Rethinking the human revolution

Edited by Paul Mellars, Katie Boyle, Ofer Bar-Yosef & Chris Stringer
Chapter 12

Down with the Revolution

Sally McBrearty

The European Upper Palaeolithic is a wondrous thing. European archaeologists have rightly been fascinated by its richness, inventiveness and sheer volume: elegant and variable flint tools, human burials with striking ornaments, superb and enigmatic art objects, painted caves with skillfully rendered depictions of extinct Ice Age animals, and even individual portraits of people dead for tens of thousands of years. The Middle to Upper Palaeolithic transition in Europe is equally riveting. It is the last time, except perhaps on the island of Flores 18,000 years ago (Brown et al. 2004; Morwood et al. 2004), when human beings actually beheld a member of another species of their own genus. These phenomena provide a source of justified and never-ending fascination, but what have they got to do with the origin of human beings, language or symbolic thought? Nothing much. No more than the equally stunning material culture of the Natufian, of Angkor Wat, of Tudor England, of Great Zimbabwe, of Beijing’s Forbidden City, or of twentieth-century Manhattan. But by a series of historical accidents, the European Upper Palaeolithic became the model for what it means to be human. I will argue here that this practice hampers our understanding of past events and reveals the persistence of a regrettable attitude of European superiority. The European Upper Palaeolithic is important as a local archaeological phenomenon, but has no relevance for explaining how, when or why sophisticated behaviour, advanced cognition, or spoken language originated.

In nearly every undergraduate textbook that has dealt with the subject of human origins in the last 30 years, the early stages in the human evolutionary career occur in Africa. The culture is simple, the creatures ape-like, the time remote. But as the timeline approaches the present, inexplicably the focus switches to Europe. As in a traditional hero myth (cf. Landau 1991), the brave colonizers venture into strange and hostile terrain, test their mettle against the challenges of the glacial landscape, rise to the occasion by force of will and intellect, and achieve the goal of true humanity. The African homeland rarely merits a mention in the final chapter.

When I was an undergraduate, it was still possible to entertain the possibility that Neanderthals, the sole inhabitants of Europe for most of the Middle and Later Pleistocene, were the ancestors of *Homo sapiens*. The dramatic difference between Middle and Upper Palaeolithic material culture (e.g. White 1982), and the abruptness of the change between them, was seen as the sudden appearance of the human capacity for language and symbolism, the flipping of a cognitive switch about 40 kya that suddenly illuminated where previously was darkness (e.g. Pfeiffer 1986).

As chronology became more perfectly known, it became obvious that there simply was not enough time to accomplish the transformation of Neanderthals into *Homo sapiens* (Mellars 1986; 1998; 2005; 2006a), and no morphologically intermediate fossils were discovered. Neanderthal anatomy and genetics (e.g. Krings et al. 1997; Ovchinnikov et al. 2000; Ponce de Leon & Zollikofer 2001; Serre et al. 2004) have confirmed their distinct evolutionary trajectory, and highlight the fact that the ancestors of *Homo sapiens* must be sought elsewhere.

In the early 1980s Gunter Bräuer (1984a,b) outlined his ‘Afro-European *sapiens* hypothesis’, describing the fossil evidence for an African origin for *Homo sapiens*. The work of Cann et al. (1987) on human mitochondrial DNA supported an African origin, and Stringer & Andrews (1988) integrated the fossil and genetic evidence as it was then known. Subsequent findings have borne out their contention that our species originated in Africa. The African fossil record shows clear antecedents for *Homo sapiens* in early Middle Pleistocene specimens such as Bodo, Kabwe and Ndufu, and in later Middle Pleistocene fossils such as Ngloba, Florisbad and Djebel Irhoud (McBrearty & Brooks 2000, table 1 & refs. therein). The oldest securely dated specimen as yet ascribed to our own species is the Omo 1 partial skeleton from the Kibish Formation, Ethiopia, dated to ~195 kya (McDougall...
et al. 2005). If fossils such as Florisbad are included in Homo sapiens, then our species has a time depth of at least 260 kya (Grün et al. 1996). Somewhat younger are the three crania from the Herto Member of the Bouri Formation, Ethiopia, dated to ~160 kya (White et al. 2003). The oldest of the human skeletal material from Klásies River that provoked such debate in the 1980s dates to perhaps 110 kya (Shackleton 1982; Deacon 1993a; Deacon & Shurman 1992). Clearly both fossil and genetic evidence support an African origin for Homo sapiens. The European Middle to Upper Palaeolithic transition is sudden and dramatic because it represents a replacement of the indigenous Neanderthals by incoming populations of Homo sapiens.

‘You say you want a revolution.........’

The use of the phrase ‘Human Revolution’ in this context is profoundly misguided. The term ‘revolution’ entails a fundamental, sudden and often violent transformation of the human behavioural, technological, or social landscape from within. Familiar examples of revolutions in the archaeological literature are the Urban and Neolithic Revolutions described by V. Gordon Childe (1934), whose ideas were much influenced by the eighteenth- and early nineteenth-century European Industrial Revolution (Greene 1999). The word revolution implies a home-grown development. It does not imply that the changes were the product of a population replacement.

What is an acceptable duration for a series of events in order for it to qualify as a revolution? The parallel question has arisen repeatedly in debates over the nature of punctuated equilibria (Eldredge & Gould 1972; Gould & Eldredge 1996), but it has never been successfully resolved. The French Revolution effectively dismantled the ancien régime in a mere ten years, and in vernacular usage, revolutions are perceived to occur within a human lifespan, or perhaps within a few generations at most. It was therefore with a sense of bewilderment that I read this statement by João Zilhão:

Human societies 30,000 years ago were clearly different from those of ca. 100,000 b.p. Thus, it is appropriate to refer to the changes that occurred across the intervening time period as a ‘revolution’ (Zilhão 2003, 642).

Surely a period of 70,000 years is a bit lengthy to qualify as a revolution? And in fact, as we shall see, the period of time in question is at least four times longer.

The record of the struggle to define what it means to be human stretches back to the dawn of the written word, and forms most of the basis for the world’s major religions, not to mention the discipline of anthrop学. The use of the term ‘human’ in palaeontology and archaeology is now generally confined to references to Homo sapiens. Humans are contrasted to non-humans, proto-humans or archaic humans. A ‘Human Revolution’, then, should distinguish the humans from the rest.

The ‘Human Revolution’ is said to be signalled by the appearance of ‘modern’ human behaviour. The vernacular meaning of the term ‘modern’ of course varies with context. ‘Modern European history’, for example, refers to the entire post-medieval period, whereas ‘modern art’ denotes a specific twentieth-century aesthetic. As it is used in discussions of the ‘Human Revolution’, ‘modern behaviour’ is equated with technological sophistication, cognitive acuity and symbolic behaviour. The word human in this context implies that these developments are what made some hominins human, and that others are not really human.

Klein (1992; 1994; 1995; 1998; Klein & Edgar 2002) and others (e.g. Diamond 1992; Mithen 1996a,b; 2000) insist that, although fossils that indisputably represent Homo sapiens are present by at least 100 kya in Africa, modern behaviour did not appear there until ~40 kya. This implies that early African Homo sapiens, like the Neanderthals, were not really human. The statement that early Africans, while indistinguishable anatomically from modern people, were not really human resembles a racist pronouncement so strongly that it compels close examination. Others are troubled by the denial of humanity to Neanderthals. The critical difference here is that Neanderthals belong to a different species from modern people, whereas early Africans do not.

Despite criticisms of my ‘Afrocentric’ approach, I have never endorsed the view the Neanderthals were stupid. Nor have I subscribed to the idea that they were forced to survive in glacial Europe by scavenging (e.g. Gamble 1987). On the contrary, I believe that many of the traits that we value so highly, language among them, have a great longevity, and are perhaps in some form characteristic of the genus Homo as a whole. I do, however, conceive of cognition as part of a species’ adaptive package, and thus I expect species to bring different kinds of intelligences to their adaptive challenges. Because I find Homo sapiens and Homo neanderthalensis to be valid taxa (e.g. Tattersall 1992; Krings et al. 1999; Ovchinnikov et al. 2000; Hublin 2000; Ponce de Leon & Zollikofer 2001; Spoer et al. 2003; Serre et al. 2004), I expect them to have different adaptations and modes of thought, though these differences may be subtle and difficult to detect. Lieberman & Bar-Yosef (2005) seem pessimistic that species-level behavioural distinctions can be recognized
in the archaeological record, and in some aspects of their subsistence behaviour Neanderthals and Homo sapiens appear to be identical (Adler et al. 2006). But in Europe and the Levant, the unique archaeological signatures of Homo sapiens and Homo neanderthalensis can perhaps be perceived (Lieberman & Shea 1994; Shea 2003; d’Errico 2003).

The appealing idea of a ‘sudden illumination’ persists despite having been shown to be unsupported by the facts originally cited in its support. How has the fiction been maintained? Some authors propose that the entire human species experienced a simultaneous, punctuated, genetically encoded event that resulted in a behavioural breakthrough that included the capacity for language (Klein 1992; 1994; 1995; 1998; Klein & Edgar 2002; Diamond 1992; Mithen 1996a,b; 2000). As in Europe, they see this event occurring about 40 kya, a date which corresponds to the beginning of the Later Stone Age (LSA). Because evidence in support of sophisticated behaviour in Africa in the preceding Middle Stone Age (MSA) and even earlier has continued to accumulate, a behavioural revolution at 80–60 kya has recently been proposed. A sudden increase in technological, cognitive, communicative and social complexity, driven by genetic, environmental or purely adaptive factors, is thought to have permitted the geographic expansion of Homo sapiens outside Africa (Watson et al. 1997; Mellars 2006b). Either reading of the record supports the impression that the earliest Homo sapiens in Africa were behaviourally primitive.

Why has the idea of a behavioural revolution persisted? The attempt to explain the origin of humans by virtue of their most positive attributes, such as language, upright posture or a large brain, belongs to a tradition extending back at least to classical antiquity (Lovejoy 1948; Cartmill et al. 1986). By contrast, little curiosity is expended on the reasons for our copious sweat glands or loss of sensory acuity. The essential divide between humans and the rest of nature and the attribution of innate superiority to humans is an essential part of the Judeo-Christian tradition. In Genesis, humans are the result of unique acts of creation, and are given dominion over the beasts. The wide gulf between humans and the rest of the animal kingdom is exaggerated in the sciences by the fact that behavioural comparisons can be undertaken only with living taxa. Any trace of linguistic or symbolising facility that arose early in the genus Homo is absent from chimpanzees, and extinct species of Homo are not available for observation. Unhappily, in many archaeological scenarios, early members of our species in Africa are not considered truly human until they begin acting like early Europeans or, worse, until they actually set foot in Europe.

The African Middle Stone Age

In the past it could be argued that there simply was little evidence for the later record of human development in Africa, but this position grows ever more untenable. In a review published in 2000 (McBrearty & Brooks 2000), Alison Brooks and I pointed out that many of the behaviours thought to be unique to the European Upper Palaeolithic in fact could be found in the record of the African MSA. We argued that behavioural change in Africa was gradual, not sudden, and sophisticated behaviour appeared there very early, in fact hundreds of thousands of years earlier than predicted by either ‘Revolution’ model.

The evidence in the African MSA for behaviours usually considered characteristic of ‘modern’ human behaviour is reviewed in our 2000 paper, and I will only briefly outline it here. But it is worth reiterating

![Figure 12.1. Behavioural innovations of the Middle Stone Age in Africa. (After McBrearty & Brooks 2000, 530, fig. 13.)](image-url)
that the record of behavioural change begins with the Acheulean to MSA transition at ~300 kya, not with the MSA to LSA transition at 40 kya. Thus the first appearances of many of these behaviours fall into the time span of fossils such as Florisbad and Ngaloba. These developments were summarized in much-reproduced diagram, which is presented here as Figure 12.1, amended to reflect developments since 2000.

At the beginning of the MSA the abandonment of the hand axe and adoption of composite tools that incorporated points signal the beginning of a reorganization of technology (McBrearty 2001; Tryon & McBrearty 2002). Well-executed blades and finely-made lancelate and foliate points, the hallmark of the MSA, date in East Africa to before 285 kya (Deino & McBrearty 2002).

The ubiquity and morphology of African points signals the presence of complex projectile weaponry systems, perhaps the bow and arrow, even from the earliest MSA (Brooks et al. 2005). Though Shea (2006) argues that most African MSA points do not conform to a design template derived from the projectile points of Holocene hunters, I see no reason whatever to demand that early representatives of a new technology incorporate all the refinements accumulated by hunters over the course of the succeeding 300,000 years. It would be astonishing if a Ford model T of the 1920s had the propulsive and aerodynamic properties of a 2006 Porsche Carrera GT. While Shea argues that MSA points would simply not work as projectiles, replication work shows otherwise (Odell 1988; Waweru 2004; 2007).

African MSA points show formal standardization and stylistic variation across space and time (see Fig. 12.2), and they provide an avenue into the social and symbolic world of early humans. Deacon & Wurz (2001), following Byers (1994; 1999) and others, see the imposition of arbitrary forms, and changes in form following the dictates of style independent of function, as evidence for symbolic communication. Projectile points are the standard means of defining archaeological cultures in North America and elsewhere. Points, as the fossiles directeurs of the African Middle Stone Age, form a functionally equivalent class of objects whose variation can be attributed to style. Regional and temporal differences in African MSA projectile point styles (see Fig. 12.2) suggest the boundaries of linguistic or ethnographic groups, or perhaps the edges of formalized exchange networks similar to those described by Wiessner (1983) for the Kalahari San.

The backed geometries of the Howiesons Poort and Mumba industries at ~75 kya are another excellent example of a stylistic adaptation to the demands of projectile technology. Because geometric microliths remained in use until recent times, there is good archaeological and ethnographic evidence that they were used as arrow armatures, both for hunting and in warfare (McBrearty & Brooks 2000, 502). In Africa, the origin of the geometric tradition appears to predate 200 kya (Barham 2001; 2002). The elaborate bone points dating to >75 kya from three sites at Katanda, People’s Republic of Congo (Brooks et al. 1995; Yellen et al. 1995; Yellen 1998), demonstrate the presence of an additional complex weaponry system at this time.

Further evidence for symbolic behaviour is provided by the presence of red ochre at sites predating 285 kya in the Kapthurin Formation, Kenya (McBrearty & Brooks 2000; Deino & McBrearty 2002), and dating to ~230 kya at Twin Rivers, Zambia (Barham
1998; Barham & Smart 1996). Pigment is frequently encountered in MSA sites in South Africa immediately postdating ~130 kya (Watts 2002). Personal adornment in the form of beads is known from 135 kya (Vanhaeren et al. 2006). Finally, incised items of bone, stone, and red ochre, are all present at MSA sites in Africa predating 70 kya (McBrearty & Brooks 2000 & refs. therein; Henshilwood & Marean 2003; Henshilwood et al. 2001; 2002; 2004).

Regions of Africa not inhabited during preceding periods were occupied during the MSA. This is argued by Clark (1988; 1993) to indicate the increased technological competence of MSA hominins. Subsistence behaviour includes fishing, specialized hunting, and the intense, scheduled, and seasonal use of resources. Repeated reoccupation and the structured use of domestic space are also visible at MSA sites. The transport of obsidian for distances ~200 km at the MSA sites of Muguruk, Kenya, and Mumba and Nasera, Tanzania, dating to the late Middle Pleistocene (McBrearty 1988; Mehman 1989; Merrick & Brown 1984; Merrick et al. 1994) indicates either a vastly increased geographic range over previous periods, or the existence of trade.

In our 2000 paper (McBrearty & Brooks 2000), Brooks and I discussed what these traces reveal about ecological adaptations, technology, and economic, social, and symbolic behaviour. We argued that African MSA technology shows logic and inventiveness, and that ecological and economic aspects of the record reflect human innovation, and abstract thought in the form of systematic planning depth, conceptualization of the future, and formalized social relationships among individuals and groups. We further argued that these features demonstrate a capacity to imbue aspects of experience with meaning, to communicate abstract concepts, and to manipulate symbols as a part of everyday life.

The interplay of cultural processes and anatomical responses that resulted in the modern human adaptation therefore has African roots that penetrate deep into the Middle Pleistocene (cf. Howell 1999). This evidence shows that the mental capacity for sophisticated behaviour was present in Africa in the earliest Homo sapiens, that these behaviours arose by normal processes of innovation, and that their traces in the archaeological record accumulated sporadically over the course of the next 300,000 years.

In examining Figure 12.1, some have remarked upon the apparent ‘punctuated’ event at ~130 kya. I would like to reiterate here that this can be explained by three factors:
1. The date of ~130 kya represents the boundary between the Middle and Later Pleistocene, and faunal analysts have frequently given this date as a ‘ball park’ estimate where good chronometric data were lacking.
2. The archaeological record at many well-documented MSA sites on the Cape coast of South Africa begins at ~130 kya, because any older material has been swept away by the oceanic highstand of stage 5.
3. Taphonomic bias, discussed further below.

It is pertinent to note some important discoveries subsequent to 2000. Remains reported by White et al. (2003) and Clark et al. (2003) in the Upper Herto Member of the Bouri Formation in the Middle Awash region of Ethiopia appear to represent an example of early mortuary practice. Crania of at least three individuals, a juvenile and two adult males, bear traces of cutmarks, and the juvenile skull also shows traces of polishing to its surfaces and edges. None of the cutmarks resembles those made by defleshing for consumption, and the authors in particular stress the similarity of the polishing of the juvenile cranium to modern ethnographic examples of ritual treatment of human skeletal remains. Ritual defleshing, prolonged handling, and storage in a skin bag would all appear to be consistent with the cutmarks and polishing observed on these specimens. The Herto fossils clearly represent Homo sapiens, and 40Ar/39Ar dating allows a precise and reliable age estimate of 160–154 kya.

Another particularly important development is the escalation in antiquity for beads in Africa and the surrounding region. Ostrich eggshell beads are common in African LSA contexts, and the dates of 37–40 kya from Enkapune ya Muto, Kenya (Ambrose 1998) are widely cited. In 2000 Brooks and I gave 52 kya as the maximum age then known for beads in Africa (McBrearty & Brooks 2000, 521), based upon AAR dates on ostrich eggshell beads from Mumba, Tanzania (Hare et al. 1993). The Nassarius shell beads from Blombos, reported in 2004 by Henshilwood et al. (2004) quickly surpassed them in age at ~75 kya. Newly-described specimens of perforated Nassarius shells reported by Vanhaeren et al. (2006) from the Aterian site of Oued Djebanna, Algeria, and from Es-Skuhl, Israel, indicate the presence of a shell bead tradition dating to as early as 135 kya, a nearly three-fold age increase in only six years. It is also interesting to note that the shells at Oued Djebanna must have been transported ~190 km to the site from the shore of the Mediterranean.

**MSA vs LSA**

Some have responded to the accumulating evidence by dismissing it. Klein, invoking stratigraphic mixing, discounts the bone tools at both Blombos and Katanda (Klein & Edgar 2002). Apparently lack of confidence in
the dating allows him also to reject both the beads and the incised ochre from Blombos (Klein & Edgar 2002). Binford (1984) purported to show that MSA people were scavengers, not hunters, and Klein (1998; 1999; 2000; Klein & Edgar 2002) continues to assert that MSA people were less competent and less specialized hunters than those of the LSA, being unable to take down dangerous animals or to target seasonally available prey. Marean (1998; Marean & Kim 1998; Marean & Assefa 1999) and Milo (1998) have demonstrated that the claims for the incompetence of MSA hunters are based upon flawed analysis of selected assemblages. The discard of bone shaft fragments by the excavators at Klasies River (Singer & Wymer 1982) is especially significant in decreasing the number of larger animals identified, and in giving the impression of late access to carcasses. Furthermore, time averaging in long MSA sequences like those at Klasies River or Die Kelders has obliterated any possible seasonal signal (Henshilwood & Marean 2003; Marean & Assefa 1999; Marean et al. 2000), which is not the case in the shorter-term LSA occupations.

Following Marean and others (Marean & Assefa 1999; Minichillo & Marean 2000), Brooks and I argued that much of the proliferation of ‘Upper Palaeolithic-like’ extractive technology of the LSA can be seen as intensification in response to increased population or declining resources. Certainly it is a waste of effort to invent clever tools and to spend time extracting nutrition from tricky or problematic resources if preferred foods are plentiful and readily available, as they were in the MSA. The switch from eland to buffalo at some South African sites in the LSA can likewise be seen as a response to a decline in eland numbers. There was no merit in hunting dangerous animals in the MSA when docile ones were there for the taking. Brooks and I argued that the situation facing LSA peoples was in fact brought about by the success of preceding MSA hunters and fishers (McBrearty & Brooks 2000, 510).

Another factor that serves to exaggerate the contrast between the MSA and the LSA is simply that the MSA is much older and of longer duration than the LSA. The MSA comprises at least 245,000 years of prehistory (>285–40 kya), whereas the LSA spans only the last 40,000 or 50,000 years. Taphonomic and diagenetic processes have therefore had much more time to operate upon the MSA record, and have destroyed most traces of organic materials in the majority of open sites in Africa, where acidic groundwater is the rule. The observation that worked bone or shell beads in are present LSA levels but absent in MSA layers is frequently repeated, but few note that at many cave sites (e.g. Enkapune ya Muto, Kenya; Mumba, Tanzania; White Paintings Rock Shelter, Botswana; Die Kelders, South Africa) there is a clear gradient in the quality of preservation from top to bottom. Not only are worked bone and beads absent from the MSA levels, but decalcification, bioturbation, or other taphonomic and diagenetic processes have almost completely obliterated any trace of bone or shell at all. At Blombos, on the Cape Coast of South Africa, which has yielded shell beads and worked bone in the MSA levels, preservation is enhanced by the presence of alkaline bedrock and a carbonate-rich body of fossil dune sand that sealed the site after the occupation (Henshilwood et al. 2001).

**Is the MSA really so special?**

Some thoughtful authors have recommended careful scrutiny of the measures of behavioural modernity (e.g. Kuhn & Bar-Yosef 1999; Henshilwood & Marean 2003), and a number of criteria for modernity listed in McBrearty & Brooks (2000) are not accepted by our peers. Descriptions of European Upper Palaeolithic technology invariably stress that they are blade-based; Brooks and I pointed out that nearly all coastal South African MSA artefacts are made on blades (e.g. Singer & Wymer 1982; Volman 1984), and that the manufacture of blades extends beyond 285 kya in East Africa (McBrearty & Brooks 2000), and perhaps to a similar time depth in the Levant (Bar-Yosef 1998). Kuhn & Bar-Yosef (1999) argue that blades are no more sophisticated than other kinds of lithic technology. Because we do not know the functions of early African blades, it remains to be seen whether their more standardized shapes and dimensions provided an advantage over other kinds of flakes. However, blades did provide the technological substrate upon which the African microlithic tradition was developed, perhaps as early as 200 kya (Barham 2002). Backing in itself may be of questionable significance, but it is significant is that these small backed geometric elements were part of composite weapons, quite likely arrow armatures.

Perhaps more important than any of the issues raised here is the fact that the African record is simply different from that of Europe, as has been repeatedly emphasized by Deacon (1993b; Deacon & Deacon 1999; Deacon & Wurz 2001). How could it be otherwise? Africa covers about 30.3 million km²; all of Europe west of the Urals, only about 10.4 million km². Unlike Europe, Africa never experienced widespread continental glaciation during the Pleistocene. The distribution of its vast expanses of forest, savanna, and desert are governed by precipitation, not temperature, and its seasonal challenges are dry spells, not winters. While its overall population size may have been greater than that of Europe simply due to
its greater landmass (Relethford 2001), archaeological site densities suggest that Africa in the Middle and Later Pleistocene was peopled by small geographically dispersed populations (Yellen 1998). They were not subject until the LSA to the severe crowding and intense competition for resources that appear to have motivated much of the symbolic signaling seen in the record of late glacial Europe, but they did express their abilities in ways appropriate to their circumstances.

**Identifying early signs of cognitive sophistication**

As I see it, these are the challenges to identifying ‘modern’ human behaviour in the archaeological record:
1. the behaviour must involve material objects;
2. the material objects must be preserved;
3. the objects must be accurately dated;
4. the species of the maker of the objects must be correctly identified;
5. archaeologists must agree that the objects are the product of behaviour that reveals advanced cognition or symbolic thought.

Archaeologists will be undeterred by the difficulties posed by items 1, 2, and 3, but it is worth noting that interior mental states, gestures, social interactions, vocalizations, and manipulations of organic or ephemeral materials will be unrepresented in the archaeological record. Item 4 presents a greater challenge. Later Pleistocene hominin populations in Europe and the Levant, *Homo neanderthalensis* and *Homo sapiens*, represent lineages that had been separate for more than 500,000 years (Krings et al. 1999). Their physical characteristics are well documented by fossil evidence, and with few exceptions specimens are easily diagnosed to species. Although limitations of the radiocarbon method may preclude resolution of fine-grained chronologic issues (Ambrose 1998; Conard & Bolus 2003; Pettit & Pike 2001), Neanderthals and *Homo sapiens* appear to have shared the continent of Europe for on the order of 10,000 years (Mellars 1986; 1998; 2005; 2006a). In contrast, Middle and Later Pleistocene hominins in Africa consist of *Homo sapiens* and its closest relatives, that is, ancestral and sister groups who resemble it closely. There is no agreement among investigators regarding the number of species present, and the degree of temporal overlap among them is difficult to assess on current evidence, but is probably to be measured in the tens if not hundreds of thousands of years. Populations of early *Homo sapiens* were probably never very large. The inescapable implication is that many Middle and Later Pleistocene sites in Africa represent the behaviour of other species. Rarely are diagnostic artefacts recovered in association with hominin remains, and even in such cases one must entertain the possibility that the hominin fossils represent food remains rather than the makers of the artefacts. At Klasiy River, for example, there is clear evidence for cannibalism (White 1987). How likely is it that the diner and the dinner belonged to the same social group or even to the same species?

But perhaps the greatest challenge is provided by item number 5. Henshilwood & Marean (2003) have suggested external symbolic storage as a testable criterion for the presence of advanced cognition in the archaeological record. As Zilhão (2003) points out, application of this criterion will exclude from humanity some societies known from the historic and ethnographic records. I sometimes wonder whether the contents of my own tent in Africa, if buried for 200,000 years, would qualify me as truly human!

I would add technological complexity as evidence for cognitive sophistication, because it implies the transmission of complex knowledge and innovations across generations and the ‘ratcheting up’ of cultural content (Boyd & Richerson 1985). As Henrich & McElreath (2003, 124) put it,

> Foraging, as it is known ethnographically, would be impossible without technologies such as kayaks, blow-guns, bone tools, boomerangs, and bows. These technological examples embody skills and know-how that no single individual could figure out in his lifetime.

The bow and arrow is sufficiently complex to qualify as a culturally rich technological system. It requires not only knowledge of the design of the weapon and skill in its use, but its manufacture and maintenance require advance planning as well as knowledge of the properties of all its components (stone, wood, bone, gum, sinew, hide), and their acquisition, curation, and processing over a sustained period of time. As discussed earlier, the presence of backed geometrics indicates that the bow and arrow weapon system was present by 75 kya, and the morphology of MSA points strongly suggests that it was present substantially earlier (Brooks et al. 2005; Waweru 2004; 2007).

**An African revolution?**

As mentioned earlier, some archaeologists have claimed to observe a sudden, late ‘behavioural revolution’ in Africa. It is imagined to have occurred at the MSA to LSA transition at ~40 kya, the same time depth as the Middle to Upper Palaeolithic transition in Europe (e.g. Klein 1998; 1999; 2000; Ambrose 1998; Klein & Edgar 2002; Wadley 2001). The supposed contrast in behaviour between the MSA and the LSA is artificially enhanced in a number of ways: discounting evidence with dates that are ‘too early’, insisting
that all items of material culture must appear together as a package in order to be meaningful, and comparing late time-restricted LSA assemblages with time-averaged MSA assemblages that span tens of thousands of years. The effect is further exaggerated by attributing normal economic and cultural change to an intellectual breakthrough at the MSA–LSA transition. Partly in response to accumulating evidence for behavioural sophistication in Africa that predates 40 kya, and partly in response to findings in molecular genetics, several investigators have now proposed a slightly earlier ‘revolution’ in Africa dating to 80–60 kya.

Both nuclear and mitochondrial African genomes exhibit greater diversity, indicating their greater time depth (Wainscoat et al. 1986; Cann et al. 1987; Vigilant et al. 1991; Chen et al. 1995; Tishkoff et al. 1996). Migrations out of Africa can be detected because founder events result in only a fraction of this total diversity being present in daughter populations. Mutations that have appeared in localized descendant populations allow reconstruction of subsequent branching relationships (Bandelt et al. 1995). Analysis of many hundreds of mitochondrial DNA (mtDNA) genomes seems to reveal the genetic footprint of a population bottleneck followed by rapid expansion of a single mtDNA lineage, termed L1, within Africa, as well as a subsequent expansion of a founding population, termed L3, that gave rise to the M, N, and R lineages in the Near East. These are construed as the mitochondrial ancestors of all non-Africans. The age of the expansions within Africa and out of Africa have been estimated at 130 kya and 80–60 kya respectively (Watson et al. 1997; Forster 2004). Analysis of nuclear DNA (nDNA) seems to confirm the general pattern, if not the timing, of these events (e.g. Underhill 2000). But humans are not mitochondria, and reconstructions of human population history are more complex when based upon the total genome (e.g. Li et al. 2002).

Watson et al. (1997) speculate that behavioural innovations during the period 80–60 kya spurred these population expansions and dispersals. Both Watson et al. (1997) and Mellars (2006b,c) express puzzlement that African Homo sapiens populations ‘failed’ to reach Europe until 40 kya. Mellars (2006b, 9381) poses the question,

if ... populations that were essentially modern in both genetic and anatomical terms had already emerged in Africa by at least 150,000 years ago, why did it take these populations a further 100,000 years to disperse to other regions of the world?

Mellars (2006b,c) finds the appearance of Howiesons Poort technology and the beads, bone tools, and engraved ochre from the Still Bay levels at Blombos, South Africa, to be of special significance. He suggests that these archaeological traces may reflect an adaptive shift in response to challenging environmental conditions, or that a genetic mutation may have caused cognitive changes that in turn prompted novel behaviours allowing the migration out of Africa. None of the alleles that characterize the mtDNA haplogroups discussed here is linked to brain function. Neither does the archaeological record support the scenario of abrupt cognitive enhancement. As mentioned earlier, the design parameters of even the earliest MSA points indicate the use of complex projectile weaponry systems (Brooks et al. 2005). Regional point styles (see Fig. 12.2) and the use of ochre suggest symbolic communication and ethnic identity commencing before 285 kya (McBrearty & Brooks 2000, 502; Brooks et al. 2005; Yellen 1998). There is therefore no evidence for a sudden cognitive advance at 80–60 kya.

Migration and intelligence

Was a genetic mutation enhancing intelligence required for hominins to migrate out of Africa? No, faunal exchange between Africa and Asia has occurred sporadically since the land bridge at Sinai was established 17 million years ago, and Homo erectus, with a brain size considerably smaller than Homo sapiens, exited Africa before 1.8 mya. There is a very large literature on animal dispersals (e.g. Shigesada 1980; South 1999; Travis et al. 1999; Sutherland et al. 2000; Okubo & Levin 2001; Clobert et al. 2001; Kokko & López-Sepulcre 2006), and no author invokes increased intelligence as an explanatory mechanism. Rather, population dispersal is thought to be motivated by inbreeding avoidance, changing geography, or more frequently, habitat depletion and the resulting inter- or intragroup competition. Dispersal rates and patterns are affected by body size, generation length, fecundity, diet, population density, predator density, landscape carrying capacity, habitat diversity, resource patchiness, and aspects of the social system, especially those regarding mating and territorial defense. Dispersal is assumed to incur costs in either survival or fecundity, and these costs increase with distance travelled. Dispersal incurs increased mortality risks from unfamiliar habitat, passage through areas of high predator densities, or the absolute cost of increased movement, but populations often experience growth when entering new territory. Increased longevity, decreased time between births, or increased offspring survivorship can increase individual fecundity. These in turn can be positively influenced by factors such as increased foraging efficiency, decreased competition, decreased predator pressure, or enhanced disease resistance. While increased intelligence or improved

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technology might be proposed to enhance any of these factors, the success of invasive species is commonly due to either r-selection or tolerance of wide variance in environmental conditions (Ehrlich 1984; McMahon 2002; Kokko & López-Sepulcre 2006).

Sutherland et al. (2000) review the data on the distances moved by juvenile animals during natal dispersal for 78 species of birds and 80 species of mammals, and model variation in predicted dispersals as responses to some standard parameters. They find, like Peters (1983), Van Vuren (1998) and many others, that there is an overall correlation between body mass, speed of locomotion, and maximum distance of migration. For both birds and mammals, predicted dispersal distances for carnivores exceed by two orders of magnitude those for herbivores of equivalent body mass. Carnivory should thus be a significant factor in the dispersal of Homo sapiens (Foley 1987). Sutherland et al. caution, however, that there is great potential difference in median and maximum observed dispersal distances. Thus, median observed distances are ~40 km for Canis lupus, but the maximum is 432 km. Likewise for Ursus arctos, median distances range between 5.5 and 9.5 km, whereas the maximum observed distance is 134 km (Sutherland et al. 2000, table A2). The authors note that such rare long-distance dispersal events are difficult to observe and may be very important for the spread of species (cf. Kot et al. 1996).

Van Peer (1998) has presented archaeological evidence for population movements northward up the Nile corridor during the MSA, and the action of the Sahara as a ‘pump’ drawing human and animal populations in during wet periods and expelling them during dry intervals was noted 25 years ago by Boaz et al. (1982). An updated version of this scenario is provided by Deacon & Wurz (2001). Arid conditions in the Sahara and adjacent regions of the Arabian peninsula were mitigated somewhat during warmer, wetter periods, as the intermittent occupation of these regions during the Middle and Later Pleistocene attest. Thus, OIS-5 (~130–75 kya) would provide an opportunity for small bands of foragers to expand out of North Africa by means of a land route, only to become isolated during the ensuing aridity of stage 4, as may have happened at an earlier stage to the ancestors of the Skuhl-Qafseh population. Mishmar et al. (2003) suggest that the possession of certain mitochondrial mutations may have favoured some populations in hyperarid conditions, but there is present little evidence to support this hypothesis.

Much has been made of the possibility of a coastal migration route out of Africa (e.g. Lahr & Foley 1994; Stringer 2000; Petraglia 2003; Oppenheimer 2003; Macaulay et al. 2005; Forster & Matsumura 2005; Field & Lahr 2005; Mellars 2006c), but until now the archaeological evidence has been slim. Mellars (2006c) illustrates a collection of backed geometric stone tools, ostrich eggshell beads, and incised ostrich eggshell from the sites of Patna, India, and Batadomba-Lena, Sri Lanka, dating to 30–35 kya which, superficially at least, bear a striking similarity to sub-Saharan African examples dating to 75–40 kya. This would seem to provide evidence for the route if not the precise timing of a southern migration out of Africa in the late Pleistocene. There is no real reason to exclude an exit across Sinai, but watercraft would have been required if the route involved crossing the Bab-el-Madib, as it presented an effective water barrier with intimidating currents even during marine low stands (Derricourt 2005). The use of watercraft is in any case indicated by the colonization of Australia by 45 kya if not earlier (Davidson & Noble 1992; O’Connell & Allen 2004).

Backed geometric tools were most likely armatures for arrows or other forms of advanced projectiles (McBrearty & Brooks 2000, 500), and beads and objects with incised designs are good signs of symbolic communication. Symbolic identity and the use of the bow and arrow may have given early Africans a profound logistical advantage both in hunting and interpersonal violence over populations who lacked them. However, neither symbolic behaviour nor projectile weaponry appeared suddenly in Africa at 80–60 kya. As noted earlier, the first appearances of these behaviours do not lie in the interval of 80–60 kya, but in the interval of 300–200 kya.

Pathogens may also have aided Homo sapiens in their replacement of archaic hominins. In some parts of the New World after initial European contact, imported infectious diseases, including smallpox, measles, and viral influenza, reduced Native American populations by more than 90 per cent in as little as five years (Dobyns 1993; Patterson & Runge 2002). In the model of Zubrow (1989) that assumes interacting populations of stable size, Neanderthal mortality exceeding that of Homo sapiens by only two percent could account for the extinction of the Neanderthals in only 30 generations, or 1000 years.

None of this evidence supports a ‘cognitive revolution’ at either 80 kya or 40 kya. The items of material culture whose sudden appearance is cited as evidence for the mental leap forward in this time interval in fact appeared individually much earlier in the record. Like gunpowder in a later age, the bow and arrow may have given dispersing African populations a competitive edge, but like gunpowder, the bow and arrow underwent a long period of experimentation and development; its invention did not require a human genetic mutation. Dispersal
from Africa can be expected to have resulted from the interplay of population growth, normal migration among foragers, and ecological change driven by Milankovitch cycles. Mundane factors such as greater fecundity or disease immunity also may have played an important role.

Mellars (2006b) and others ask why Africans did not enter Europe until 40 kya. One might also ask, why did Asians not enter the New World until the late Pleistocene? Why did Europeans fail to enter the New World until the fifteenth century and? Why were there no human footprints on the moon until 1969? Not due to a genetic mutation or cognitive enhancement, but for reasons of environment, demography, technology, historical contingency, and in the last two cases, motivation and finance.

**Genes, language and the brain**

Several additional strands in recent human genetic research contribute to the discussion of the origin for ‘modern’ behaviour. The pattern in the literature has been: 1) to claim discovery of an important gene such as ‘the gene for language’ or ‘the gene for large brain size’; 2) to estimate its age of origin; 3) to correlate this date with some event deemed significant in the archaeological or fossil record; and 4) to conclude that the observed event is biologically driven. There are a number of critical flaws in this approach, and some recent applications reveal an unfortunate and rather unsubtle pro-European bias.

**Language**

FOX2 has received attention as the ‘language gene’ (Lai et al. 2001; Enard et al. 2002; Zhang et al. 2002; Marcus & Fisher 2003). Two additional genes purported to control for increased brain size, MCPH1 (microcephalin) and ASPM (abnormal spindle-like microcephaly associated), are reported in the recent literature (Wang & Su 2004; Evans et al. 2005; Mekel-Bobrov et al. 2005; Ponting & Jackson 2005). In each case, the genes were initially discovered because a simple mutation leads to severe disability, language impairment in the case of FOX2, and to microcephaly for MCPH1 and ASPM.

Only three amino acid differences distinguish the FOX2 proteins found in the mouse and humans (Enard et al. 2002; Marcus et al. 2003; Zhang et al. 2002), but two of those mutations have occurred in the human lineage after its divergence from that of the chimpanzee, and are concluded by Zhang et al. (2002), to have been subject to positive selection. The function of the normal FOX2 alleles is not precisely known, but they are thought to influence the neurological bases of speech comprehension and production. Enard et al. (2002) estimate a maximum age for the fixation of the advantageous FOX2 allele at 220 kya ($p = 0.05$). Though its role in brain development and speech production has been stressed, the FOX2 gene is also expressed in other tissues, such as the lung, gut, and heart (Lai et al. 2001; Marcus & Fisher 2003). Thus the explanation for selection of these alleles may lie outside the realm of language altogether.

The regularity in structure of languages worldwide, the universal language acquisition process in infants, and such phenomena as the independent invention of languages by communities of deaf children, show beyond doubt that the capacity for language is innate (Pinker 1995; Hauser et al. 2002). It no doubt has a genetic basis. However, I think it goes without saying that there is no single ‘gene for language’.

As a non-linguist, I will not venture to summarize the many points of view in the debates concerning the origin of language (for a reasonable review, see Wind 1992). But I would concur with the many who argue that language has evolved incrementally since the divergence of the ape and human lineages (e.g. Ambrose 2001; Bickerton 1995; Falk 2004; Gibson & Ingold 1993; Lieberman 1989; 1991; 2000; Lieberman et al. 1992; Pinker 1995). It seems self-evident that some form of spoken language or proto-language (cf. Bickerton 1995) was present early in the evolution of the genus *Homo*. The process of language evolution probably involved recruitment of existing neural systems involving cognition and motor control (Marcus & Fisher 2003). Jackendoff (1999) argues that some of the stages in the evolution of the language capacity can be detected as ‘fossils’ in modern languages, but the precise form and content of ancient extinct languages of course remain irretrievable.

Currently interest is focused upon what is perceived to be the most recent step in language evolution. Is a single genetic mutation responsible for the appearance of ‘fully syntactical’ language? I remain somewhat skeptical, but if so, I would posit that this event occurred early, at the origin of *Homo sapiens* if not before. The basicranium of the African Kabwe skull, flexed relative to that in earlier hominins, indicates the presence of a descended larynx (Lieberman 1989; Lieberman et al. 1992; D. Lieberman et al. 2002), allowing for speech production. In the absence of a powerful behavioural advantage such as language, this arrangement would be under strong negative selective pressure due to the danger of choking (Lieberman 1989; 1991). This is a compelling argument that some form of language was present in Africa by 400–700 kya (McBrearty & Brooks 2000, table 1 & refs. therein).
Brain size and intelligence

The MCPH1 and ASPM alleles are said to have appeared very recently, to have been subject to strong positive selection, and to occur at higher frequencies in non-African populations than in African populations. The microcephalin mutation is estimated to have appeared at ~37 kya, and is explicitly linked by its describers to the ‘Upper Palaeolithic revolution’ (Evans et al. 2005, 1718), while the even more recent mutation of ASPM, estimated at ~8.5 kya, is suggested to have spurred domestication and the invention of written language (Mekel-Bobrov et al. 2005).

The claim that ASPM and MCPH1 haplotypes conferring larger brain size and a selective advantage are present in lower frequencies in Africans demands scrutiny. Unfortunate claims that people of African descent are intellectually inferior (Jensen 1979; 1998; Herstein & Murray 1994; Rushton 2000) have repeatedly been demonstrated to be spurious, most recently confounding genetic and environmental effects (e.g. Tobias 1970; Gould 1981; Graves 2002; Marks 1995; Peters et al. 1998; Schoenemann et al. 2000; Lieberman 2001). Nor is there any indication that human brain sizes are smaller than the norm in Africa. Brain size of course scales with body size, and more massive human body sizes are found at higher latitudes, in conformance with Bergmann’s rule (Ruff et al. 1997; Ruff 2002). As a result Neanderthal brain size and body weight are large compared to Homo sapiens.

More fundamentally, it has been shown that there is no correlation between the supposed ‘large brain’ allele with actual brain volume for either MCPH1 or ASPM. Woods et al. (2006) report a study of 120 individuals who were genotyped for both loci and whose brain volumes were determined by MRI. No significant correlation, either positive or negative, was found with brain volume for either allele, leading to the conclusion that neither gene is a contributor to normal variation in brain size. As Woods et al. point out, human brain volumes are a compromise among various selective factors, including body size and maternal pelvic dimensions among others. Like FOXP2, the MCPH and ASPM genes are also expressed outside the brain, and thus selection may operate upon characters unrelated to brain size or function. Woods et al. (2006, 2028) conclude that although the recessive allele for both the MCPH1 and ASPM leads to microcephaly,

it is potentially misleading to refer to either of these genes as controlling, regulating or determining human brain size outside the context of the microcephalic state.

I do not intend to impugn the integrity of those involved in human genetic research, and I am sure that any apparent bias is inadvertent. But I would urge geneticists, before they rush to publication, to consult with a number of archaeologists, and to thoroughly digest the relevant literature. I would also suggest that they seriously examine their motives as well as their methods. A good question to ask themselves might be: Why does it seem reasonable to me to conclude that Africans are cognitively inferior? As has been observed in another context: ‘I am always suspicious when those who are at an advantage proclaim that a disadvantaged group of people is innately less able’ (Barres 2006, 134).

Age estimates from genes

Lying at the heart of all these debates is the question of how the dates for the first appearances of genes are computed. In order to estimate the elapsed time: 1) the mutation rate must be assumed to be uniform; 2) assumptions must be made about the population’s size and demographic history; and 3) the ‘clock’ must be set by reference either to the fossil record (phylogenetic analysis) or to mutations observed by comparing genotypes across generations within families (pedigree analysis). In most cases the role of natural selection in observed gene frequencies is unknown.

Human genetic analysis is a useful tool for assessing the geographic origin of human populations, and perhaps the order of past evolutionary events. It is less good at estimating the time elapsed since those events. Because of the large size of the genome, mutations, which are the result of essentially random events, accumulate at a regular rate, as predicted by Kimura (1968). But as Forster (2004, 256) notes, ‘The mutation rate is the Achilles heel for any DNA chronology’. Genotyping now shows that rates differ according to which portion of the genome is scrutinized (e.g. Li et al. 2002), and phylogenetic and pedigree analysis lead to very different results, in part due to the role played by homoplasny. Excoffier (2002) points out that different methods for computing the mtDNA mutation rate for the control region yield results ranging between 7.2 per cent and 64 per cent per million years. The resulting age estimates for the earliest African population expansion differ by an order of magnitude, that is, 500 kya vs 56 kya. Estimates of ancient effective population sizes and population growth rates are also critical to time estimates in genetic analysis (Relethford & Harpending 1995; Harpending et al. 1998; Relethford & Jorde 1999). Modelling by Wall & Przeworski (2000) suggests that some of the conventional assumptions, especially those regarding effective population size and the role of natural selection, require revision. Mitochondria also play an important role in metabolism. If the frequency of mitochondrial alleles is influenced
by selection, as argued by Mishmar et al. (2003) and Kisivild et al. (2006), then a uniform rate of mitochondrial evolution cannot be assumed.

The molecular clock is most often set by reference to the fossil and archaeological records. For example, in their original treatment of human mtDNA evolution, Cann et al. (1987) estimated the age for the mitochondrial common ancestor at 140–290 kya. They calculated a mutation rate of two to four per cent per million years, based upon a date of 12 kya for the first occupation of the New World, and of 40 kya for Australia and New Guinea. Earlier dates for occupation of both Australasia and the New World have their advocates, but the debate remains contentious (Dillahay 1999; 2001; Bowler et al. 2003; O’Connell & Allen 2004; Field & Lahr 2005 & refs. therein). Should new data support a ‘long chronology’ for either region, age estimates for the common human ancestor would need to be revised downward. In most recent research, investigators employ the age of the divergence of the ape and human clades in their estimates of mutation rates. Enard et al. (2002), for example, place this event at 5 mya, while Evans et al. (2005, suppl. info.) put it at 6 mya. But the skull of *Sahelanthropus* now provides the earliest fossil evidence for the independent existence of the hominin lineage, and its age lies closer to 7 mya (Brunet et al. 2005). A slower ticking of the molecular clock would indicate that some current age estimates for recent evolutionary events may be as much as 40 per cent too low.

**FADs and LADs**

There is a good reason why origin dates derived from the fossil record have a tendency to get older and older the more research attention they receive. The extensive literature on fossil and last appearance data (FADs and LADs) for a variety of taxa, including rodents, early mammals, and a variety of invertebrates (Gingerich 1990; MacLeod 1991; Pol & Norell 2006) shows that they are nearly always a direct reflection of the stratigraphic completeness of the geological record. That is, under ideal circumstances, sediment must accumulate in the right place at the right time to record a speciation or extinction event. The first or last individual must become fossilized, the sediments must become lithified and subsequently eroded; the properties of the rocks must be conducive to application of current chronometric techniques; the fossil must then be discovered and correctly identified, and its age accurately determined. The likelihood of all of these events occurring is exceedingly remote, and consequently the critical well dated fossils are rare. FADs and LADs are always estimates, and their accuracy and precision increase as a function of sample size. The estimate of a first appearance will almost inevitably grow more distant in time as sample numbers increase, until ultimately the vicinity of the true limit is reached. With the tiny number of fossils now known from the 5–8 mya time range, *Sahelanthropus* is unlikely to represent the true first appearance of the hominin clade. The origin of the order Primates, usually estimated at 65 mya, is another event often used for calibration in molecular genetics. Martin (1993) surmises that the FAD for the primates may lie closer to 80 mya, an increase of 23 per cent.

Neither is the uncertainty in estimating FADs and LADs confined to the computation of mutation rates. All age estimates involve a range of error, and for recent events the effect is more pronounced. It is absurd to expect to identify the true ages of the earliest appearance of *Homo sapiens* or symbolic artefacts precisely from the minute sample sizes currently known from the appropriate time interval.

**Interpretation of age estimates**

In light of the uncertainties in age estimates from genetic data and the fossil and archaeological records, one must exercise extreme caution in attempts at correlation among them. For example the 95 per cent confidence limits for the appearance of *ASPM* haplogroup D span the interval from 0.5 kya (ad 1500) to 14.1 kya; the age estimate preferred by Mekel-Bobrov et al. (2005) is ~8.5 kya. In the Levant, domestication was on ongoing process that appears to have been underway by ~11.5 kya (Bar-Yosef & Meadow 1994; Kislev et al. 2006); cuneiform writing appears to have its origins in clay tokens that appear in early Neolithic sites by at least 10 kya (Schmandt-Besserat 1992). So at ~8.5 kya the appearance of *ASPM* would appear to postdate the events it is said to have caused. More fundamentally, however, both domestication and written systems are known in the New World, where frequencies for the ‘advantageous’ haplogroup are effectively zero. Four major systems of writing appear to have originated in Mesoamerica, beginning at ~2.5 kya (~650 BC) (Marcus 1976; 1992; Pohl et al. 2002). Is each one the product of an as-yet undiscovered mutation? If not, what events in global history are to be explained by the next genetic discovery?

This ‘cherry picking’ of archaeological dates, the elastic genetic age estimates, and the misstatement of the role of genes in brain development lead to at least three very unfortunate consequences.

1. It creates increased skepticism on the part of those like myself who would truly like to see an integration of the fossil, genetic, and archaeological records.
2. It exacerbates the public misapprehension that all human accomplishments are biologically driven. The average person may be forgiven for asking, ‘What next? The gene for velcro?’

3. Most importantly, once again, Africans are portrayed as cognitively inferior. The expansion of populations of *Homo sapiens* out of Africa seems to be subject to renewed interest in part because it may have left a genetic signature that is accessible with current research techniques. While of course it is an interesting and legitimate issue for investigation, it needs to be emphasized that the focus once again is upon the origin of non-Africans, not the origin of *Homo sapiens* or of humanity as a whole. It is acutely revealing that special human qualities, particularly advanced cognition, are invoked as a mechanism for the migration out of Africa. I see the importance attached to the ‘time lag’ between the appearance of *Homo sapiens* and their ‘escape’ from Africa, and the insistence that it required superior intellect, as an attempt to paint non-Africans in the most flattering conceivable light. The research seems to seek to identify not what makes us human, but what makes non-Africans special. The assumption seems to be that superior intelligence was required to leave Africa. The inevitable corollaries are that: 1) not much intelligence is required to survive there; 2) those who remain there are not particularly intelligent; and 3) once intelligence was acquired, the smart humans lost no time in making tracks to escape Africa.

**Down with the Revolution**

The term ‘Human Revolution’ is a serious misnomer. The concept as it was originally envisioned was predicated upon a mistaken interpretation of the archaeological and evolutionary records. It was built upon the belief that the Middle to Upper Palaeolithic transition represented rapid *in situ* change, rather than a population replacement. Despite the repeated demonstration that this original reconstruction of events was in error, archaeologists have not jettisoned the idea of a revolution, but continue to seek a ‘human revolution’ of some kind, somewhere. This is seen as a single extraordinary moment that defines what it is to be human and explains all or most of subsequent events in prehistory. This quest for this ‘eureka moment’ reveals a great deal about the needs, desires, and aspirations of archaeologists, but obscures rather than illuminates events in the past. It continues to put Europe on centre stage, casting it either as the arena where the actual events of human origins were enacted, or as the yardstick by which human accomplishments elsewhere must be measured.

Now, to accommodate recent genetic and archaeological discoveries, a new version of the human revolution story is presented, this time in Africa or the adjacent regions of the Arabian Peninsula at 60–80 kya, rather than in Europe at 40 kya. Like its predecessor, it is seen as the product of an imagined human cognitive advance, perhaps caused by a genetic mutation. This new model now sets the entry into Europe, or at least the exit from Africa, as the test of true humanity, with earlier African and Levantine populations of *Homo sapiens*, despite their demonstrations of symbolic behaviour, now cast as ‘failed’ migrants who lacked the special qualities that such a migration required. Like its predecessor, this new ‘revolution’ can instead be explained by normal processes of invention and migration undertaken by early African populations of *Homo sapiens*, who had shared the capacity for advanced cognition at least since the origin of our species more than 200,000 years before. The European Upper Palaeolithic record shows that people ultimately of African origin responded to their new environment in interesting and arresting ways, not that they underwent a cognitive reorganization when they set foot on European soil, nor that the Africans ‘left behind’ never achieved the goal of true humanity.

The continued search for a ‘human revolution’ is the playing out of a number of well established themes in the European intellectual endeavor: to provide simple answers to complex questions, to establish a clear gulf between humans and the rest of nature, and to set Europeans apart from their African ancestry. The perceived gulf between humans and the rest of the natural world is so fundamental to Western thought that it is not likely to disappear in response to this or any other rational presentation of the facts. But I would hope that the continued pernicious assertion of European superiority will give some pause. Geneticists must seek to understand archaeological data as diligently as some archaeologists have sought to understand genetic research. And at the very least, I would urge those who study the European Upper Palaeolithic or the Middle to Upper Palaeolithic transition to abandon the term ‘Human Revolution’. It implies a swift, in-place transformation of Neanderthals into *Homo sapiens*, which is not in accord with the vast body of research findings of the last twenty years. The term conflates ‘human’ with ‘European,’ and implies that those outside Europe were not really human. As Paul Veyne (1987, 119) has observed in another context: ‘A social class proud of its superiority sang hymns to its own glory’.

I predict that those who argue for a very recent origin for language or advanced cognition, or for an origin for these things outside Africa, will need to revise their ideas as ever more ancient symbolic artefacts
come to light in Africa. It is clear that the best place to look for these objects is in Africa since that is where early humans lived. But the tendency instead has been to shift the criteria for inclusion in humanity, with the result that it is always denied to early Africans.

Each of us chooses the research questions that we pursue for a variety of reasons: intellectual, personal, and practical. Perhaps it is inevitable that biologists and archaeologists will continue to search for a ‘magic bullet’ to answer the profound questions that have troubled human beings throughout history. But archaeologists have a special obligation to distinguish a marvelous, unique, specifically European prehistoric heritage from the defining characteristics of all of humanity.

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Notes

1. The term ‘European’ is used here to indicate those of European ancestry, no matter where they reside.
2. *Homo sapiens* will be used in this paper to denote ‘anatomically modern’ *Homo sapiens*, sometimes referred by others to *Homo sapiens sapiens*.
3. The term ‘hominin’ (formerly ‘hominid’) designates members of the bipedal clade after its separation from that of the African apes.

References


Bräuer, G., 1984b. The ‘Afro-European sapiens hypothesis’ and hominin evolution in East Asia during the Late Middle and Upper Pleistocene. *Courier Forschungsinstitut Senckenberg* 69, 145–65.


Byers, A.M., 1994. Symboling and the Middle–Upper Paleo-


