunović, I. Janković and F. H. Smith 2004. New discoveries and interpretations of fossil hominids and artifacts from Vindija Cave, Croatia. *Journal of Human Evolution* 46: 25–65.

Allsworth-Jones, P. L. 1986. The Szeletian: main trends, recent results, and problems for resolution. In M. Day, R. Foley and Wu Rukang (eds), *The Pleistocene perspective*, pp. 1–25. World Archaeological Congress, Southampton 1986. Allen and Unwin, London.

Anikovich, M. 2005. Early Upper Paleolithic cultures of eastern Europe. *Journal of World Prehistory* 6(2): 205–245.

Asmus, G. 1964. Kritische Bemerkungen und neue Gesichtspunkte zur jungpaläolithischen Bestattung von Combe-Capelle, Périgord. *Eiszeitalter und Gegenwart* 15: 181–186.

Atkinson, Q. D. 2011. Phonemic diversity supports a serial founder effect model of language expansion from Africa. *Science* 332: 346–349.

Awadalla, P., A. Eyre-Walker and J. Maynard Smith 1999. Linkage disequilibrium and recombination in hominid mitochondrial DNA. *Science* 286: 2524–2525.

Ayala, F. J. 1996. Response to Templeton. *Science* 272: 1363–1364.

Bächler, E. 1940. *Das alpine Paläolithikum der Schweiz*. Monographien zur Ur- und Frühgeschichte der Schweiz, Vol. 2, Basle.

Bada, J. and P. Masters Helfman 1976. Application of amino acid racemization dating in paleoanthropology and archaeology. *Extrait du Colloque de l'U.I.S.P.P.*, Union Internationale des Sciences Préhistoriques-Protohistoriques, pp. 39–63.

Bader, O. N. 1978. *Sungir': verkhnepaleoliticheskaya stoyanka*. Izdatel'stvo "Nauka", Moscow.

Barinaga, M. 1992. "African Eve" backers beat a retreat. *Science* 255: 686–687.

Bayer, J. 1929. Die Olschewakultur. *Eiszeit und Urgeschichte* 6: 83–100.

Beaumont, P. B and R. G. Bednarik 2013. Tracing the emergence of palaeoart in sub-Saharan Africa. *Rock Art Research* 30(1): 33–54.

Bednarik, R. G. 1986. Parietal finger markings in Europe and Australia. *Rock Art Research* 3: 30–61, 159–170.

Bednarik, R. G. 1987. Engramme und Phosphene. *Zeitschrift für Ethnologie* 112(2): 223–235.

Bednarik, R. G. 1992a. Palaeoart and archaeological myths. *Cambridge Archaeological Journal* 2(1): 27–43.

Bednarik, R. G. 1992b. The Paleolithic art of Asia. In S. Goldsmith, S. Garvie, D. Selin and J. Smith (eds), *Ancient images, ancient thought: the archaeology of ideology*, pp. 383–390. Proceedings of the 23rd Annual Chacmool Conference, University of Calgary.

Bednarik, R. G. 1993. Wall markings of the cave bear. *Studies in Speleology* 9: 51–70.

Bednarik, R. G. 1994a. The Pleistocene art of Asia. *Journal of World Prehistory* 8(4): 351–375.

Bednarik, R. G. 1994b. A taphonomy of palaeoart. *Antiquity* 68: 68–74.

Bednarik, R. G. 1995a. The age of the Côa valley petroglyphs in Portugal. *Rock Art Research* 12(2): 86–103.

Bednarik, R. G. 1995b. Concept-mediated marking in the Lower Palaeolithic. *Current Anthropology* 36(4): 605–634.

Bednarik, R. G. 1997a. The global evidence of early human symboling behaviour. *Human Evolution* 12(3): 147–168.

Bednarik, R. G. 1997b. The origins of navigation and language. *The Artefact* 20: 16–55.

Bednarik, R. G. 1998. The “australopithecine” cobble from Makapansgat, South Africa. *South African Archaeological Bulletin* 53: 4–8.

Bednarik, R. G. 1999. Maritime navigation in the Lower and Middle Palaeolithic. *Comptes Rendus de l’Académie des Sciences Paris*, Earth and Planetary Sciences 328: 559–563.

Bednarik, R. G. 2003a. The earliest evidence of palaeoart. *Rock Art Research* 20(2): 89–135.

Bednarik, R. G. 2003b. Seafaring in the Pleistocene. *Cambridge Archaeological Journal* 13(1): 41–66.

Bednarik, R. G. 2005. Middle Pleistocene beads and symbolism. *Anthropos* 100(2): 537–552.

Bednarik, R. G. 2007. Antiquity and authorship of the Chauvet rock art. *Rock Art Research* 24(1): 21–34.

Bednarik, R. G. 2008a. The mythical Moderns. *Journal of World Prehistory* 21(2): 85–102.

Bednarik, R. G. 2008b. Beads and the origins of symbolism. *Time and Mind: The Journal of Archaeology, Consciousness and Culture* 1(3): 285–318.

Bednarik, R. G. 2008c. The domestication of humans. *Anthropologie* 46(1): 1–17.

Bednarik, R. G. 2009. Fluvial erosion of inscriptions and petroglyphs at Siega Verde, Spain. *Journal of Archaeological Science* 36(10): 2365–2373.

Bednarik, R. G. 2010. Australian rock art of the Pleistocene. *Rock Art Research* 27(1): 95–120.

Bednarik, R. G. 2011. *The human condition*. Springer, New York.

Bednarik, R. G. 2012. The origins of human modernity. *Humanities* 1(1): 1–53.

Bednarik, R. G. 2013. African Eve: hoax or hypothesis? *Advances in Anthropology* 3(4): 216–228; *http://www.scirp.org/journal/PaperInformation.aspx?PaperID=39900#.U5JvUnYUqqY*

Bednarik, R. G. 2014. Exograms. *Rock Art Research* 31(1): 47–62.

Bednarik, R. G. 2014b. Doing with less: hominin brain atrophy. *HOMO—Journal of Comparative Human Biology* 65: 433−449.

Bednarik, R. G. 2015. *The first mariners*, 3rd edn. Bentham Science Publishers, Oak Park, IL.

Bednarik, R. G. 2016. *Myths about rock art*. Archaeopress, Oxford.

Bischoff, J. L., K. R. Ludwig, J. F. Garcia, E. Carbonell, M. Vaquero, T. W. Stafford and A. J. T. Jull 1994. Dating of the basal Aurignacian sandwich at Abric Romani (Catalunya, Spain) by radiocarbon and uranium series. *Journal of Archaeological Science* 21: 541–551.

Bräuer, G. 1980. Die morphologischen Affinitäten des jungpleistozänen Strinbeins aus dem Elbmündungsgebiet bei Hahnöfersand. *Zeitschrift für Morphologie und Anthropologie* 71: 1–42.

Bräuer, G. 1984. Präsapiens-Hypothese oder Afro-europäische Sapiens-Hypothese? *Zeitschrift für Morphologie und Anthropologie* 75: 1–25.

Brodar, S. 1957. Zur Frage der Höhlenbärenjagd und des Höhlenbärenkults in den paläolithischen Fundstellen Jugoslawiens. *Quartär* 9: 147–159.

Brookfield, J. F. Y. 1997. Importance of ancestral DNA ages. *Nature* 388: 134.

Butti, C., C. C. Sherwood, A. Y. Hakeem and J. M. Allman 2009. Total number and volume of von Economo neurons in the cerebral cortex of cetaceans. *Journal of Comparative Neurology* 515(2): 243–259.

Cabrera Valdés, V. and J. Bischoff 1989. Accelerator ^{14}C dates for Early Upper Palaeolithic (Basal Aurignacian) at El Castillo Cave (Spain). *Journal of Archaeological Science* 16: 577–584.

Campbell, M. C. and S. A. Tishkoff 2010. The evolution of human genetic and phenotypic variation in Africa. *Current Biology* 20: R166–R173.

Cann, R. L., M. Stoneking and A. C. Wilson 1987. Mitochondrial DNA and human evolution. *Nature* 325: 31–36.

Carlier, L., J. Couprie, A. le Maire, L. Guilhaudis, I. Milazzo, M. Gondry, D. Davoust, B. Gilquin and S. Zinn-Justin 2007. Solution structure of the region 51-160 of human KIN17 reveals an atypical winged helix domain. *Protein Science* 16: 2750–2755.

Carruthers, M. 1990. *The book of memory.* Cambridge University Press, Cambridge.

Carruthers, M. 1998. *The craft of thought*. Cambridge University Press, Cambridge.

Cartailhac, E. 1902. Les cavernes ornées de dessins. La grotte d'Altamira, Espagne. "Mea culpa d'un sceptique". *L'Anthropologie* 13: 348–354.

Cavalli-Sforza, L. L., A. Piazza, P. Menozzi and J. Mountain 1988. Reconstruction of human evolution: Bringing together genetic, archaeological, and linguistic data. *Proceedings of the National Academy of Sciences, U.S.A.* 85: 6002–6006.

Chiaroni, J., P. A. Underhill and L. L. Cavalli-Sforza 2009. Y-chromosome diversity, human expansion, drift, and cultural evolution.