Modern Humans: Their African Origin and Global Dispersal

John F. Hoffecker
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The origin and spread of our species, *Homo sapiens*, has been and will continue to be a central theme in human evolutionary studies (e.g., Stringer 2016). As a research topic, it combines the two great aspects of the evolutionary process, temporal change and spatial variation. Across the world, researchers are exploring the evolution of our species, from excavations in the remotest deserts to laboratory analyses that would have been impossible just a few years ago. Against this exciting backdrop, Hoffecker's book is useful in some regards as a synthesis, yet it also offers a somewhat stale view of the evolution and dispersal of our species.

Hoffecker's book is highly ambitious in its scope. Not content with the already formidable topic of the origin and spread of our species, Hoffecker tries to synthesize a very grand narrative in which the evolution of *Homo sapiens* is fused with topics such as the origin of language. He also tries to tell much of the history of paleoanthropology. Much of this material makes interesting reading, but I think the book would have been improved if it was more focused. On one page, Hoffecker will be discussing chronometric dating techniques, and a few paragraphs later he will be discussing metazoan brain evolution in the Paleozoic. A chapter on the recent African origin of *Homo sapiens* begins by talking about a feral boy who lived in the woods in France.

Below I will discuss the major themes of the book, rather than listing what it contains chapter by chapter. But, in outline, the book begins with a discussion of our African origin, before moving to southern Asia and Sahul, then northern Eurasia, and lastly, the Americas.

Hoffecker attempts to combine models for the spread of *Homo sapiens* such as that of Paul Mellars and colleagues (2013)—itself a somewhat bizarre and probably flawed model (see Groucutt et al. 2015)—with a menagerie of other ideas. He claims to be advancing Darwin's ideas on human evolution, which he believes were sidelined by paleoanthropologists who confused things by looking at actual paleoanthropological data. He likewise seems to think that there is great meaning in describing the evolution of *Homo sapiens* as a 'major transition in evolution' *sensu* Smith and Szathmáry (1995). He favors a Chomskyan view on language. To me, this attempted grand synthesis does not really work. Take the origin of language. Ask two archaeologists when language evolved and you will probably get three different answers. No one would doubt that language is of great importance, but it is also incredibly hard to pin down, and it is unclear how the emergence of our species relates to language evolution.

Hoffecker claims that the evolution of *Homo sapiens* cannot be explained by the 'modern synthesis' of Darwinism and Mendelian genetics, because when this was formulated little was known about non-genetic aspects of the evolutionary process. He goes into considerable detail on some aspects of this, such as giving several pages to considering how the term 'information' is defined. Hoffecker paints a world in which hominins other than *Homo sapiens* are rather asinine creatures, and then suddenly and dramatically—and in terms of actual evidence, I would say rather illusively—we pop onto the scene. He claims there is a dramatic shift in the behavior of our species about 75 thousand years ago. Popular authors such as Yuval Noah Harari might like such a view, but the archaeological underpinnings of it are at best tenuous. In contrast to the brave early *Homo sapiens* pioneers, Neanderthals had apparently stopped evolving, so provide a proxy for the behavior and cognition of earlier hominins such as *Homo heidelbergensis* (p. 167).

While Hoffecker aims to develop a new theoretical framework, the discussion centers on the kind of ideas and data prominent in the rather stagnant 'modern human behavior' debate. I think that this is a shame, and many pressing topics are overlooked. For example, what was the extent and impact of population structure on the evolution of *Homo sapiens*? What about the considerable biases that influence the paleoanthropological record? In Africa, for example, the vast majority of data come from either the Rift Valley or small stretches of the coast at the extreme southern and (to a lesser extent) northern margins of the continent. Can such data really be generalized across the whole of Africa? Where should future fieldwork be conducted to acquire representative information? To what extent is the record biased by using radiocarbon to date sites that are near or beyond the limit of radiocarbon dating? It is the lack of consideration of such issues that make this book interesting reading, but not destined to lead to any significant changes in our understanding of the origin and dispersal of *Homo sapiens*.

The book also seems rather out of date in many regards. For example, the evolution of *Homo sapiens* from *Homo heidelbergensis* it argues for is actually not very clear (e.g., Stringer 2016). Hoffecker also seems to be rather selective in the information he presents. For example, in the

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case of Arabia he ignores the dozens of papers published in recent years on sites in Saudi Arabia, and only discusses archaeological sites in southern and eastern Arabia, which fit his narrative. Hoffecker also is often uncritical with chronometric age estimates. For example, is the Manot Cave calvarium really 55 thousand years old? In cases such as this, and the handful of redeposited lithics at the Omani site of Aybut al Auwal, it is of profound significance to emphasize that these are *minimum* age estimates. He is also uncritical in his replication of early 'industries' that some archaeologists are fond of, but which are incoherently and inconsistently defined (e.g., the 'Nubian Complex'), and which are increasingly being shown to be at odds with reality.

The terminology used by Hoffecker is also confusing. This is more to criticize our discipline as a whole than this author specifically. Terms such as *Homo sapiens*, modern humans, anatomically modern humans, 'near moderns,' and so on often appear to be randomly interchangeable. Likewise, the distinction between 'modern' and 'archaic' seems increasingly unhelpful. One senses that we need a major spring-clean and simplification. Philosophical terms such as 'modern' should be abandoned entirely, and anatomically modern humans, *Homo sapiens idaltu* and various other problematic concepts should be jettisoned. Hoffecker highlights the problems with terms such as modern by generally using the word in relation to the biology and behavior of (generally late) *Homo sapiens*, yet he also slips into other uses. For example, he argues that elements of 'modern' morphology were in place by 1.5 million years ago (p. 10), for example, the hands (p. 128). He also describes *Homo heidelbergensis* as the first modern humans (p. 156)! In one place, he describes the discovery of two teeth, and in the same sentence says that one has been assigned to *Homo sapiens* and the other to modern humans (p. 224). It seems to me that Hoffecker is reflecting the complete confusion that currently exists. A focus on the biological term *Homo sapiens* would seem better than the current alphabet soup. As in many aspects of paleoanthropology, perhaps our mantra should be 'less words, more data'.

In regards to the origin of our species, Hoffecker argues that 'modern anatomy' was in place by around 150 thousand years ago (although he then describes younger fossils from sites such as Skhul and Qafzeh as being 'near modern'). This downplays the fact that significant evolutionary change occurred long *after* this point (e.g., Neubauer et al. 2018). The dramatic effects of processes such as the Holocene Filter (Lahr 2016) should also not be underestimated. Fossils such as the Iwo Eleru calvaria—a young, yet morphological primitive fossil—are of fundamental importance in understanding recent human evolution in Africa, yet are not discussed by Hoffecker. *Homo sapiens* has deep African roots, and we should see a long and complex evolutionary process over the past half a million years or so. Cutting off part of this and labelling it 'modern' is neither particularly meaningful nor helpful. Clearly, considerable variation and change occurred *within* the *Homo sapiens* lineage.

When it comes to (successful) dispersal out of Africa, Hoffecker favors a model in which dispersal occurred between 75 and 60 thousand years ago. This time period, broadly correlating with MIS 4 would, on climatic grounds, have been one of the worst possible times for humans to disperse out of Africa. There is also no specific archaeological or paleontological data from around the Indian Ocean rim that a major dispersal occurred at this time. Growing evidence from Arabia, India, east Asia, and Sahul suggests that *Homo sapiens* dispersed far and wide much earlier than previously envisaged. This may or may not have been a failed dispersal, but a failed expansion certainly seems somewhat less likely than when the 'early dispersal 'was only known in the Levant, a small area on the doorstep of Africa. In that sense, increasing evidence suggests that 75 to 60 thousand years ago is simply too late for the major dispersal phase. On the hand, recent genetics papers tend to suggest even younger chronologies for successful dispersal, of less than 55 thousand years ago (e.g., Posth et al. 2016).

What is going on? Geneticists are still riding the wave of recent advances in sequencing technology. There is currently little integration of non-genetic data into their models. It seems likely that many models may be undermined by factors such as their underestimation of high levels of population structure in African Middle and Late Pleistocene *Homo sapiens*. Panmixia may be computationally easy, but is an increasingly problematic premise. But, in broad terms, it currently seems likely that there were early dispersals into Asia between broadly 130 and 90 ka and perhaps late dispersals around 55 ka. Current debate is about the relative balance between these two main phases of dispersal. It seems like the former was much more extensive than previously believed, yet recent interpretations suggest that it was almost swamped by the latter. This model leaves little room for an apparent coastal 'exodus' around 70 or 60 thousand years ago.

Hoffecker's narrative continues many of the problems with the Mellars and colleagues (2013) perspective. We know that dispersal into Asia must have occurred from northeast Africa, as this is the only area of Africa bordering Asia, yet archaeologists find distant and intensively-researched South Africa interesting, and so various unconvincing ways are made to try and link behavioral change in South Africa with our dispersal into Eurasia. Likewise, a traditional Eurocentric emphasis on the Upper Paleolithic has to be squared with the observation that *Homo sapiens* had left Africa thousands of years before the origin of the Upper Paleolithic. Hoffecker perpetuates and embellishes these contradictions. He favors a conservative view of when *Homo sapiens* reached Sahul—already rickety when he wrote this book, it is now known that humans arrived there by 65 thousand years ago (Clarkson et al. 2017). Humans, probably *Homo sapiens,* were in Sahul more than 15 thousand years before the Upper Paleolithic began! Such findings will hopefully be the death knell of the Upper Paleolithic as a marker of either 'modernity' or of *Homo sapiens* dispersal. While paleoanthropologists often seem in awe of the latest *Nature* and *Science* papers by geneticists,

which produce attractive sounding and simple stories, we should be wary of the fast-changing character of these debates. Archaeologists, paleoenvironmental scientists, and paleontologists should be proud of our data, and not try to contort it to fit fast evolving genetics models.

While Hoffecker prefers to talk about things in terms of concepts such as 'computation'—and I do not think the word 'automata' has ever previously been used so much in a single publication—he is basically talking about the concept of 'modern human behavior' (see Shea 2011). With behavior, the archaeological record arguably indicates a gradual and mosaic pattern across time and space, in distant and largely isolated populations. To Hoffecker though, behavioral change is presented as a ladder towards 'modernity'. Perhaps understandably as it the area where he conducts research, Hoffecker is very interested in the high latitudes of northern Eurasia and Beringia. In my opinion, this flavors too much his interpretation of processes in the core, low latitude, areas of Pleistocene human societies. How humans recently expanded to areas like the far north is indeed interesting, but I do not think one that gets to the heart of the human condition. The key to understanding human dispersal lies in resolving our dispersal across southern and southeastern Asia (where most humans live today). We should be wary about extrapolating lessons from human occupation of extreme northern environments to our spread across the low latitudes. Hoffecker gives a lot of attention to the spread of the Upper Paleolithic, but his narrative here is not convincing. He claims the Upper Paleolithic begins in the Levant and then spreads. However, the oldest reliable dates for the Upper Paleolithic in the Levant are around 45 thousand years ago (see, e.g., Stutz et al. 2015), or maybe a millennium or two older than this, but there are many stratigraphic and methodological ambiguities. This chronology is the same as, or indeed younger than, Upper Paleolithic and 'transitional' assemblages elsewhere. The key here, of course, is dating Boker Tachtit using modern methods, which is currently ongoing. That might change the picture. With current data it is quite possible that there were multiple transitions to the Upper Paleolithic, and/or that its onset in the Levant reflected dispersal from somewhere further into Asia or even Europe. Hoffecker makes some mistaken claims here that might suggest that he is not familiar with some of the details (not surprising given the vast topic covered by the book). For example, he claims that the Emiran was defined by Garrod after her excavations at Ksar Akil (p. 271). Actually, the Emiran was named after the assemblage from Mugharat el-Emireh, and Garrod did not excavate at Ksar Akil.

Likewise, Hoffecker embraces the simplistic phylogeography favored by some—but by no means all—geneticists. Yet, for example, we cannot simply assume that gene trees are also population histories. This has recently been highlighted by research on Neanderthals indicating that they apparently acquired their mitochondrial variants from a spread of African hominins ca. 400–200 ka (Posth et al. 2017). What complexity! The central point is that genetic data requires contextualization and interpretation, and paleoanthropologists and environmental scientists are well equipped to do this. Bending complex data to fit models will only lead to confusion, as will forcing complex and indeed often contradictory data into simple narratives. Understanding the origin and spread of *Homo sapiens* will only come from meaningful interdisciplinarity, based on spatially and temporally representative datasets.

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