



Center for Academic Research & Training in Anthropogeny (CARTA)

“Behaviorally Modern Humans: The Origin of Us

Friday, May 10, 2013 • Public Symposium

Chairs: Alison S. Brooks, George Washington University • Ajit Varki, UCSD

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ABSTRACTS

African Climate of the Last 400,000 Years

Rick Potts, Smithsonian Institution

Given East Africa's role in the origin of *Homo sapiens*, this region's climate history deserves attention, although pertinent models are lacking. Analysis of Earth's orbital dynamics yields a new model that shows the alternation of high and low climate variability for tropical East Africa over time, with potentially important implications for Pleistocene human evolution. This high/low variability model reconciles evidence that typically supports either aridity or strong moisture as factors in human evolution. Based on current evidence, key events such as the appearance of Middle Stone Age behaviors and *Homo sapiens* in tropical East Africa coincided with prolonged eras of climate instability. The complexity of climate dynamics, and associated resource uncertainty, likely influenced the evolution of adaptive versatility in our species, expressed by the expansion of mobile technologies, symbolism, social networks, and behavioral diversity.

Fossil Record of Anatomically Modern Humans

Chris Stringer, Natural History Museum, London

Evidence points strongly to Africa as the major center for the genetic, physical and behavioral origins of both ancient and modern humans, but new discoveries are prompting a rethink of some aspects of our evolutionary origins. The fossil record from Africa for the last half-million years covers less than half the continent, and is particularly lacking from central and western areas. Recent genetic and paleontological research suggests more complex scenarios for our origins than had been considered previously. This includes the likelihood of interbreeding between archaic and modern humans, both within and outside of Africa.

East African Archaeological Evidence

Alison S. Brooks, George Washington University/Smithsonian Institution

Sally McBrearty, University of Connecticut

Apart from references to the oldest fossil hominins attributed to *Homo sapiens*, the East African record is often ignored in current scenarios of modern human origins in favor of the much more detailed, well-preserved and better-explored region at the southern end of the continent. Over 20 years of research in the eastern and south-central African zones of woodlands and savannas surrounding the central African rainforest have produced new evidence concerning the transition from pre-sapiens behavior to behaviors more characteristic of the Late Pleistocene humans who expanded from Africa and replaced the pre-existing populations of Eurasia. In long sequences from Kenya, Ethiopia and to a lesser extent, Tanzania, Malawi, Zambia and the Sudan, radical shifts to new, more complex technologies, economic strategies and social formations began around 500 kya. Well before the first appearance of *H. sapiens*, earlier Acheulian technologies had been largely abandoned in favor of smaller, more standardized flakes and elongated blades, shaped into scrapers, points, knives and other tools, some of which were thinned at the base for hafting. Two of the most striking features of the Middle Pleistocene record are the evidence for the collection and use of large quantities of ochre, and for very long distance transport of raw materials for tools. The importation of exotic materials implies new relationships between groups, and expanded social networks, as well as new ways of thinking about and scheduling resource procurement. The use of ochre also carries possible symbolic implications. The Late Pleistocene record parallels but differs from the contemporaneous South African coastal record. While possibly sharing an early appearance of personal ornaments and small geometrically-shaped lithics, East Africa differs in its emphasis on extensive raw material networks, and in the widespread presence of small points which likely functioned as elements in a complex projectile weapons system. The transition to the Later Stone Age began by 60m to 50 kya, and continues without the reversion to earlier technological and economic systems seen in South Africa.

ABSTRACTS (continued)

South African Archaeological Evidence

Lyn Wadley, University of the Witwatersrand, Johannesburg

As archaeologists, we cannot access culture or cognition directly; we must interpret levels of cultural or cognitive complexity from circumstantial evidence or from technological evidence. The interpretive process requires carefully constructed bridging theory between archaeologically recovered data and interpretations about behavior and human capacity. Some technologies involve permanent transformations of their ingredients that cannot be achieved without modern mental capacities. In South Africa, the manufacture of compound adhesives and compound paints by 100,000 years ago is clear evidence for modern thought processes that involve, for example, multi-tasking. Some early hunting technologies support this conclusion. Cultural traditions, reminiscent of hunter-gatherer ones practiced in historic times, are also evident in South Africa's Middle Stone Age, by not less than 100,000 years ago.

Interbreeding with Archaic Humans in Africa

Michael Hammer, University of Arizona

Early research on mitochondrial DNA (mtDNA) had a decisive role in the long-standing paleontological debate over human origins by providing a relatively simple picture of human evolutionary history: the set of traits that define our species as "anatomically modern" originated in a small, isolated population in Africa during the Late Pleistocene. This population then completely replaced archaic forms of humans as it expanded its size and range throughout Africa and the Old World. Today there is an abundance of DNA sequence data from the entire genome of contemporary human populations, as well as from ancient DNA recovered from extinct forms of humans. Analyses of these data, with increasingly sophisticated computational tools, are yielding new insights into human evolutionary history. The story of our origins may not be as simple as once imagined.

Relationships of Ancient African Languages

Christopher Ehret, UCLA

Almost all of the more than 1,000 African languages spoken today belong to just four families—Afroasiatic, Niger-Kordofanian, Nilo-Saharan, and Khoesan. Each family is relatively ancient, with its mother language, or protolanguage, spoken during the late Pleistocene. As these language families spread out across the continent in the early Holocene, they gradually drove out of use hundreds of other languages that used to be spoken in Africa. But in the late Pleistocene, these mother languages were just four among many languages spoken in the continent. Only about three of those other languages survived in use down to the present. What were the relationships of these languages to the existing African families and to the language families of the rest of the world, and what can this information tell us about human origins and early human history?

Archaeological Evidence for the Spread of Modern Humans

Ofer Bar-Yosef, Harvard University

The presentation will briefly summarize the archaeological evidence for the dispersals of modern humans into Eurasia avoiding the assumptions that these events, whether short or continuous, were triggered by climatic conditions or followed the dispersals of other mammals. Tracing past human groups as they move through time and space in Eurasia relies on the recognition of how they made their stone tools. These artifacts served as carpentry tools and a few were hafted to serve as spear points or even as arrowheads, assuming that archery was one of the inventions of modern humans after 40,000 years ago. Colonization was successful in regions where animal and plant resources were abundant, and interbreeding, as well as clashes with local populations, were probably part of the repertoire of activities that characterized modern humans and their ancestors. Successful adaptation to different environment and the inventions of warm cloths, sledges, etc. assisted them in occupying the northern latitude, leading eventually to migrations into the Americas.

ABSTRACTS (continued)

Interbreeding with Archaic Humans Outside Africa

Richard “Ed” Green, UC Santa Cruz

Neanderthals and Denisovans are the closest extinct ancestors of modern humans. High-quality genome sequence is now available from both and has revealed multiple instances of admixture between these archaic hominins and the ancestors of currently living humans. We are using these data to refine the demographic models describing recent human evolution and to detect selective sweeps that post-dated our split from Neanderthals and Denisovans.

Stone Tools and Cognition: Lessons from Australia

Iain Davidson, University of New England

In this talk I will address four topics: What is cognition? Can we learn anything from brains? What was the cognitive ability of the Last Common Ancestor? And, how can we learn from stone tools?

I will emphasize eight aspects of stone tool making and use, which show how it required particular cognitive abilities and provided a selective context for their evolutionary emergence. The take-home lesson is that we must move beyond artefact forms; that the best evidence of behavior is to be found in the archaeological record; that brain size changes after 0.5Myr may indicate organizational change; that the permanence of stone tool products had an important role in cognitive evolution; that cutting and carrying imply cognitive novelty; and that a cognitive ability to cope with attention distraction permitted planning—the essential requirement for colonizing the last New Worlds.