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References

Aktuell

Andriole 2009

Gerald L. Andriole et al., *Mortality Results from a Randomized Prostate-Cancer Screening Trial.* New England Journal of Medicine **360** (2009), 1310–1319.

NEJMed360-1310-Supplement.pdf

Gerald L. Andriole, E. David Crawford, Robert L. Grubb III, Saundra S. Buys, David Chia, Timothy R. Church, Mona N. Fouad, Edward P. Gelmann, Paul A. Kvale, Douglas J. Reding, Joel L. Weissfeld, Lance A. Yokochi, Barbara O'Brien, Jonathan D. Clapp, Joshua M. Rathmell, Thomas L. Riley, Richard B. Hayes, Barnett S. Kramer, Grant Izmirlian, Anthony B. Miller, Paul F. Pinsky, Philip C. Prorok, John K. Gohagan & Christine D. Berg, for the PLCO Project Team

Background The effect of screening with prostate-specific–antigen (PSA) testing and digital rectal examination on the rate of death from prostate cancer is unknown. This is the first report from the Prostate, Lung, Colorectal, and Ovarian (PLCO) Cancer Screening Trial on prostate-cancer mortality.

Methods From 1993 through 2001, we randomly assigned 76,693 men at 10 U.S. study centers to receive either annual screening (38,343 subjects) or usual care as the control (38,350 subjects). Men in the screening group were offered annual PSA testing for 6 years and digital rectal examination for 4 years. The subjects and health care providers received the results and decided on the type of follow-up evaluation. Usual care sometimes included screening, as some organizations have recommended. The numbers of all cancers and deaths and causes of death were ascertained.

Results In the screening group, rates of compliance were 85 % for PSA testing and 86 % for digital rectal examination. Rates of screening in the control group increased from 40 % in the first year to 52 % in the sixth year for PSA testing and ranged from 41 to 46 % for digital rectal examination. After 7 years of follow-up, the incidence of prostate cancer per 10,000 person-years was 116 (2820 cancers) in the screening group and 95 (2322 cancers) in the control group (rate ratio, 1.22; 95 % confidence interval [CI], 1.16 to 1.29). The incidence of death per 10,000 person-years was 2.0 (50 deaths) in the screening group and 1.7 (44 deaths) in the control group (rate ratio, 1.13; 95 % CI, 0.75 to 1.70). The data at 10 years were 67 % complete and consistent with these overall findings.

Conclusions After 7 to 10 years of follow-up, the rate of death from prostate cancer was very low and did not differ significantly between the two study groups. (ClinicalTrials.gov number, NCT00002540.)

Grimm 2016

David Grimm, *Dogs may have been domesticated more than once, But all living dogs have Asian roots.* science **352** (2016), 1153–1154.

Taken together, the data suggest that humans domesticated dogs in Asia more than 14,000 years ago, and that a small subset of these animals eventually migrated west through Eurasia, probably with people. This implies that all modern dogs, as well as the Newgrange canine, can trace their ancestry back to Asia.

But here's the twist: Archaeologists previously had found the remains of dogs in Germany that may be more than 16,000 years old, suggesting that dogs had already been domesticated in Europe by the time the Asian canines got there.

Herley 2016

Cormac Herley, *Unfalsifiability of security claims*. PNAS **113** (2016), 6415–6420.

There is an inherent asymmetry in computer security: Things can be declared insecure by observation, but not the reverse. There is no observation that allows us to declare an arbitrary system or technique secure. We show that this implies that claims of necessary conditions for security (and sufficient conditions for insecurity) are unfalsifiable. This in turn implies an asymmetry in self-correction: Whereas the claim that countermeasures are sufficient is always subject to correction, the claim that they are necessary is not. Thus, the response to new information can only be to ratchet upward: Newly observed or speculated attack capabilities can argue a countermeasure in, but no possible observation argues one out. Further, when justifications are unfalsifiable, deciding the relative importance of defensive measures reduces to a subjective comparison of assumptions. Relying on such claims is the source of two problems: once we go wrong we stay wrong and errors accumulate, and we have no systematic way to rank or prioritize measures.

Keywords: security | falsifiable | passwords | self-correction

Significance: Much in computer security involves recommending defensive measures: telling people how they should choose and maintain passwords, manage their computers, and so on. We show that claims that any measure is necessary for security are empirically unfalsifiable. That is, no possible observation contradicts a claim of the form "if you don't do X you are not secure." This means that self-correction operates only in one direction. If we are wrong about a measure being sufficient, a successful attack will demonstrate that fact, but if we are wrong about necessity, no possible observation reveals the error. The fact that claims of necessity are easy to make, but impossible to refute, makes waste inevitable and cumulative.

Shoag 2016

Jonathan E. Shoag, Sameer Mittal & Jim C. Hu, *Reevaluating PSA Testing Rates in the PLCO Trial*. New England Journal of Medicine **374** (2016), 1795–1796.

NEJMed374-1795-Supplement.pdf

In the landmark 2009 trial report, the rate of testing in the control group was limited to men who responded that they had been tested within the previous year as part of a routine physical examination, and other responses were not counted as testing.

Altpaläolithikum

Carotenuto 2016

F. Carotenuto, N. Tsikaridze, L. Rook, D. Lordkipanidze, Laura Longo, Silvana Condemi & P. Raia, *Venturing out safely, The biogeography of Homo erectus dispersal out of Africa*. Journal of Human Evolution **95** (2016), 1–12.

JHumEvo095-0001-Supplement1.docx

The dispersal of Homo erectus out of Africa at some 1.9 million years ago is one of the most important, crucial, and yet controversial events in human evolution. Current opinions about this episode expose the contrast between those who see H. erectus as a highly social, cooperative species seeking out new ecological opportunities to exploit, and those preferring a passive, climate driven explanation for such an event. By using geostatistics techniques and probabilistic models, we characterised the ecological context of H. erectus dispersal, from its East African origin to the colonization of Eurasia, taking into account both the presence of other large mammals and the physical characteristics of the landscape as potential factors. Our model indicated that H. erectus followed almost passively the large herbivore fauna during its dispersal. In Africa, the dispersal was statistically associated with the presence of large freshwater bodies (Rift Valley Lakes). In Eurasia, the presence of H. erectus was associated with the occurrence of geological outcrops likely yielding unconsolidated flint. During the early phase of dispersal, our model indicated that H. erectus actively avoided areas densely populated by large carnivores. This pattern weakened as H. erectus dispersed over Europe, possibly because of the decreasing presence of carnivores there plus the later acquisition of Acheulean technology. During this later phase, H. erectus was associated with limestone and shaley marl, and seems to have been selecting for high-elevation sites. While our results do not directly contradict the idea that H. erectus may have been an active hunter, they clearly point to the fact that predator avoidance may have conditioned its long-distance diffusion as it moved outside Africa. The modelled dispersal route suggests that H. erectus remained preferentially associated with low/middle latitude (i.e., comparatively warm) sites throughout its colonization history.

Keywords: Homo erectus | Dispersal | Large mammals | Least cost route path | Out of Africa I

Anthropologie

Boivin 2016

Nicole L. Boivin et al., *Ecological consequences of human niche construction, Examining long-term anthropogenic shaping of global species distributions*. PNAS **113** (2016), 6388–6396.

Nicole L. Boivin, Melinda A. Zeder, Dorian Q. Fuller, Alison Crowther, Greger Larson, Jon M. Erlandson, Tim Denham & Michael D. Petraglia

The exhibition of increasingly intensive and complex niche construction behaviors through time is a key feature of human evolution, culminating in the advanced capacity for ecosystem engineering exhibited by Homo sapiens. A crucial outcome of such behaviors has been the dramatic reshaping of the global biosphere, a transformation whose early origins are increasingly apparent from cumulative archaeological and paleoecological datasets. Such data suggest that, by the Late Pleistocene, humans had begun to engage in activities that have led to alterations in the distributions of a vast array of species across most, if not all, taxonomic groups. Changes to biodiversity have included extinctions, extirpations, and shifts in species composition, diversity, and community structure. We outline key examples of these changes, highlighting findings from the study of new datasets, like ancient DNA (aDNA), stable isotopes, and microfossils, as well as the application of new statistical and computational methods to datasets that have accumulated significantly in recent decades. We focus on four major phases that witnessed broad anthropogenic alterations to biodiversity—the Late Pleistocene global human expansion, the Neolithic spread of agriculture, the era of island colonization,

and the emergence of early urbanized societies and commercial networks. Archaeological evidence documents millennia of anthropogenic transformations that have created novel ecosystems around the world. This record has implications for ecological and evolutionary research, conservation strategies, and the maintenance of ecosystem services, pointing to a significant need for broader cross-disciplinary engagement between archaeology and the biological and environmental sciences.

Keywords: biodiversity | extinctions | invasive species | novel ecosystems | Anthropocene

Haile-Selassie 2016

Yohannes Haile-Selassie, Stephanie M. Melillo & Denise F. Su, *The Pliocene hominin diversity conundrum, Do more fossils mean less clarity?* PNAS **113** (2016), 6364–6371.

Recent discoveries of multiple middle Pliocene hominins have raised the possibility that early hominins were as speciose as later hominins. However, debates continue to arise around the validity of most of these new taxa, largely based on poor preservation of holotype specimens, small sample size, or the lack of evidence for ecological diversity. A closer look at the currently available fossil evidence from Ethiopia, Kenya, and Chad indicate that Australopithecus afarensis was not the only hominin species during the middle Pliocene, and that there were other species clearly distinguishable from it by their locomotor adaptation and diet. Although there is no doubt that the presence of multiple species during the middle Pliocene opens new windows into our evolutionary past, it also complicates our understanding of early hominin taxonomy and phylogenetic relationships.

Keywords: hominin diversity | Australopithecus | Kenyanthropus | Pliocene | ecological diversity

Klein 2016

Richard G. Klein, *Issues in human evolution, Special Feature: Introduction.* PNAS **113** (2016), 6345–6347.

This PNAS Special Feature showcases some recent discoveries and ideas on what makes the hominin mind unique, on the environmental backdrop to hominin evolution, on whether early hominin evolution should be characterized as a ladder or a bush, on what ancient DNA tells us about the demographic history of living humans and their closest fossil relatives—above all the Neanderthals—on the extent to which the Neanderthals differed behaviorally from modern humans, and finally on how prehistoric modern humans, following their expansion from Africa 50–40 ka, impacted other species.

MacLean 2016

Evan L. MacLean, *Unraveling the evolution of uniquely human cognition.* PNAS **113** (2016), 6348–6354.

A satisfactory account of human cognitive evolution will explain not only the psychological mechanisms that make our species unique, but also how, when, and why these traits evolved. To date, researchers have made substantial progress toward defining uniquely human aspects of cognition, but considerably less effort has been devoted to questions about the evolutionary processes through which these traits have arisen. In this article, I aim to link these complementary aims by synthesizing recent advances in our understanding of what makes human cognition unique, with theory and data regarding the processes of cognitive evolution. I review evidence that uniquely human cognition depends on synergism between both representational and motivational factors and is unlikely to be accounted

for by changes to any singular cognitive system. I argue that, whereas no nonhuman animal possesses the full constellation of traits that define the human mind, homologies and analogies of critical aspects of human psychology can be found in diverse nonhuman taxa. I suggest that phylogenetic approaches to the study of animal cognition—which can address questions about the selective pressures and proximate mechanisms driving cognitive change—have the potential to yield important insights regarding the processes through which the human cognitive phenotype evolved.

Keywords: cognitive evolution | human evolution | comparative psychology | human uniqueness | cognition

Roebroeks 2016

Wil Roebroeks & Marie Soressi, *Neandertals revised*. PNAS **113** (2016), 6372–6379.

The last decade has seen a significant growth of our knowledge of the Neandertals, a population of Pleistocene hunter-gatherers who lived in (western) Eurasia between ≈400,000 and 40,000 y ago. Starting from a source population deep in the Middle Pleistocene, the hundreds of thousands of years of relative separation between African and Eurasian groups led to the emergence of different phenotypes in Late Pleistocene Europe and Africa. Both recently obtained genetic evidence and archeological data show that the biological and cultural gaps between these populations were probably smaller than previously thought. These data, reviewed here, falsify inferences to the effect that, compared with their near-modern contemporaries in Africa, Neandertals were outliers in terms of behavioral complexity. It is only around 40,000 y ago, tens of thousands of years after anatomically modern humans first left Africa and thousands of years after documented interbreeding between modern humans, Neandertals and Denisovans, that we see major changes in the archeological record, from western Eurasia to Southeast Asia, e.g., the emergence of representational imagery and the colonization of arctic areas and of greater Australia (Sahul).

Keywords: Neandertals | early modern humans | Middle Paleolithic | Middle Stone Age

Slatkin 2016

Montgomery Slatkin & Fernando Racimo, *Ancient DNA and human history*. PNAS **113** (2016), 6380–6387.

We review studies of genomic data obtained by sequencing hominin fossils with particular emphasis on the unique information that ancient DNA (aDNA) can provide about the demographic history of humans and our closest relatives. We concentrate on nuclear genomic sequences that have been published in the past few years. In many cases, particularly in the Arctic, the Americas, and Europe, aDNA has revealed historical demographic patterns in a way that could not be resolved by analyzing present-day genomes alone. Ancient DNA from archaic hominins has revealed a rich history of admixture between early modern humans, Neanderthals, and Denisovans, and has allowed us to disentangle complex selective processes. Information from aDNA studies is nowhere near saturation, and we believe that future aDNA sequences will continue to change our understanding of hominin history.

Keywords: human history | Neanderthal | Denisovan | ancient DNA | demography

Uno 2016

Kevin T. Uno, Pratigya J. Polissar, Kevin E. Jackson & Peter B. deMenocal, *Neogene biomarker record of vegetation change in eastern Africa*. PNAS **113** (2016), 6355–6363.

pnas113-06355-Supplement.zip

The evolution of C4 grassland ecosystems in eastern Africa has been intensely studied because of the potential influence of vegetation on mammalian evolution, including that of our own lineage, hominins. Although a handful of sparse vegetation records exists from middle and early Miocene terrestrial fossil sites, there is no comprehensive record of vegetation through the Neogene. Here we present a vegetation record spanning the Neogene and Quaternary Periods that documents the appearance and subsequent expansion of C4 grasslands in eastern Africa. Carbon isotope ratios from terrestrial plant wax biomarkers deposited in marine sediments indicate constant C3 vegetation from ≈24 Ma to 10 Ma, when C4 grasses first appeared. From this time forward, C4 vegetation increases monotonically to present, with a coherent signal between marine core sites located in the Somali Basin and the Red Sea. The response of mammalian herbivores to the appearance of C4 grasses at 10 Ma is immediate, as evidenced from existing records of mammalian diets from isotopic analyses of tooth enamel. The expansion of C4 vegetation in eastern Africa is broadly mirrored by increasing proportions of C4-based foods in hominin diets, beginning at 3.8 Ma in Australopithecus and, slightly later, Kenyanthropus. This continues into the late Pleistocene in Paranthropus, whereas Homo maintains a flexible diet. The biomarker vegetation record suggests the increase in open, C4 grassland ecosystems over the last 10 Ma may have operated as a selection pressure for traits and behaviors in Homo such as bipedalism, flexible diets, and complex social structure.

Keywords: leaf wax | carbon isotope | mammalian evolution | molecular distribution | hominin

Bibel

Schmid 2012

Konrad Schmid, *Genesis and Exodus as Two Formerly Independent Traditions of Origins for Ancient Israel*. Biblica **93** (2012), 187–208.

This paper is a response to Joel Baden's article, which claims that the material in Genesis and Exodus was already literarily connected within the independent J and E documents. I suggest an alternative approach that has gained increased acceptance, especially in European scholarship. The ancestral stories of Genesis on the one hand and the Moses story in Exodus and the following books on the other hand were originally autonomous literary units, and it was only through P that they were connected conceptually and literarily.

Wells 2015

Bruce Wells, *The Interpretation of Legal Traditions in Ancient Israel*. Hebrew Bible and Ancient Israel **4** (2015), 234–266.

This article argues that each of the three discrete law collections in the Pentateuch (the Covenant Code, the Holiness Code, and the Deuteronomic Code) possesses a distinctive approach to interpreting legal traditions. The article focuses on the interpretation of longstanding traditions that circulated in the broader ancient Near East. It looks at how the pentateuchal collections respond to expressions of these traditions in other biblical and cuneiform texts. It maintains that

the Covenant Code discloses a traditional mode of interpretation, the Deuteronomic Code engages in an interpretive approach of redirection and expansion, and the Holiness Code promotes the interpretation of redefinition.

An important remaining question relates to the purpose or agenda motivating the authors of each code to follow their respective interpretive approaches. This is a question of considerable scope and import, and I wish to offer only a brief suggestion here. CC's emphasis on fairness and equity points to a concern on the part of its authors with justice. The new directions that one finds in D undergird an effort to establish stability. Its provisions are interested in clear expectations, a system of deterrents, and interactions among the population and even with the deity that are predictable and manageable. As for H, I would point to separation as an important guiding principle for its authors. It wants separation from foreign elements and practices (even the so-called sojourner [Ger] must observe H's rules) and, in some cases, even from previous Israelite/Judean traditions (e.g., levirate marriage). With each collection, the authors did not simply submit to the authority of older traditions, nor did they always seek to overturn and supersede them. Both their motivations and their interpretive approaches were more complex and sophisticated than any simple description can fully capture. Nevertheless, it is evident that the authors of these three biblical collection were well-versed in older traditions and engaged them deeply – adopting, adapting, and interpreting them in their own way and for their own purposes.

Energie

Stone 2016

Richard Stone, *Near miss at Fukushima is a warning for U.S.* science **352** (2016), 1039–1010.

Panel says spent reactor fuel in a storage pool could have boiled dry and caught on fire.

Jungpaläolithikum

d'Errico 2016

Francesco d'Errico, Laure Dayet Bouillot, Marcos García-Diez, Africa Pitarch Martí, Daniel Garrido Pimentel & Joπo Zilhπo, *The technology of the earliest European cave paintings, El Castillo Cave, Spain.* Journal of Archaeological Science **70** (2016), 48–65.

JAS070-0048-Supplement1.pdf, JAS070-0048-Supplement2.pdf, JAS070-0048-Supplement3.pdf

The red disks from El Castillo Cave are among the earliest known cave paintings. Here, we combine the morphometric and technological study of red disks from two areas located at the end of the cave with the microscopic, elemental, and mineralogical analysis of the pigment and compare the results obtained with observations derived from experimental replication. Ergonomic constraints imply that a number of disks were made by adults, and the differences in pigment texture and composition suggest that they correspond to an accumulation through time of panels made by different persons who shared neither the same technical know-how nor, very possibly, the same symbolic system.

Keywords: Cave art | Upper Palaeolithic | Ochre | Pigment | Symbolism | EDXRF | SEM-EDS microscopy | m-XRD | m-Raman spectroscopy

Frantz 2016

Laurent A. F. Frantz et al., *Genomic and archaeological evidence suggests a dual origin of domestic dogs.* science **352** (2016), 1228–1231.

Laurent A. F. Frantz, Victoria E. Mullin, Maud Pionnier-Capitan, Ophélie Lebrasseur, Morgane Ollivier, Angela Perri, Anna Linderholm, Valeria Mattiangeli, Matthew D. Teasdale, Evangelos A. Dimopoulos, Anne Tresset, Marilyne Duffraisse, Finbar McCormick, László Bartosiewicz, Erika Gál, Éva A. Nyerges, Mikhail V. Sablin, Stéphanie Bréhard, Marjan Mashkour, Adrian Bãlã´escu, Benjamin Gillet, Sandrine Hughes, Olivier Chassaing, Christophe Hitte, Jean-Denis Vigne, Keith Dobney, Catherine Hänni, Daniel G. Bradley & Greger Larson

The geographic and temporal origins of dogs remain controversial. We generated genetic sequences from 59 ancient dogs and a complete (28x) genome of a late Neolithic dog (dated to ≈4800 calendar years before the present) from Ireland. Our analyses revealed a deep split separating modern East Asian and Western Eurasian dogs. Surprisingly, the date of this divergence (≈14,000 to 6400 years ago) occurs commensurate with, or several millennia after, the first appearance of dogs in Europe and East Asia. Additional analyses of ancient and modern mitochondrial DNA revealed a sharp discontinuity in haplotype frequencies in Europe. Combined, these results suggest that dogs may have been domesticated independently in Eastern and Western Eurasia from distinct wolf populations. East Eurasian dogs were then possibly transported to Europe with people, where they partially replaced European Paleolithic dogs.

Kultur

Grosman 2016

Leore Grosman & Natalie D. Munro, *A Natufian Ritual Event.* Current Anthropology **57** (2016), 311–331.

CurrAnth57-311-Supplement.pdf

Ritual practice plays crucial social roles in human societies by communicating information about social status, calming tensions, and integrating communities. Although communication occurs through the act of ritual performance itself, the archaeological record rarely has the resolution to identify individual ritual actions. The high quality of preservation and recovery of a well-preserved grave of an unusual woman at the Late Natufian (12,000 cal BP) site of Hilazon Tachtit, Israel, enables the identification of multiple stages of a funerary ritual. These represent a variety of actions that allow glimpses into ritual performance as well as larger generalizations about Natufian ritual practice during this dynamic period at the beginning of the agricultural transition.

Mathematik

Morgan 2016

Thomas J. H. Morgan, *Testing the Cognitive and Cultural Niche Theories of Human Evolution.* Current Anthropology **57** (2016), 370–377.

CurrAnth57-370-Supplement.pdf

The cognitive niche and the cultural niche are two competing theories of human evolution. One point over which they disagree is the importance of gene-culture interactions. Here, I use three models to evaluate this disagreement: (i) an asocial baseline model; (ii) a model of the cognitive niche, which includes a form of social

learning that prevents gene-culture coevolution; and (iii) amodel of the cultural niche, which allows gene-culture coevolution. Intelligence can evolve in all three models, and social transmission increases the range of conditions under which it can do so. However, only the model of the cultural niche (i) produces periods of evolutionary stasis, (ii) produces a positive relationship between population size and the rate of cultural and genetic evolution, and (iii) results in behaviors that are difficult to discover dominating the population. I review the available evidence for such patterns in human evolution and conclude that the cultural niche provides amore comprehensive explanation for human evolution than does the cognitive niche.

Methoden

Gerbault 2016

Pascale Gerbault, Rosalind Gillis, Jean-Denis Vigne, Anne Tresset, Stéphanie Bréhard & Mark G. Thomas, *Statistically robust representation and comparison of mortality profiles in archaeozoology*. Journal of Archaeological Science **71** (2016), 24–32.

JAS071-0024-Supplement.pdf

Archaeozoological mortality profiles have been used to infer site-specific subsistence strategies. There is however no common agreement on the best way to present these profiles and confidence intervals around age class proportions. In order to deal with these issues, we propose the use of the Dirichlet distribution and present a new approach to perform age-at-death multivariate graphical comparisons. We demonstrate the efficiency of this approach using domestic sheep/goat dental remains from 10 Cardial sites (Early Neolithic) located in South France and the Iberian Peninsula. We show that the Dirichlet distribution in age-at-death analysis can be used: (i) to generate Bayesian credible intervals around each age class of a mortality profile, even when not all age classes are observed; and (ii) to create 95 % kernel density contours around each age-at-death frequency distribution when multiple sites are compared using correspondence analysis. The statistical procedure we present is applicable to the analysis of any categorical count data and particularly well-suited to archaeological data (e.g. potsherds, arrow heads) where sample sizes are typically small.

Keywords: Archaeozoology | Mortality profiles | Sheep/goat | Dental wear | Dirichlet distribution | Cardial neolithic

Livarda 2015

Alexandra Livarda & Hector A. Orengo, *Reconstructing the Roman London flavourscape, New insights into the exotic food plant trade using network and spatial analyses*. Journal of Archaeological Science **55** (2015), 244–252.

Using archaeobotanical data and examining them with a novel combination of density interpolation surfaces and social and spatial network analyses, this study has brought together exotic food plants in Roman London to outline the changing 'face' of its flavourscape, and contextualise it within the broader exotics commerce in Britannia. Consumption of a variety of exotics appeared to be widespread since the very first stages of London's establishment and their presence was maintained throughout although later on, as life in the town developed and its character changed, the focus of their distribution also changed. The emphasis shifted from the core of the city in its early days towards its outer zones, such as

the upper Walbrook valley and Southwark in the Middle Roman, and the western and eastern sectors in the Late Roman phase. These changes appeared to largely reflect the changes in the overall commerce network of exotics in Britannia. In this network London starts as a mainly consumption place in the Early Roman phase to become the main redistribution centre in the Middle Roman and the necessary intermediate node in the transport system that had been established by the Late Roman phase, connecting the south to the north.

Keywords: Roman London | Exotic food plants | Network analysis | Commerce | Flavourscape | Archaeobotany

Orengo 2016

Hector A. Orengo & Alexandra Livarda, *The seeds of commerce, A network analysis-based approach to the Romano-British transport system.* Journal of Archaeological Science **66** (2016), 21–35.

JAS066-0021-Supplement1.docx, JAS066-0021-Supplement2.docx, JAS066-0021-Supplement3.docx

Communication routes are an important subject in the study of the human past. They allowed interactions between communities and the dispersal of goods and ideas. Their study, therefore, can shed light on the way in which communities inhabited the landscape, related to each other and were affected by macro-regional trends. Many methods, such as archaeomorphological analysis and Least Cost Route modelling (LCR), have been devised and are routinely employed for the reconstruction of ancient routes. Their analysis in terms of communication, trade or historical significance, however, has usually been left unexplored. This is probably due to the connected nature of routes, which form communication networks: these are shaped by interconnected nodes and extend over territories surpassing the regional scale in such a way that even a change in a single node or link can affect the whole network. Consequently, the partial reconstruction of communication networks provided by the aforementioned methods does not usually allow a holistic analysis. In this paper the relatively well understood British Roman road network is employed to explore the analytical possibilities offered by a combination of Social Network Analysis, Spatial Network Analysis and spatial interpolation-based distribution analysis. The British road network has been reconstructed using published data but also a variation of LCR in which cost surfaces are derived from cultural data obtained from large-scale cultural inventories. The distribution of introduced food plants during the Roman period serve as an excellent proxy for the study of trade along the network and its historical consequences. This multi-period archaeobotanical dataset has some evident advantages to other types of material remains: archaeobotanical remains are not reused as, for example, amphorae and, accordingly, they reflect a distribution pattern based on consumption or commerce. Some of them are imported (as they cannot be produced locally) and, consequently, their distribution would be applied through usage of the main routes.

The results suggest a continuous inflow of exotics but highlight their changing transport routes, their differential access and the particular weight of certain nodal sites in the development of this commerce with direct impact on urbanisation and the overall economy of Britannia. The Roman road network acted as a major factor in the distribution of sites, their political and economic importance and their permanence or disappearance as global economic trends changed over time.

Keywords: Spatial analysis | Network analysis | GIS | Archaeobotany | Roman Britain | Trade | Exotics

Mittelpaläolithikum

Jaubert 2016

Jacques Jaubert et al., *Early Neanderthal constructions deep in Bruniquel Cave in southwestern France.* nature **534** (2016), 111–114.

n534-0111-Supplement1.pdf, n534-0111-Supplement2.mov

Jacques Jaubert, Sophie Verheyden, Dominique Genty, Michel Soulier, Hai Cheng, Dominique Blamart, Christian Burlet, Hubert Camus, Serge Delaby, Damien Deldicque, R. Lawrence Edwards, Catherine Ferrier, François Lacrampe-Cuyaubère, François Lévêque, Frédéric Maksud, Pascal Mora, Xavier Muth, Édouard Régnier, Jean-Noël Rouzaud & Frédéric Santos

Very little is known about Neanderthal cultures1, particularly early ones. Other than lithic implements and exceptional bone tools2, very few artefacts have been preserved. While those that do remain include red and black pigments3 and burial sites4, these indications of modernity are extremely sparse and few have been precisely dated, thus greatly limiting our knowledge of these predecessors of modern humans5. Here we report the dating of annular constructions made of broken stalagmites found deep in Bruniquel Cave in southwest France. The regular geometry of the stalagmite circles, the arrangement of broken stalagmites and several traces of fire demonstrate the anthropogenic origin of these constructions. Uranium-series dating of stalagmite regrowths on the structures and on burnt bone, combined with the dating of stalagmite tips in the structures, give a reliable and replicated age of 176.5 thousand years (±2.1 thousand years), making these edifices among the oldest known well-dated constructions made by humans. Their presence at 336 metres from the entrance of the cave indicates that humans from this period had already mastered the underground environment, which can be considered a major step in human modernity.

Soressi 2016

Marie Soressi, *Neanderthals built underground.* nature **534** (2016), 43–44.

The finding of 175,000-year-old structures deep inside a cave in France suggests that Neanderthals ventured underground and were responsible for some of the earliest constructions made by hominins.

Weaver 2016

Timothy D. Weaver et al., *Neonatal postcrania from Mezmaiskaya, Russia, and Le Moustier, France, and the development of Neandertal body form.* PNAS **113** (2016), 6472–6477.

Timothy D. Weaver, Hélène Coqueugniot, Liubov V. Golovanova, Vladimir B. Doronichev, Bruno Maureille & Jean-Jacques Hublin

Neandertal and modern human adults differ in skeletal features of the cranium and postcranium, and it is clear that many of the cranial differences—although not all of them—are already present at the time of birth. We know less, however, about the developmental origins of the postcranial differences. Here, we address this deficiency with morphometric analyses of the postcrania of the two most complete Neandertal neonates—Mezmaiskaya 1 (from Russia) and Le Moustier 2 (from France)—and a recent human sample. We find that neonatal Neandertals already appear to possess the wide body, long pubis, and robust long bones of adult Neandertals. Taken together, current evidence indicates that skeletal differences between Neandertals and modern humans are largely established by the time of birth.

Keywords: body proportions | climatic adaptation | Homo neanderthalensis | infracranial | ontogeny

Significance: One of the oldest questions in human evolutionary studies is: why do Neandertals look different from present-day and ancient modern humans? This question can be addressed at different levels, but a critical component of a complete answer is understanding the developmental basis of adult differences. We now know that many skull differences are present by the time of birth. We know less, however, about the developmental basis of differences in the rest of the body. By studying the two most complete Neandertal neonates, we were able to establish that, as for the skull, many differences in body form are present by the time of birth. Neandertals largely look like Neandertals, regardless of age.

Ostasien

Wang 2016

Jiajing Wang, Li Liu, Terry Ball, Linjie Yu, Yuanqing Li & Fulai Xing, *Revealing a 5,000-y-old beer recipe in China*. PNAS **113** (2016), 6444–6448.

The pottery vessels from the Mijiaya site reveal, to our knowledge, the first direct evidence of in situ beer making in China, based on the analyses of starch, phytolith, and chemical residues. Our data reveal a surprising beer recipe in which broomcorn millet (Panicum miliaceum), barley (Hordeum vulgare), Job's tears (Coix lacrymajobi), and tubers were fermented together. The results indicate that people in China established advanced beer-brewing technology by using specialized tools and creating favorable fermentation conditions around 5,000 y ago. Our findings imply that early beer making may have motivated the initial translocation of barley from the Western Eurasia into the Central Plain of China before the crop became a part of agricultural subsistence in the region 3,000 y later.

Keywords: Yangshao period | alcohol | starch analysis | phytolith analysis | archaeological chemistry

Significance: This research reveals a 5,000-y-old beer recipe in which broomcorn millet, barley, Job's tears, and tuberswere fermented together. To our knowledge, our data provide the earliest direct evidence of in situ beer production in China, showing that an advanced beerbrewing technique was established around 5,000 y ago. For the first time, to our knowledge, we are able to identify the presence of barley in archaeological materials from China by applying a recently developed method based on phytolith morphometrics, predating macrobotanical remains of barley by 1,000 y. Our method successfully distinguishes the phytoliths of barley from those of its relative species in China.

Ozeanien

Lawler 2016

Andrew Lawler, *'Culinary frontier' tracks Madagascar's Asian settlers*. science **352** (2016), 1154–1155.