Early Old World migrations of Homo sapiens: archaeology

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Early Old World migrations of *Homo sapiens*: archaeology

Peter Hiscock

This chapter complements chapter 4 by focusing on the cultural evidence for the origins and dispersal of early Homo sapiens. *It points out that the dispersal of modern humans across the Old World was not so clearly marked in the archaeological record as some earlier models suggested, especially those focused only on Africa, the Near East, and Europe.*

One of the great unanswered questions of archaeology is how the first modern humans (*Homo sapiens)* dispersed across the globe. The evidence from studies of modern and ancient genetics as well as preserved human skeletons makes it clear that they did disperse. *Homo sapiens* evolved in Africa, probably eastern/southern sub-Saharan Africa, at least 200 kya and migrated across the rest of the globe during the last 100,000 years (chapter 4; Campbell & Tishkoff 2010). This global dispersal is likely to have been at least the third major movement of hominids from Africa, and has been termed "Out of Africa 3" (Klein 2008). Questions that remain largely unanswered concern how these populations spread, when they reached each region, by what paths they moved, and the adaptive strategies they employed during their dispersion.

Maps of migratory routes in this dispersal of modern humans have been produced, typically hypothesizing pathways similar to those shown in Figure 5.1. Broadly similar maps are common in the literature (e.g. Pettitt 2009). Figure 5.1 reflects the proposition that modern humans originated in eastern Africa and expanded their geographic range mostly to the north, from where they spread westward across northern Africa and eastward out of Africa. It is presumed that they then moved either through the Sinai land bridge into the Middle East and/or across the narrow Bab al Mandab Strait at the mouth of the Red Sea into the southerly portion of the Arabian peninsula. From here it is presumed that human groups moved in several directions: into Europe across the Dardanelles and then along the Danube and/or the Mediterranean lowlands; into northern and northeastern Asia through the steppes north of the Black Sea; and

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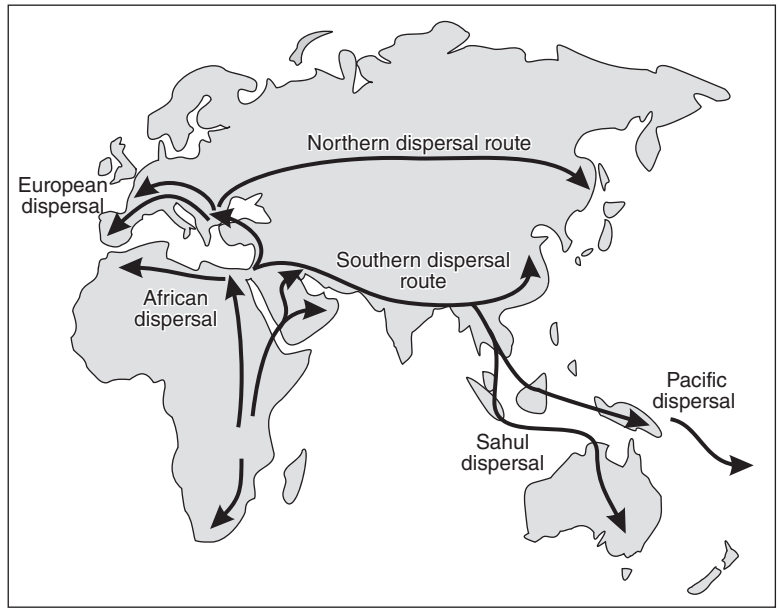

Figure 5.1 Suggested dispersal routes for the early migrations of Homo sapiens out of Africa. Map production by Education and Multimedia Services, College of Asia and the Pacific, The Australian National University.

into eastern and southeastern Asia through the lowlands encircling the Indian Ocean. From peninsula Southeast Asia it is commonly proposed that modern humans moved into Sahul, the glacial-period continent combining Australia and New Guinea, via a "Sahul route." People also moved into the Bismarck and Solomon Islands of Melanesia via the "Pacific route." Dispersal of people into the New World has been much debated but has often been seen as a movement from Siberia, continuing the northern dispersal (as described in chapter 8).

While these proposed migratory routes are plausible, they are founded largely on propositions about geography and are often based in the presumption that the shortest, flattest land pathways would have been employed. Even where specific routes shown in Figure 5.1 have some support in genetic or archaeological evidence, that support is limited and alternative pathways are also conceivable, as for instance suggestions of movement from North Africa into Europe across the Gibraltar Strait (e.g. Sharon 2011).

While genetic analyses have demonstrated the reality of the dispersal out of Africa (chapter 4), they have been of limited value in plotting routes and precise timings. Genetic analyses of biological divergence amongst modern humans have been used to frame discussions of global migration, but such calculations have large errors attached to them (Ho & Larson 2006). Once put at 45–60 kya, such estimates now need to be revised upwards to 50–100 kya in order to accommodate new and earlier dates for relevant human skeletons (e.g. Stoneking & Delfin 2010). This very wide age-range helps propel discussions of human movement, but it offers insufficient

precision for confident linkage between specific archaeological changes and early *sapiens* migration.

Most importantly, genetic patterns in living people typically tell us that biological changes have taken place, but not necessarily where they originated. For example, identifying the age of a common ancestor for Australians does not indicate when Australia was colonized; the biological divergence of extant Aboriginal groups might have begun either before these groups arrived in Sahul, or even some time after the colonization. While a sequence of skeletons would help to define the spread, well-preserved skeletons are rare for the time period between 50 and 100 kya. Only material residues of ancient behavior, such as the artifacts and food debris found in archaeological deposits, are abundant and well-preserved in all regions across the Old World. For this reason, archaeologists have searched for a material signal to identify dispersing modern humans in the archaeological record.

Models of modernity and their implications for identifying dispersion

The notion that *sapiens* populations moving out of Africa might have carried a distinctive form of behavior is entwined with the theory that distinctively "modern behavior" emerged at a particular point in the last 100,000 years. This notion of behavioral modernity implies that there was a set of material objects (1) that were distinctive of the kinds of social and economic lives led by modern *H. sapiens*, and (2) that appeared before people left Africa but were carried with them throughout their global dispersion, thereby explaining the set of behaviors shared by all modern peoples. If both these conditions were true, then the model of modernity offers archaeologists working outside Africa a very useful signature. Much debate has been generated about this proposition, but less about its logic than about whether the two conditions were true. Different researchers have offered slightly different lists of traits as distinctive of behaviorally "modern" hominins (compare Mellars 1989; McBrearty & Brooks 2000; Klein 2008). However, such lists typically share material manifestations of symbols used for public signaling, such as jewelery or art, together with economic or social behaviors deemed to signify planning of resource use or campsite structure; as well as evidence for successful adaptations like colonizations of harsh environments or major sea crossings.

A recent example by Klein (2008) illustrates such a pattern, in that recent behaviorally modern *H. sapiens* are stated to have had, in comparison to earlier hominins, tools made from bone/ivory and shell, art and ornamentation, different campsite arrangements, economic systems that transported stone for knapping over tens or hundreds of kilometers, the ability to live in extremely cold climates, higher population densities, a greater range of standardized tools, and technologies that changed rapidly. But while these characteristics have frequently been claimed to be distinctive of *Homo sapiens*, recent archaeological discoveries cast doubt on each of them.

Initiation of working bone, ivory and shell. Bone, ivory, and shell shaped through carving, drilling, or abrading are not commonly reported outside Africa prior to 50 kya,

but even after they do appear in the Eurasian record they were clearly not made in all times and at all places. They appear more commonly at higher latitudes and their production might therefore have been a technological strategy that suited some conditions more than others. Furthermore, if the ornaments found in the Châtelperronian cave assemblages of southern France were produced by Neanderthals, without enculturation by modern humans, then we have examples of other hominins working these kinds of materials (see d'Errico et al. 1998; Riel-Salvatore et al. 2008; Bar-Yosef & Bordes 2010).

Appearance of art and ornamentation. The use of coloration agents such as ocher extends back at least 300,000 years, preceding the evolution of *Homo sapiens* (Barham 1998; Hovers et al. 2003). Additionally, Châtelperronian Neanderthals were perhaps manufacturing ornaments. Hence art and ornamentation were common amongst early modern humans, but not diagnostic of modernity.

Spatial organization of campsites. In at least some well-described sites there was no significant difference in the spatial arrangement of campsite activities between modern and earlier hominins (Hovers 2009).

Transport of large quantities of desirable stone materials over tens or hundreds of kilometers.

In Western Europe there is evidence that Pleistocene *Homo sapiens* often had exchange systems that moved stone materials very long distances. But there are also examples of other hominins moving rock over such distances for purposes that were clearly planned (Turq 2000; Meignen et al. 2009; Hiscock et al. 2009). The transport distances probably related to local economic and social issues and are not a clear signal of modernity.

Initiation of ceremonies and rituals shown in evidence such as graves. Ritual behavior, such as burial, is found amongst hominins other than *sapiens* (e.g. Pettitt 2011). While there may have been different rituals employed by the latter, it is not true that the mere existence of rituals is distinctive of modern humans.

Human ability to live in cold climates in Europe and Asia. It has been suggested that the occupation of the northern sub-arctic landscapes of Eurasia was accomplished only by modern humans because of their technological advantage over other hominins in creating clothing. For instance, Gilligan (2007a, 2007b) has argued that a lack of sewn clothing was a limiting factor in the northward expansion of Neanderthals and a contributing factor in their extinction, while *Homo sapiens* had such clothing and were able to occupy extremely cold environments. However, these claims do not provide a signature of the arrival of anatomically modern humans (AMH) in more southerly, hence warmer, lands.

Increase in population densities to levels seen in the historic period for similar environments and economies. Estimates of prehistoric population sizes have proved difficult and they have often been based on site numbers. Recent modeling has shown that site numbers can largely be a reflection of greater destruction with increasing age (Surovell et al. 2009), limiting inferences about population size in the past. While genetic evidence clearly points to population increase during the global dispersal of modern humans, we do not have similar information for other hominins, nor is it a simple matter to compare size signals with those of historic non-agricultural people.

Diversification of economies to extract energy, such as fishing. Evidence is increasingly emerging of pre-*sapiens* economies that were more elaborate and diverse than had

previously been thought. For example, in Gorham's and Vanguard Caves in Gibraltar, the faunal material indicates Neanderthal exploitation of marine mammals, mollusks, fish, and birds, as well as terrestrial fauna (Stringer et al. 2008). This kind of evidence means that economic diversity in itself is not a signal of a modern human presence.

Significant increase in tool diversity and standardization within each type. It is now clear that measurements of tool diversity are often arbitrary and correlated with assemblage size. Consequently, the calculated diversity of tool classes depends on the typological system employed by each individual archaeologist, as well as on the mobility of the ancient foragers themselves, given that the latter will influence the number of tools discarded in any one location. When studies in Western Europe have systematically examined these factors they have demonstrated that there was no difference in tool-type richness between assemblages created by Neanderthals and those created by modern humans (Grayson & Cole 1998). Detailed studies of the standardization of tool sizes also reveal no difference between those made by *Homo sapiens* and those made by earlier Neanderthals (Marks et al. 2001).

Increase in the rate of tool variation through time and space. Largely derived from the sequence of changes in Western Europe, this rate increase is not applicable to all regions to which modern humans spread. For instance, the rate of tool change in Pleistocene Australia has been described as lower than the rate observed in other regions (Hiscock 2008; Hiscock et al. 2009).

The problems described above create significant difficulties for any attempt to trace the dispersion of modern humans across Eurasia using the residues of their activities. With the exceptions of Australia, the Americas, the extreme north of Eurasia, and isolated islands such as Greenland, Iceland, and the Pacific islands, most of the globe's land surface had already been colonized by culture-bearing, tool-using hominins long before the arrival of *Homo sapiens*. Without distinctive objects or behaviors made or used *only* by the latter it is difficult or impossible in most regions to distinguish the debris created by dispersing modern humans from that created by the hominins who preceded them. This has been the challenge facing archaeologists seeking to employ cultural residues to map the global migration of *H. sapiens* after the species left Africa.

Despite the above problems, a number of attempts have been made to identify more specific technology-based archaeological signals of the spread. Three of the most prominent are discussed here.

The Middle to Upper Palaeolithic transition in Europe

It is from Europe that some of the strongest arguments have emerged for a distinct cultural signal for the arrival of *Homo sapiens,* or Crô-Magnon as they are known locally. This proposition developed in the 19th century because some of the earliest systematic archaeological excavations in the Dordogne region of France provided evidence for an association of Neanderthals with Middle Palaeolithic assemblages at sites such as Le Moustier, and of *H. sapiens* with Upper Palaeolithic assemblages at sites such as the Abri de Crô-Magnon itself (Lartet & Christy 1875). For the next century the idea of broad association between hominin taxa and archaeological assemblages

was repeatedly encouraged by suggestions that the replacement of Neanderthals by *H. sapiens* in Western Europe occurred in the early Upper Palaeolithic. The evidence from skeletons suggested that the replacement occurred about 45–35 kya.

This model is only viable in Europe and adjoining regions and cannot be extrapolated to Africa, East Asia, Australasia, or the Americas since the division of archaeological sequences into Middle and Upper Palaeolithic is not appropriate in those locations. However, even in Europe the connection of these cultural changes with the dispersion of *Homo sapiens* is ambiguous. For instance, the Châtelperronian is the earliest archaeological phase in Europe with worked bone, ivory, teeth, and antler. As it represents a substantial behavioral change, it was once thought to mark the arrival of *sapiens*. Yet, many of the elements of the Châtelperronian lithic technology show continuity/similarity with the preceding Middle Palaeolithic industries that were definitely produced by Neanderthals. Recently, archaeologists have offered a variety of opinions about the identity of the hominins who made Châtelperronian objects: some have suggested that Neanderthals alone were responsible, others suggest that Crô-Magnons were present and that they influenced any Neanderthals who may also have been present, and some argue that the makers of the Châtelperronian still cannot be defined (e.g. Mellars et al. 2007; Bar-Yosef & Bordes 2010). This uncertainty is not restricted to the Châtelperronian but also extends to the Aurignacian, the succeeding Upper Palaeolithic cultural phase.

The Aurignacian is a geographically diverse set of industries, typically with an emphasis on the production of thin stone blades, and has often been discussed as the most likely archaeological indicator of the spread of *H. sapiens* from the Levant into Western Europe. The recent evidence cited in support of this model is an east to west trend in radiocarbon dates for the appearance of Aurignacian and related industries, consistent with the idea that migrating modern humans might have carried these technological behaviors with them (Mellars 2006a). This model predicts that the initiation of the Aurignacian should represent a sharp cultural break with preceding technological, economic, and social traditions in the path of this migration.

While Aurignacian assemblages appear in some places as a radical change to earlier industries, there are also a number of regions across Europe where they show links to local variants of Middle Palaeolithic industries (Kuhn et al. 2004). Furthermore, in eastern Europe, Crimea, and the Levant the appearance of the Aurignacian may not mark the point at which key behavioral changes occurred, since ornaments and bone tools were already in use. These complexities are compounded in the Levant, where the early modern human inhabitants of Skhul and Qafzeh caves in Israel produced distinctively Middle Palaeolithic assemblages, and across Europe by a scarcity of human remains dating to the critical period between 45 and 35 kya.

Such complexities raise the possibility that, even in Europe, archaeological industries such as the Châtelperronian and the Aurignacian do not map on to human biology in any simple way. Until these uncertainties are resolved it seems that the appearance of early Upper Palaeolithic industries in Europe is not a reliable marker of the dispersal of modern humans (Kuhn et al. 2004), even though the sequence of skeletons in Europe points to a window about 10–15,000 years long during which the dispersal probably took place.

The microlith dispersion model

Another model suggests that dispersing populations carried with them what archaeologists call "microliths," small flakes of stone with a blunted back which often have distinctive symmetrical shapes. Such tools are often very small, only a few centimeters long, and were probably hafted on to wooden or bone shafts to construct tools such as saws, knives, or projectiles with stone points/barbs (Lombard 2005; Lombard & Pargeter 2008; Robertson et al. 2009). While such tools may be explained as adaptations to changing environmental and economic conditions (Attenbrow et al. 2009), they have commonly been seen as stylistic markers, perhaps indicating a common technological and cultural tradition. This view forms the basis for the idea that they might also have been stylistically loaded tools carried by humans dispersing beyond Africa. Developed in its most recent form by Paul Mellars (2006b), this model is founded on the observation that not only do microliths occur in European deposits close in time to the appearance of anatomically modern humans, but similar microliths have also been observed in southern and eastern Africa at more than 60 kya. They also occur across large areas of South Asia, perhaps representing material signals of the dispersal of microlith-using modern humans through the arc of land surrounding the Indian Ocean, from Africa to Australia.

However, the proposition that lithic technologies based on blade production were carried by modern humans spreading from Africa does not work well, as Mellars (2006b) has recognized. In Africa, these tools and technologies were present prior to the appearance of modern humans, by at least 300 kya, and have oscillated in and out of use since that time (Barham 2002; Hiscock & O'Connor 2006). Hence, it appears that even within Africa there was not a simple relationship between these tools and early *Homo sapiens*.

Nor does the evidence from India conform to a microlithic-linked model of human dispersal. For instance, at sites in Andhra Pradesh there were no dramatic changes in technology in the period 50–80 kya, when modern human populations are predicted to have dispersed through the area (Haslam et al. 2010). Instead, microliths appeared in the region around 34 kya in response to climate change, and noticeably after modern humans arrived (Clarkson et al. 2009; Majumder 2010; Perera et al. 2011). In this context, the idea that the earliest dispersal across the lands around the Indian Ocean was linked to the use of microliths is implausible, especially if that dispersal also resulted before 50 kya in the colonization of Australia. If the appearance of microliths in India was a result of large-scale population dispersal then it probably reflected a secondary migration.

The earliest archaeological sites in Australia indicate that human occupation had commenced by about 50–55 kya (see chapter 7). For the first 30,000 years lithic technologies were diverse, based on many different forms of core reduction, and no microliths were made until about 20 kya, around the time of the last glacial maximum (LGM). This pattern is not what would be expected if the original colonists had employed microlithic tools. Mellars (2006b) recognized the problem that Australia posed for his microlith dispersion model and proposed as explanations local adaptations to

low-quality raw materials, different functional needs for such tools, and a reduction of technological diversity through multiple founder effects as successive landscapes were colonized. While this could be the case, it is puzzling that such a model invokes adaptive processes only at the eastern end of human dispersion along the southern route, while implying that microliths were a traditional, invariant element in the toolkits of groups dispersing from Africa across the Middle East and South Asia. If dispersing Pleistocene foraging groups could, and did, choose not to make microliths for tools then the association of this kind of implement with the first wave of modern humans spreading out of Africa is weak. The evidence from India suggests that the earliest modern human migrants did not make microliths and that they were introduced by subsequent migrations.

The Mode 3 hypothesis

The apparent arrival of modern humans in south Asia and Australia well before microliths were introduced is an example of the reason why Lahr and Foley (1994; Foley & Lahr 1997, 2003) argued that the global spread of AMH must have been associated with an earlier suite of tools and cultural material. They hypothesized that the migrants carried what is called "Mode 3" technology, stoneworking using "prepared core" strategies such as Levallois. They argued that whereas earlier and later modes were geographically restricted, Mode 3 is found across much of the Old World and has a time depth that matches with the emergence of *Homo sapiens* in Africa. In one sense they must be correct, but this does not mean that Mode 3 industries are diagnostic of the dispersal of *H. sapiens*. Several contemporary hominin taxa, including *H. neandertalensis* and *H. floresiensis*, employed Mode 3 technologies and hence these artefacts cannot be used as diagnostic for a presence of modern humans (Moore et al. 2009). In any case, the use of Mode 3 as an indicator of any specific hominin taxon is complicated by its status as the least well-defined technological system in the Palaeolithic. Foley and Lahr may well be looking merely at generic core reduction processes that appear similar between regions only because distinctive elements are not present.

The dispersal of anatomically modern humans and the nature of cultural transitions in the archaeological record

The failure of these various attempts to identify a clear and direct archaeological signature of the initial global migration of modern humans is significant. This is best understood not as a failure of archaeologists to see the distinctive culture or technology of dispersing hominins, but as an indication that there was no simple connection between taxon and culture, between the biological and cultural phylogenies associated with population radiations. Instead of our species inflexibly carrying forth a particular set of behaviors or technologies which assisted their success, the evidence points us to a different image. Colonization of the diverse landscapes across the globe was facilitated by the capacity of early *Homo sapiens* to adapt its social, economic, and technological activities to the different contexts in which it existed. While the reorganization of

the behavioral systems of migrating humans was no doubt contingent on tradition, those systems did not merely reproduce previously existing habits. The diversification of archaeological patterns and the lack of a coherent global signal created by modern humans in their spread beyond Africa reveal that the creation of behavioral diversity, either through maintenance of existing social and material culture systems or through repeated adjustment to those systems, may typify the adaptive process that underpinned the migration of *Homo sapiens* across the Old World.

SEE ALSO: 4 Early Old World migrations of Homo sapiens: human biology; 7 The human colonization of Australia; 8 The human colonization of the Americas: archaeology

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