New hominin cranial fossils highlight the early exploits of Homo erectus.

Scientists have hypothesized that Homo as a genus relied more heavily on technological extraction of food resources (meat, marrow, and plants) and was behaviorally more flexible than Paranthropus or Australopithecus. Even in light of the diversity among Homo species, H. erectus seems to be the beginning of something new. In the \( \approx 7 \)-million-year history of the human lineage, H. erectus was the first species to leave the African continent (see the figure). In fact, almost as soon as they arose, H. erectus appeared outside of Africa at the site of Dmanisi in the Republic of Georgia. Over the next nearly 2 million years, H. erectus occupied a variety of different habitats and contexts before going extinct well after 0.5 million years ago on presentday Java.

The traditional “out of Africa” model, which posits a dispersal of modern Homo sapiens across Eurasia as a single wave at \( \approx 60,000 \) years ago and the subsequent replacement of all indigenous populations, is in need of revision. Recent discoveries from archaeology, hominin paleontology, geochronology, genetics, and paleoenvironmental studies have contributed to a better understanding of the Late Pleistocene record in Asia. Important findings highlighted here include growing evidence for multiple dispersals predating 60,000 years ago in regions such as southern and eastern Asia. Modern humans moving into Asia met Neandertals, Denisovans, mid-Pleistocene Homo, and possibly H. floresiensis, with some degree of interbreeding occurring. These early human dispersals, which left at least some genetic traces in modern populations, indicate that later replacements were not wholesale.
fire mosaics and the intensity of recent use, and this was consistent across habitats regardless of their quality. Fire mosaics build up in regions with low cost of access to water, high intrinsic food availability, and good access to trade opportunities; these mosaics (constrained by water access during the winter) then draw people back in subsequent years or seasons, largely independent of intrinsic habitat quality. Our results suggest that the positive feedback effects of landscape burning can substantially change the way people value landscapes, affecting mobility and settlement by increasing sedentism and local population density.

**Key terms:** ideal free distribution | positive density dependence | niche construction | historical ecology | hunter-gatherer mobility

**Significance:** Models of human habitat choice and landscape use assume that people have negative effects on resource availability, which causes them to avoid regions that are already occupied or that show signs of extensive past use in favor of regions of higher quality. We show that when people engage in activities that increase resource productivity, like burning, there is the potential for these improvements to change habitat preferences in favor of places that have been previously modified and occupied by people. This process changes the way we think about intensification (and the origins of broad-spectrum economies), which may arise not from the negative effects of people on resources, but from the positive (and often unintentional) feedbacks between people and their environments.

**Braun 2019**


The manufacture of flaked stone artifacts represents a major milestone in the technology of the human lineage. Although the earliest production of primitive stone tools, predating the genus Homo and emphasizing percussive activities, has been reported at 3.3 million years ago (Ma) from Lomekwi, Kenya, the systematic production of sharp-edged stone tools is unknown before the 2.58–2.55 Ma Oldowan assemblages from Gona, Ethiopia. The organized production of Oldowan stone artifacts is part of a suite of characteristics that is often associated with the adaptive grade shift linked to the genus Homo. Recent discoveries from Ledi-Geraru (LG), Ethiopia, place the first occurrence of Homo ≈250 thousand years earlier than the Oldowan at Gona. Here, we describe a substantial assemblage of systematically flaked stone tools excavated in situ from a stratigraphically constrained context [Bokol Dora 1, (BD 1) hereafter] at LG bracketed between 2.61 and 2.58 Ma. Although perhaps more primitive in some respects, quantitative analysis suggests the BD 1 assemblage fits more closely with the variability previously described for the Oldowan than with the earlier Lomekwan or with stone tools produced by modern nonhuman primates. These differences suggest that hominin technology is distinctly different from generalized tool use that may be a shared feature of much of the primate lineage. The BD 1 assemblage, near the origin of our genus, provides a link between behavioral adaptations—in the form of flaked stone artifacts—and the biological evolution of our ancestors.

**Keywords:** Oldowan | stone tools | Homo | cultural evolution | paleoanthropology
Significance: Humans are distinguished from all other primates by their reliance on tool use. When this uniquely human feature began is debated. Evidence of tool use in human ancestors now extends almost 3.3 Ma and becomes prevalent only after 2.6 Ma with the Oldowan. Here, we report a new Oldowan locality (BD 1) that dates prior to 2.6 Ma. These earliest Oldowan tools are distinctive from the 3.3 Ma assemblage and from materials that modern nonhuman primates produce. So, although tool production and use represent a generalized trait of many primates, including human ancestors, the production of Oldowan stone artifacts appears to mark a systematic shift in tool manufacture that occurs at a time of major environmental changes.

Connah 2001

Connah 2004

Diamond 1987

At this point it’s instructive to recall the common complaint that archaeology is a luxury, concerned with the remote past, and offering no lessons for the present. Archaeologists studying the rise of farming have reconstructed a crucial stage at which we made the worst mistake in human history. Forced to choose between limiting population or trying to increase food production, we chose the latter and ended up with starvation, warfare, and tyranny.

Domínguez-Rodrigo 2009
M. Domínguez-Rodrigo et al., *Unraveling hominin behavior at another anthropogenic site from Olduvai Gorge (Tanzania), New archaeological and taphonomic research at BK, Upper Bed II.* *Journal of Human Evolution* 57 (2009), 260–283.

New archaeological excavations and research at BK, Upper Bed II (Olduvai Gorge, Tanzania) have yielded a rich and unbiased collection of fossil bones. These new excavations show that BK is a stratified deposit formed in a riverine setting close to an alluvial plain. The present taphonomic study reveals the secondlargest collection of hominin-modified bones from Olduvai, with abundant cut marks found on most of the anatomical areas preserved. Meat and marrow exploitation is reconstructed using the taphonomic signatures left on the bones by hominins. Highly cut-marked long limb shafts, especially those of upper limb bones, suggest that hominins at BK were actively engaged in acquiring small and middle-sized animals using strategies other than passive scavenging. The exploitation of large-sized game (Pelorovis) by Lower Pleistocene hominins, as suggested by previous researchers, is supported by the present study.


Keywords: Olduvai Gorge | Meat-eating | Cut marks | Percussion marks | Taphonomy | Lower Pleistocene archaeology | Hunting | Scavenging
Domínguez-Rodrigo 2010
pnas107-20929-Comment.pdf, pnas107-20929-Reply.pdf

The announcement of two approximately 3.4-million-y-old purportedly butchered fossil bones from the Dikika paleoanthropological research area (Lower Awash Valley, Ethiopia) could profoundly alter our understanding of human evolution. Butchering damage on the Dikika bones would imply that tool-assisted meat-eating began approximately 800,000 y before previously thought, based on butchered bones from 2.6- to 2.5-million-y-old sites at the Ethiopian Gona and Bouri localities. Further, the only hominin currently known from Dikika at approximately 3.4 Ma is Australopithecus afarensis, a temporally and geographically widespread species unassociated previously with any archaeological evidence of butchering. Our taphonomic configurational approach to assess the claims of A. afarensis butchery at Dikika suggests the claims of unexpectedly early butchering at the site are not warranted. The Dikika research group focused its analysis on the morphology of the marks in question but failed to demonstrate, through recovery of similarly marked in situ fossils, the exact provenience of the published fossils, and failed to note occurrences of random striae on the cortices of the published fossils (incurred through incidental movement of the defleshed specimens across and/or within their abrasive encasing sediments). The occurrence of such random striae (sometimes called collectively “trampling” damage) on the two fossils provide the configurational context for rejection of the claimed butchery marks. The earliest best evidence for hominin butchery thus remains at 2.6 to 2.5 Ma, presumably associated with more derived species than A. afarensis.

Keywords: Taphonomy | Cut marks | Hammerstone percussion | Abrasion | Equifinality

Domínguez-Rodrigo 2012

In order to assess further the recent claims of w3.4 Ma butchery marks on two fossil bones from the site of Dikika (Ethiopia), we broadened the actualistic-interpretive zooarchaeological framework by conducting butchery experiments that utilized naïve butchers and rocks unmodified by human flaking to deflesh chicken and sheep long limb bones. It is claimed that the purported Dikika cut marks present their unexpectedly atypical morphologies because they were produced by early hominins utilizing just such rocks. The composition of the cut mark sample produced in our experiments is quite dissimilar to the sample of linear bone surface modifications preserved on the Dikika fossils. This finding substantiates and expands our earlier conclusion that—considering the morphologies and patterns of the Dikika bone surface modifications and the inferred coarse-grained depositional context of the fossils on which they occur—the Dikika bone damage was caused incidentally by the movement of the fossils on and/or within their depositional substrate(s), and not by early hominin butchery. Thus, contrary to initial claims, the Dikika evidence does not warrant a major shift in our understanding of early hominin behavioral evolution with regard to carcass foraging and meat-eating.

Keywords: Early hominin carcass foraging | Taphonomy | Cut marks | Random striae | Trampling
Eco 1977


Eco was aware of this predicament. As a university professor, he knew that the majority of students in Italian universities seldom attended classes, that very few of them would continue to write and do research, and that the degree they eventually earned would not necessarily improve their social conditions. It would have been easy to call for the system to be reformed so as not to require a thesis from students ill-equipped to write one, and for whom the benefit of spending several months working on a thesis might be difficult to justify in cold economic terms.

But Eco did not believe that education belonged to an elite, or that it should lower its standards in including the non-elite. He understood that the writing of a thesis forced many students outside of their cultural comfort zone, and that if the shock was too sudden or strong, they would give up. For him, it was about tailoring the challenge to students’ needs and capabilities, but without giving up thoroughness, complexity, and rigor. If students’ interests and ambitions could be met, while the limits of their sense of security were stretched, education would be achieved.

Evans 2014


Blind-testing is an important tool that should be used by all analytical fields as an approach for validating method. Several fields do this well outside of archaeological science. It is unfortunate that many applied methods do not have a strong underpinning built on, what should be considered necessary, blind-testing. Historically lithic microwear analysis has been subjected to such testing, the results of which stirred considerable debate. However, putting this aside, it is argued here that the tests have not been adequately exploited. Too much attention has been focused on basic results and the implications of those rather than using the tests as a powerful tool to improve the method. Here the tests are revisited and reviewed in a new light. This approach is used to highlight specific areas of methodological weakness that can be targeted by developmental research. It illustrates the value in having a large dataset of consistently designed blind-tests in method evaluation and suggests that fields such as lithic microwear analysis would greatly benefit from such testing. Opportunity is also taken to discuss recent developments in quantitative methods within lithic functional studies and how such techniques might integrate with current practices.

Keywords: Blind-tests | Quantification | Method improvement | Lithic microwear | Functional analysis

Fauvelle 2013a


Fauvelle 2013b

Current fossil, genetic, and archeological data indicate that Homo sapiens originated in Africa in the late Middle Pleistocene. By the end of the Late Pleistocene, our species was distributed across every continent except Antarctica, setting the foundations for the subsequent demographic and cultural changes of the Holocene. The intervening processes remain intensely debated and a key theme in hominin evolutionary studies. We review archeological, fossil, environmental, and genetic data to evaluate the current state of knowledge on the dispersal of Homo sapiens out of Africa. The emerging picture of the dispersal process suggests dynamic behavioral variability, complex interactions between populations, and an intricate genetic and cultural legacy. This evolutionary and historical complexity challenges simple narratives and suggests that hybrid models and the testing of explicit hypotheses are required to understand the expansion of Homo sapiens into Eurasia.

An ESR signal used for dating should have the following properties.

(i) A zeroing effect deletes all previously stored ESR intensity in the sample at the event which is to be dated.

(ii) The signal intensity grows in proportion to the dose received.

(iii) The signals must have a stability which is at least one order of magnitude higher than the age of the sample.

(iv) The number of traps is constant or changes in a predictable manner. Recrystallization, crystal growth or phase transitions must not have occurred.

(v) The ESR signal is not influenced by sample preparation (grinding, exposure to laboratory light) or anomalous fading.

Human evolutionary scholars have long supposed that the earliest stone tools were made by the genus Homo and that this technological development was directly linked to climate change and the spread of savannah grasslands. New fieldwork in West Turkana, Kenya, has identified evidence of much earlier hominin technological behaviour. We report the discovery of Lomekwi 3, a 3.3-million-year-old archaeological site where in situ stone artefacts occur in spatio-temporal association with Pliocene hominin fossils in a wooded palaeoenvironment. The Lomekwi 3 knappers, with a developing understanding of stone’s fracture properties, combined core reduction with battering activities. Given the implications of the Lomekwi...
3 assemblage for models aiming to converge environmental change, hominin evol-
ution and technological origins, we propose for it the name ‘Lomekwian’, which
predates the Oldowan by 700,000 years and marks a new beginning to the known
archaeological record.

**Hertel 2001**

Peter Hertel, *Projekt Diplomarbeit, Schreibwerkstatt*. (Osnabrück
2001). <http://www.informatik.hs-furtwangen.de/~hanne/LATEX-

Wir halten fest: Jedes Dokument, mit dem man sich wegen der Diplomarbeit
beschäftigt, ist sofort in der Literaturdatenbank zu vermerken. Auch dann, wenn
Sie noch gar nicht wissen können, ob das Schriftstück zitiert werden soll, oder an
welcher Stelle.

**Heyd 2017**


Two recent palaeogenetic studies have identified a movement of Yamnaya
peoples from the Eurasian steppe to Central Europe in the third millennium BC.
Their findings are reminiscent of Gustaf Kossinna’s equation of ethnic identifica-
tion with archaeological culture. Rather than a single genetic transmission from
Yamnaya to the Central European Corded Ware Culture, there is considerable
evidence for centuries of connections and interactions across the continent, as far
as Iberia. The author concludes that although genetics has much to offer archae-
ology, there is also much to be learned in the other direction. This article should
be read in conjunction with that by Kristiansen et al. (2017), also in this issue.

**Hillman 1990a**

Gordon C. Hillman & M. Stuart Davies, *Measured Domestication
Rates in Wild Wheats and Barley Under Primitive Cultivation, and
Their Archaeological Implications*. _Journal of World Prehistory_ 4 (1990),
157–222.

Man’s (or, more probably, Woman’s) first cereal crops were sown from seed
gathered from wild stands, and it was in the course of cultivation that domes-
tication occurred. Experiments in the measurement of domestication rates indicate
that in wild-type crops of einkorn, emmer, and barley under primitive systems
of husbandry: (a) domestication will occur only if they are harvested when par-
tially or nearly ripe, using specific harvesting methods; (b) exposure to shifting
cultivation may sometimes have been required; and (c) under these conditions,
the crops could become completely domesticated within 200 years, and perhaps
only 20-30 years, without any conscious selection. This paper (a) considers possible
delays in the start of domestication due to early crops of wild-type cereals lacking
domestic-types mutants; (b) examines the husbandry practices necessary for these
mutants to enjoy any selective advantage; (c) considers the state of ripeness at
harvest necessary for the crops to respond to these selective pressures; (d) outlines
field measurements of the selective intensities arising from analogous husbandry
practices applied experimentally to living wild-type crops; (e) summarizes a math-
ematical model which incorporates the measured selective intensities and other
key variables and which describes the rate of increase in domestic-type mutants in
early populations of wild-type cereals under specific combinations of primitive hus-
bandry practices; (f) considers why very early cultivators should have used those
husbandry methods which, we suggest, led unconsciously to the domestication of
wild wheats and barley; and (g) considers whether these events are likely to leave
archaeologically recognizable traces.
**Keywords:** domestication rate; agricultural origins; einkorn wheat; emmer wheat; selection pressures.

**Hillman 1990b**


Man’s first cereal crops were sown from seed gathered from wild stands, and it was in the course of cultivation that domestication occurred. This paper presents the preliminary results of an experimental approach to the measurement of domestication rate in crops of wild-type einkorn wheat exposed to primitive systems of husbandry. The results indicate that in wild-type crops of einkorn, emmer and barley (a) domestication will have occurred only if they were harvested in a partially ripe (or near-ripe) state using specific harvesting methods; (b) exposure to shifting cultivation may also have been required in some cases; and (c) given these requirements, the crops could have become completely domesticated within two centuries, and maybe in as little as 20–30 years without any form of conscious selection.

This paper (1) considers the possible length of delays in the start of domestication due to early crops of wild-type cereals lacking domestic-type mutants; (2) examines the combination of primitive husbandry practices that would have been necessary for any selective advantage to have been unconsciously conferred on these mutants; (3) considers the state of ripeness (at harvest) necessary for crops to be able to respond to these selective pressures; (4) outlines field measurements of the selective intensities (selection coefficients) which arise when analogous husbandry practices are applied experimentally to living wild-type crops; (5) summarizes the essential features of a mathematical model which incorporates these measurements of selection coefficients and other key variables, and which describes the rate of increase in domestic-type mutants that would have occurred in early populations of wild-type cereals under specific combinations of primitive husbandry practices; (6) considers why very early cultivators should have used that combination of husbandry methods which, we suggest, unconsciously brought about the domestication of wild wheats and barley; and (7) concludes by considering whether these events are likely to have left recognizable traces in archaeological remains.

**Keywords:** Domestication rate – agricultural origins – einkorn wheat – emmer wheat – barley – selection pressures – archaeobotany.

**Jesse 2010**


The emergence of pottery is a compelling issue for archaeologists. In Africa, pottery appeared in what is now the southern part of the Sahara and the Sahel different localities and in different contexts in the 10th millennium BP. This paper aims to give an overview the available data concerning early pottery in Northern Africa. The radiocarbon evidence is considered as well as technological features of the pottery; the decoration and the site context. The areas of the earliest appearance of pottery in Northern Africa were uninhabited during hyperarid phase at the end of the Pleistocene. Intriguing questions are therefore the origin of the Early Holocene occupants and of their knowledge of potting and of course the role of early pottery in the prehistoric groups.

**Keywords:** Northern Africa | pottery | Early Holocene | Wavy Line
Kaplan 2000


Hunter-gatherers emerged from the “Man the Hunter” conference in 1966 as the “original affluent society”. The main features of this thesis now seem to be widely accepted by anthropologists, despite the strong reservations expressed by certain specialists in foraging societies concerning the data advanced to support the claim. This essay brings together a portion of the data and argumentation in the literature that raise a number of questions about hunter-gatherer affluence. Three topics are addressed: How “hard” do foragers work? How well-fed are members of foraging societies? And what do we mean by “work”, “leisure”, and “affluence” in the context of foraging societies? Finally, this essay offers some thoughts about why, given the reservations and critical observations expressed by anthropologists who work with foragers, the thesis seems to have been enthusiastically embraced by most anthropologists.

Kristiansen 2017

Kristian Kristiansen et al., *Re-theorising mobility and the formation of culture and language among the Corded Ware Culture in Europe*. *Antiquity* **91** (2017), 334–347.


Recent genetic, isotopic and linguistic research has dramatically changed our understanding of how the Corded Ware Culture in Europe was formed. Here the authors explain it in terms of local adaptations and interactions between migrant Yamnaya people from the Pontic-Caspian steppe and indigenous North European Neolithic cultures. The original herding economy of the Yamnaya migrants gradually gave way to new practices of crop cultivation, which led to the adoption of new words for those crops. The result of this hybridisation process was the formation of a new material culture, the CordedWare Culture, and of a new dialect, Proto-Germanic. Despite a degree of hostility between expanding Corded Ware groups and indigenous Neolithic groups, stable isotope data suggest that exogamy provided a mechanism facilitating their integration. This article should be read in conjunction with that by Heyd (2017, in this issue).

Larson 2007


Greger Larson, Umberto Albarella, Keith Dobney, Peter Rowley-Conwy, Jörg Schibler, Anne Tresset, Jean-Denis Vigne, Ceiridwen J. Edwards, Angela Schlumbaum, Alexandru Dinu, Adrian Bălăgesescu, Gaynor Dolman, Antonio Tagliacozzo, Ninna Manaseryan, Preston Miracle, Louise Van Wijngaarden-Bakker, Marco Masseti, Daniel G. Bradley and Alan Cooper

The Neolithic Revolution began 11,000 years ago in the Near East and preceded a westward migration into Europe of distinctive cultural groups and their agricultural economies, including domesticated animals and plants. Despite decades of research, no consensus has emerged about the extent of admixture between the indigenous and exotic populations or the degree to which the appearance of specific components of the “Neolithic cultural package” in Europe reflects truly independent development. Here, through the use of mitochondrial DNA from 323
modern and 221 ancient pig specimens sampled across western Eurasia, we demonstra-
trate that domestic pigs of Near Eastern ancestry were definitely introduced into
Europe during the Neolithic (potentially along two separate routes), reaching
the Paris Basin by at least the early 4th millennium B.C. Local European wild
boar were also domesticated by this time, possibly as a direct consequence of the
introduction of Near Eastern domestic pigs. Once domesticated, European pigs
rapidly replaced the introduced domestic pigs of Near Eastern origin throughout
Europe. Domestic pigs formed a key component of the Neolithic Revolution, and
this detailed genetic record of their origins reveals a complex set of interactions
and processes during the spread of early farmers into Europe.

Lessing 1982
Doris Lessing, The Making of the Representative for Planet 8. (St Albans 1983).

McPherron 2010
Shannon P. McPherron et al., Evidence for stone-tool-assisted consump-
tion of animal tissues before 3.39 million years ago at Dikika, Ethiopia.
nature 466 (2010), 857–860.
Shannon P. McPherron, Zeresenay Alemseged, Curtis W. Marean, Jonathan G. Wynn, Denné Reed, Denis Geraads, René Bobe & Hamdallah A. Béarat
The oldest direct evidence of stone tool manufacture comes from Gona
(Ethiopia) and dates to between 2.6 and 2.5 million years (Myr) ago1. At the
nearby Bouri site several cut-marked bones also show stone tool use approximately
2.5 Myr ago2. Here we report stone-tool-inflicted marks on bones found during
recent survey work in Dikika, Ethiopia, a research area close to Gona and Bouri.
On the basis of low-power microscopic and environmental scanning electron mi-
croscope observations, these bones show unambiguous stone-tool cut marks for
flesh removal and percussion marks for marrow access. The bones derive from the
Sidi Hakoma Member of the Hadar Formation. Established 40Ar-39Ar dates on
the tuffs that bracket this member constrain the finds to between 3.42 and 3.24
Myrago, and stratigraphic scaling between these units and other geological evid-
ence indicate that they are older than 3.39 Myr ago. Our discovery extends by
approximately 800,000 years the antiquity of stone tools and of stone-tool-assisted
consumption of ungulates by hominins; furthermore, this behaviour can now be
attributed to Australopithecus afarensis.

Merritt 2019
Stephen R. Merritt, Michael C. Pante, Trevor L. Keevil, Jackson K.
Njau & Robert J. Blumenschine, Don’t cry over spilled ink, Missing
context prevents replication and creates the Rorschach effect in bone
surface modification studies. Journal of Archaeological Science 102
(2019), 71–79.
JAS086-0014-Dominguez-Rodrigo.pdf, JAS102-0080-Dominguez-Rodrigo.pdf
The scientific replicability crisis has recently focused on bone surface modi-
fication (BSM) analysis, which underlies zooarchaeological and anthropological
conclusions about the ecology and evolution of tool-assisted carcass consump-
tion behavior. We review a recent blind test of inter-analyst correspondence in
morphometric analysis of experimentally generated butchery marks that advocates
algorithmic methods for diagnosing and measuring BSM in an effort to standardize
methodology and minimize inter-analyst error (Domínguez-Rodrigo et al., 2017. Use and abuse of cut mark analyses: The Rorschach effect. Journal of Archaeological Science, 86, 14–23. http://doi.org/10.1016/j.jas.2017.08.001). This study overstates concern about the inaccuracy of BSM measurement and interpretation, concluding that BSM analysis is a subjective, non-scientific endeavor. Based on a minimally described sample of cut marks, it measures variables that involve inherent inaccuracy and subjectivity and overlooks how the contexts of experimental sample generation – particularly the difference between immanent and configurational processes – differentially affect cut mark morphometrics. We illustrate this discussion with experimental taphonomic examples focused on analytical context including sample construction and control over factors that affect cut mark cross-sectional size. Our analysis suggests the relationship between tool attributes and cut mark morphology is not generalizable to all experimental and archaeological butchery contexts. We show that our experimental samples capture metric variability observed in archaeological cut marks, but that intentionally incised marks and realistic defleshing marks differ in width and depth. Further, when controlling for factors that impact cut mark size including animal size class, tool type, butcher experience, and density across bone portions, overlapping cut mark widths and depths produced by phonolite and ignimbrite flakes lead to poor classification of marks according to causal flake material, which casts doubt on the ability to discriminate cut marks made by different materials. We build datasets that include diverse experimental contexts and suggest that meta-analysis can disentangle how multiple configurational factors contribute to cut mark morphometric attributes. Ultimately, progress in BSM analysis rests on inter-analyst replicability, which must be preceded by clear discussion of all parts of the inferential loop – from the design of experiments that generate actualistic analogues, to their use in supporting archaeological arguments. Otherwise, problematic expert knowledge traditions may mask arguments from authority in sophisticated methodological language and underreported experimental context.

Keywords: Experimental taphonomy | Cut marks | Butchery | Generality | Realism | Context | Expert knowledge

MITCHELL 2013
Peter Mitchell & Paul Lane (Hrsg.), The Oxford Handbook of African Archaeology. (Oxford 2013).

O’CONNELL 2020

Bliege Bird et al.’s recent results challenge this picture by suggesting less rapid resource depletion associated with initial burns around early occupied sites, allowing more time to gain the benefits of resource regeneration. A 10-km daily foraging radius around a permanent water source contains thousands of potential 3-ha burn locations. It would take a group of 50 people setting 10 fires a week over several 6-mo burning seasons to cover a significant fraction of that catchment, long enough for burned areas to begin to display the enhanced foraging returns associated with a serial recovery process. This would reduce the incentive to move away from the improving patch and the social networks it supports. Understanding constraints like this should aid the development of increasingly realistic, archaeologically testable models of the pattern and pace of continental colonization and its ecological consequences.
Osborne 2008
Anne H. Osborne, Derek Vance, Eelco J. Rohling, Nick Barton, Mike Rogerson & Nuri Fello, A humid corridor across the Sahara for the migration of early modern humans out of Africa 120,000 years ago. PNAS 105 (2008), 16444–16447.

It is widely accepted that modern humans originated in sub-Saharan Africa ≈150–200 thousand years ago (ka), but their route of dispersal across the currently hyperarid Sahara remains controversial. Given that the first modern humans north of the Sahara are found in the Levant ≈120–90 ka, northward dispersal likely occurred during a humid episode in the Sahara within Marine Isotope Stage (MIS) 5e (130–117 ka). The obvious dispersal route, the Nile, may be ruled out by notable differences between archaeological finds in the Nile Valley and the Levant at the critical time. Further west, space-born radar images reveal networks of—now buried—fossil river channels that extend across the desert to the Mediterranean coast, which represent alternative dispersal corridors. These corridors would explain scattered findings at desert oases of Middle Stone Age Aterian lithic industries with bifacial and tanged points that can be linked with industries further to the east and as far north as the Mediterranean coast. Here we present geochemical data that demonstrate that water in these fossil systems derived from the south during wet episodes in general, and penetrated all of the way to the Mediterranean during MIS 5e in particular. This proves the existence of an uninterrupted freshwater corridor across a currently hyperarid region of the Sahara at a key time for early modern human migrations to the north and out of Africa.

Middle Stone Age | Eemian | neodymium | paleochannel | sapropel

Phillipson 1993
David W. Phillipson, African Archaeology. (Cambridge ²1993).

Phillipson 2005
David W. Phillipson, African Archaeology. (Cambridge ³2005).

Proffitt 2014

This study aims to understand what effect, in terms of inter-analysis variation and analyst accuracy, different raw material types have on modern technological analyses of lithic assemblages. This is done through a series of blind analysis tests undertaken on experimentally derived assemblages of cores and flakes. Novelties of our approach include the introduction of refit studies as a method to assess analyst’s accuracy, and the use of statistical tests specifically designed to address inter-analyst variability, common in other disciplines but rarely used in Archaeology. The experimental assemblages were produced from raw materials collected at Olduvai Gorge, an archaeological sequence that has been a source for studies of early human technology for several decades, and where re-analyses of the same assemblages have usually offered different interpretations. The results of the blind analyses are compared to the true technological values obtained through full refit analysis of the experimental material, and suggest that there is a significant difference in terms of inter-analyst variability as well as accuracy related to different raw materials. Our paper highlights the interpretative problems posed by difficult-to-analyse raw materials such as quartzite, and stresses subjectivity present in
stone-tool technological studies, which may contribute to explain differences in the interpretation of Early Stone Age lithic assemblages.

Keywords: Lithic technology | Olduvai Gorge | Blind tests | Inter-analyst variability | Analyst accuracy | Refit analysis

Reichhoff 1990

Richerson 2005

Humans are a striking anomaly in the natural world. While we are similar to other mammals in many ways, our behavior sets us apart. Our unparalleled ability to adapt has allowed us to occupy virtually every habitat on earth, and our societies are larger, more complex, and more cooperative than any other mammal’s. In “Not by Genes Alone”, Peter J. Richerson and Robert Boyd argue that only a Darwinian theory of cultural evolution can explain these unique characteristics.

“Not by Genes Alone” offers a radical interpretation of human evolution, arguing that our ecological dominance and our singular social systems stem from a psychology uniquely adapted to create complex culture. Richerson and Boyd consider culture to be essential to human adaptation, as much a part of human biology as bipedal locomotion. Drawing on work in the fields of anthropology, political science, sociology, and economics – and building their case with such fascinating examples as kayaks, clever knots, and yams that require twelve men to carry them – Richerson and Boyd convincingly demonstrate that culture and biology are inextricably linked.

In abandoning the nature-versus-nurture debate as fundamentally misconceived, “Not by Genes Alone” is a truly original and groundbreaking theory of the role of culture in evolution and a book to be reckoned with for generations to come.

Richter 2018
Jürgen Richter, Altsteinzeit, Der Weg der frühen Menschen von Afrika bis in die Mitte Europas. (Stuttgart 2018).

Riemer 2007

Despite the debate on early Holocene large bovids from the Nabta-Kiseiba region, faunal data from archaeological sites in the Eastern Sahara speak for an introduction and rapid spread of domestic cattle, goat and sheep around 6000 calBC within a highly mobile hunter-gatherer context. However, wild animals and hunting equipment are the major components of archaeological sites from the 6th millennium. Diversity in relief and water accessibility, and the seasonal influence of winter and summer rains formed the individual conditions of subsistence in which herding played only a minor role. It was not before the onset of deterioration of
the Eastern Sahara, around 5000 calBC, and the following population agglomeration in the Nile Valley that herding and plant cultivation became dominant in the predynastic economies which can truly be labelled as the earliest Neolithic in Egypt.

**Keywords:** Pastro-foragers | domesticated animals | hunting | herding | arrow heads | economic change | Holocene | Neolithic | Egypt

**Sage 1995**


Agriculture originated independently in many distinct regions at approximately the same time in human history. This synchrony in agricultural origins indicates that a global factor may have controlled the timing of the transition from foraging to foodproducing economies. The global factor may have been a rise in atmospheric CO2 from below 200 to near 270 µmol mol-1 which occurred between 15,000 and 12,000 years ago. Atmospheric CO2 directly affects photosynthesis and plant productivity, with the largest proportional responses occurring below the current level of 350 µmol mol-1 In the late Pleistocene, CO2 levels near 200 µmol mol-1 may have been too low to support the level of productivity required for successful establishment of agriculture. Recent studies demonstrate that atmospheric CO2 increase from 200 to 270 µmol mol-1 stimulates photosynthesis and biomass productivity of C3 plants by 25% to 50%, and greatly increases the performance of C3 plants relative to weedy C4 competitors. Rising CO2 also stimulates biological nitrogen fixation and enhances the capacity of plants to obtain limiting resources such as water and mineral nutrients. These results indicate that increases in productivity following the late Pleistocene rise in CO2 may have been substantial enough to have affected human subsistence patterns in ways that promoted the development of agriculture. Increasing CO2 may have simply removed a productivity barrier to successful domestication and cultivation of plants. Through effects on ecosystem productivity, rising CO2 may also have been a catalyst for agricultural origins by promoting population growth, sedentism, and novel social relationships that in turn led to domestication and cultivation of preferred plant resources.

**Keywords:** origin of agriculture, CO2 enrichment, crop domestication, global change, neolithic transition, photosynthesis

**Sahlins 1966**


Hunter-gatherers consume less energy per capita per year than any other group of human beings. Yet when you come to examine it the original affluent society was none other than the hunter’s – in which all the people’s material wants were easily satisfied. To accept that hunters are affluent is therefore to recognise that the present human condition of man slaving to bridge the gap between his unlimited wants and his insufficient means is a tragedy of modern times.

**Schmidt 2015**

Christoph Schmidt, Karin Kindermann, Philip van Peer & Olaf Bubenzer, *Multi-emission luminescence dating of heated chert from the Middle Stone Age sequence at Sodmein Cave (Red Sea Mountains, Egypt).* Journal of Archaeological Science 63 (2015), 94–103.
Sodmein Cave in Egypt is one of the rare archaeological sites in north-eastern Africa conserving human occupation remains of a period most relevant for the ‘Out of Africa II’ hypothesis. This underlines the need for establishing a chronological framework for the more than 4 m of stratified sediments ranging from the Middle Stone Age (MSA) to the Neolithic. The lowest layer J hosts huge fireplaces, from which we report luminescence ages of heated chert fragments unearthed from different depths. The ‘multiemission’ dating approach – using both the blue and red TL of each specimen as well as the OSL emission of one sample – allowed identifying the most reliable ages. Samples yield ages between $<121\pm15$ ka (maximum age) and $87\pm9$ ka. These data evidence human presence at the site during MIS 5. For integrating Sodmein Cave into the actual discussion of the dispersal patterns of modern humans and to identify potential connections with other sites in the Nile Valley and in the Middle East, a sound and reliable chronology is indispensable.

Keywords: Luminescence dating | Burnt chert | Burnt flint | Egypt | Out of Africa II | Middle Stone Age

Sealy 2010


Pastoralist Khoekhoe people in southern Africa are well known from 17th and 18th century records from the Cape, and from later descendent communities. The Cape Khoekhoen kept large herds of sheep and cattle, which constituted wealth and provided the dairy products that formed dietary staples. The origins and development of this way of life remain contentious. This paper addresses the issue by means of stable carbon and nitrogen isotope analyses of 160 adult human skeletons from the coastal forelands of southernmost Africa. Prior to 2000 bp, hunter-gatherers ate varying mixes of marine and terrestrial foods, but terrestrial C4 grasses (and animals grazing on them) were of relatively minor importance. Sheep (and probably cattle) first appeared in archaeological sites around 2000 bp, but whatever their role in peoples’ diets, there was no significant shift in the isotope ratios of human skeletons in the first millennium AD. From the early second millennium AD, people began to eat significantly more C4 based foods, probably in the form of animal products (dairy and meat) from animals grazing on C4 grasses. I argue that the most likely reason is that domestic stock – especially cattle – became more important in peoples’ diets at this time. There is evidence for a new style of burial, in which the body was interred in a seated, flexed position, and the grave capped with stones. Thus, although living sites remain elusive, important elements of the historically documented Khoekhoe way of life can be identified for the first time in the early second millennium AD. This evidence also shows that a cattle-based economy emerged centuries before Europeans seeking animals to slaughter increased the demand for stock.

Keywords: Later Stone Age | Kho | diet | domestic stock | herd

Wotzka 1993


Es war das Anliegen dieser Zeilen, insbesondere dem nicht einschlägig ausgebildeten Kulturwissenschaftler einen Eindruck von der Entstehung, inhaltlichen Bestimmung und Verwendung des traditionellen archäologischen Kulturkonzeptes zu vermitteln. Dabei sollte exemplarisch gezeigt werden, worin das Spezifische dieser Lesart des so häufig verwendeten Wortes liegt. Wenn hierzu stellenweise
tiefer ins Detail gegangen worden sein sollte, als es dem Nichtarchäologen viel-leicht auf Anhieb interessant erscheinen mag, so geschah dies in dem Bestreben, einerseits die Kluft zwischen diesem archäologischen Kulturbegriff und seinem Pendant vor allem in der Ethnologie auszumessen – und für zu weit zu befinden –, und andererseits die geringe Belastbarkeit der wenigen verbliebenen Brücken zwischen archäologischer und anthropologischer Theorie in diesem Bereich her-vorzuheben. Letzteres wäre kaum tragisch, versuchte die prähistorische Archäologie nicht gerade mittels ihrer Kulturkonzeption, Relevantes zur allgemeinen Anthropologie beizusteuern.


WOTZKA 1997

WRANGLHAM 1999

Cooking is a human universal that must have had widespread effects on the nutrition, ecology, and social relationships of the species that invented it. The location and timing of its origins are unknown, but it should have left strong signals in the fossil record. We suggest that such signals are detectable at ca. 1.9 million years ago in the reduced digestive effort (e.g., smaller teeth) and increased supply of food energy (e.g., larger female body mass) of early Homo erectus. The adoption of cooking required delay of the consumption of food while it was accumulated and/ or brought to a processing area, and accumulations of food were valuable and stealable. Dominant (e.g., larger) individuals (typically male) were therefore able to scrounge from subordinate (e.g., smaller) individuals (typically female) instead of relying on their own foraging efforts. Because female fitness is limited by access to resources (particularly energetic resources), this dynamic would have favored females able to minimize losses to theft. To do so, we suggest, females formed protective relationships with male co-defenders. Males would have varied in their ability or willingness to engage effectively in this relationship, so females would have competed for the best food guards, partly by extending their period of sexual attractiveness. This would have increased the numbers of matings per pregnancy, reducing the intensity of male intrasexual competition. Consequently, there was reduced selection for males to be relatively large. This scenario is supported by the fossil record, which indicates that the relative body size of males fell only once in hominid evolution, around the time when H. erectus evolved. Therefore we suggest that cooking was responsible for the evolution of the unusual human social system
in which pair bonds are embedded within multifemale, multimale communities and supported by strong mutual and frequently conflicting sexual interest.

**Wynn 1981**


This article uses Piagetian genetic epistemology to evaluate the intelligence of Oldowan hominids. From the analysis of the geometry of two-million-year-old artifacts from Olduvai Gorge it is concluded that the hominids who made the tools possessed pre-operational intelligence. Pre-operational intelligence employs such organizational features as trial-and-error and control of single variables but lacks such important modern features as true classification and pre-correction of errors. Pre-operational intelligence is also typical of modern pongids. This implies that Oldowan hominids were not remarkably intelligent by hominoid standards and that evolution of intelligence was not significant in human evolution until after about 1.6 million years ago, at which time it became an important factor in the rapid increase in reliance on culture.