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References

Afrika

Kappelman 2014

John Kappelman et al., *Another unique river: A consideration of some of the characteristics of the trunk tributaries of the Nile River in northwestern Ethiopia in relationship to their aquatic food resources.* Journal of Human Evolution **77** (2014), 117–131.

John Kappelman, Dereje Tewabe, Lawrence Todd, Mulugeta Feseha, Marvin Kay, Gary Kocurek, Brett Nachman, Neil Tabor & Meklit Yadeta

Aquatic food resources are important components of many modern human hunter-gatherer diets and yet evidence attesting to the widespread exploitation of this food type appears rather late in the archaeological record. While there are times when, for example, the capture of fish and shellfish requires sophisticated technology, there are other cases when the exact ecological attributes of an individual species and the particulars of its environment make it possible for these foods to be incorporated into the human diet with little or no tool use and only a minimal time investment. In order to better understand the full set of variables that are considered in these sorts of foraging decisions, it is necessary to detail the attributes of each particular aquatic environment. We discuss here some of the characteristics of the trunk tributaries of the Nile and Blue Rivers in the Horn of Africa. Unlike typical perennial rivers, these 'temporary' rivers flow only during a brief but intense wet season; during the much longer dry season, the rivers are reduced to a series of increasingly disconnected waterholes, and the abundant and diverse fish and mollusk populations are trapped in ever smaller evaporating pools. The local human population today utilizes a number of diverse capture methods that range from simple to complex, and vary according to the size and depth of the waterhole and the time of the year. When we view the particular characteristics of an individual river system, we find that each river is 'unique' in its individual attributes. The Horn of Africa is believed to be along the route that modern humans followed on their migration out of Africa, and it is likely that the riverine-based foraging behaviors of these populations accompanied our species on its movement into the rest of the Old World.

Keywords: Fish | Shellfish | Mollusks | Temporary rivers | Middle Stone Age | Archeology

Aktuell

van Andel 2014

Tinde R. van Andel et al., *Local plant names reveal that enslaved Africans recognized substantial parts of the New World flora.* PNAS **111** (2014), E5346–E5353.

pnas111-E5346-Supplement1.xlsx, pnas111-E5346-Supplement2.xls

Tinde R. van Andel, Charlotte I. E. A. van't Klooster, Diana Quiroz, Alexandra M. Towns, Sofie Ruysschaert & Margot van den Berg

How did the forced migration of nearly 11 million enslaved Africans to the Americas influence their knowledge of plants? Vernacular plant names give insight into

the process of species recognition, acquisition of new knowledge, and replacement of African species with American ones. This study traces the origin of 2,350 Afro-Surinamese (Sranantongo and Maroon) plant names to those plant names used by local Amerindians, Europeans, and related groups in West and Central Africa. We compared vernacular names from herbarium collections, literature, and recent ethnobotanical fieldwork in Suriname, Ghana, Benin, and Gabon. A strong correspondence in sound, structure, and meaning among Afro-Surinamese vernaculars and their equivalents in other languages for botanically related taxa was considered as evidence for a shared origin. Although 65 % of the Afro-Surinamese plant names contained European lexical items, enslaved Africans have recognized a substantial part of the neotropical flora. Twenty percent of the Sranantongo and 43 %of the Maroon plant names strongly resemble names currently used in diverse African languages for related taxa, represent translations of African ones, or directly refer to an Old World origin. The acquisition of new ethnobotanical knowledge is captured in vernaculars derived from Amerindian languages and the invention of new names for neotropical plants from African lexical terms. Plant names that combine African, Amerindian, and European words reflect a creolization process that merged ethnobotanical skills from diverse geographical and cultural sources into new Afro-American knowledge systems. Our study confirms the role of Africans as significant agents of environmental knowledge in the New World.

Creoles | ethnobotany | folk taxonomy | Maroons | Suriname

Langer 2014

Robert S. Langer, *The art of entrepreneurship*. science **346** (2014), 1146.

Q: How do you advise scientists to approach their careers?

A: I always tell people, "Just follow your heart. Pick something you think you are going to love." To me, that is the most important thing.

Anthropologie

Archer 2014

Will Archer, David R. Braun, Jack W. K. Harris, Jack T. McCoy & Brian G. Richmond, *Early Pleistocene aquatic resource use in the Turkana Basin*. Journal of Human Evolution **77** (2014), 74–87.

Evidence for the acquisition of nutritionally dense food resources by early Pleistocene hominins has implications for both hominin biology and behavior. Aquatic fauna may have comprised a source of highly nutritious resources to hominins in the Turkana Basin at ≈1.95 Ma. Here we employ multiple datasets to examine the issue of aquatic resource use in the early Pleistocene. This study focuses on four components of aquatic faunal assemblages (1) taxonomic diversity, (2) skeletal element proportion, (3) bone fragmentation and (4) bone surface modification. These components are used to identify associations between early Pleistocene aquatic remains and hominin behavior at the site of FwJj20 in the Koobi Fora Fm. (Kenya). We focus on two dominant aquatic species: catfish and turtles. Further we suggest that data on aquatic resource availability as well as ethnographic examples of aquatic resource use complement our observations on the archaeological remains from FwJj20. Aquatic food items provided hominins with a valuable nutritional alternative to an exclusively terrestrial resource base.We argue that specific advantages afforded by an aquatic alternative to terrestrial resources include (1) a probable reduction in required investment of energy relative to economic return in

the form of nutritionally dense food items, (2) a decrease in the technological costs of resource acquisition, and (3) a reduced level of inter-specific competition associated with carcass access and an associated reduction of predation risk relative to terrestrial sources of food. The combined evidence from FwJj20 suggests that aquatic resources may have played a substantial role in early Pleistocene diets and these resources may have been overlooked in previous interpretations of hominin behavior.

Keywords: Africa | Plio-Pleistocene | Turtle | Catfish | Bone fragmentation | Bone surface modification | Hominin diet

Brenna 2014

J. Thomas Brenna & Susan E. Carlson, *Docosahexaenoic acid and human brain development, Evidence that a dietary supply is needed for optimal development.* Journal of Human Evolution **77** (2014), 99–106.

Humans evolved a uniquely large brain among terrestrial mammals. Brain and nervous tissue is rich in the omega-3 polyunsaturated fatty acid (PUFA) docosahexaenoic acid (DHA). Docosahexaenoic acid is required for lower and high order functions in humans because of understood and emerging molecular mechanisms. Among brain components that depend on dietary components, DHA is limiting because its synthesis from terrestrial plant food precursors is low but its utilization when consumed in diet is very efficient. Negligible DHA is found in terrestrial plants, but in contrast, DHA is plentiful at the shoreline where it is made by single-celled organisms and plants, and in the seas supports development of very large marine mammal brains. Modern human brains accumulate DHA up to age 18, most aggressively from about half-way through gestation to about two years of age. Studies in modern humans and non-human primates show that modern infants consuming infant formulas that include only DHA precursors have lower DHA levels than for those with a source of preformed DHA. Functional measures show that infants consuming preformed DHA have improved visual and cognitive function. Dietary preformed DHA in the breast milk of modern mothers supports many-fold greater breast milk DHA than is found in the breast milk of vegans, a phenomenon linked to consumption of shore-based foods. Most current evidence suggests that the DHA-rich human brain required an ample and sustained source of dietary DHA to reach its full potential.

Keywords: Omega-3 polyunsaturated fatty acids | PUFA | Shore-based food | Nutrition | Brain composition | DHA | Evolution

Cunnane 2014

Stephen C. Cunnane & Michael A. Crawford, *Energetic and nutritional constraints on infant brain development, Implications for brain expansion during human evolution.* Journal of Human Evolution **77** (2014), 88–98.

The human brain confronts two major challenges during its development: (i) meeting a very high energy requirement, and (ii) reliably accessing an adequate dietary source of specific brain selective nutrients needed for its structure and function. Implicitly, these energetic and nutritional constraints to normal brain development today would also have been constraints on human brain evolution. The energetic constraint was solved in large measure by the evolution in hominins of a unique and significant layer of body fat on the fetus starting during the third trimester of gestation. By providing fatty acids for ketone production that are needed as brain fuel, this fat layer supports the brain's high energy needs well into childhood. This fat layer also contains an important reserve of the brain selective

omega-3 fatty acid, docosahexaenoic acid (DHA), not available in other primates. Foremost amongst the brain selective minerals are iodine and iron, with zinc, copper and selenium also being important. A shore-based diet, i.e., fish, molluscs, crustaceans, frogs, bird's eggs and aquatic plants, provides the richest known dietary sources of brain selective nutrients. Regular access to these foods by the early hominin lineage that evolved into humans would therefore have helped free the nutritional constraint on primate brain development and function. Inadequate dietary supply of brain selective nutrients still has a deleterious impact on human brain development on a global scale today, demonstrating the brain's ongoing vulnerability. The core of the shore-based paradigm of human brain evolution proposes that sustained access by certain groups of early Homo to freshwater and marine food resources would have helped surmount both the nutritional as well as the energetic constraints on mammalian brain development.

Keywords: Homo | Brain selective nutrients | Diet | Omega-3 fatty acids | Docosahexaenoic acid | Body fat | Ketones

Joordens 2014

Josephine C. A. Joordens, Remko S. Kuipers, Jan H. Wanink & Frits A. J. Muskiet, *A fish is not a fish, Patterns in fatty acid composition of aquatic food may have had implications for hominin evolution.* Journal of Human Evolution **77** (2014), 107–116.

From c. 2 Ma (millions of years ago) onwards, hominin brain size and cognition increased in an unprecedented fashion. The exploitation of high-quality food resources, notably from aquatic ecosystems, may have been a facilitator or driver of this phenomenon. The aim of this study is to contribute to the ongoing debate on the possible role of aquatic resources in hominin evolution by providing a more detailed nutritional context. So far, the debate has focused on the relative importance of terrestrial versus aquatic resources while no distinction has been made between different types of aquatic resources. Here we show that Indian Ocean reef fish and eastern African lake fish yield on average similarly high amounts of eicosapentaenoic acid (EPA), docosahexaenoic acid (DHA), and arachidonic acid (AA). Hence a shift from exploiting tropical marine to freshwater ecosystems (or vice versa) would entail no material difference in dietary long-chain polyunsaturated fatty acid (LC-PUFA) availability. However, a shift to marine ecosystems would likely mean a major increase in access to brain-selective micronutrients such as iodine. Fatty fish from marine temperate/cold waters yield twice as much DHA and four times as much EPA as tropical fish, demonstrating that a latitudinal shift in exploitation of African coastal ecosystems could constitute a significant difference in LC-PUFA availability with possible implications for brain development and functioning. We conclude that exploitation of aquatic food resources could have facilitated the initial moderate hominin brain increase as observed in fossils dated to c. 2 Ma, but not the exceptional brain increase in later stages of hominin evolution. We propose that the significant expansion in hominin brain size and cognition later on may have been aided by strong directional selecting forces such as runaway sexual selection of intelligence, and nutritionally supported by exploitation of high-quality food resources in stable and productive aquatic ecosystems.

Keywords: Brain growth | Diet | LC-PUFA | DHA | EPA | AA

Kyriacou 2014

Katharine Kyriacou, John E. Parkington, Adrian D. Marais & David R. Braun, *Nutrition, modernity and the archaeological record, Coastal resources and nutrition among Middle Stone Age hunter-gatherers on*

the western Cape coast of South Africa. Journal of Human Evolution **77** (2014), 64–73.

In this paper, we assess the nutritional value of some marine and terrestrial food resources available to Middle Stone Age hunter-gatherers in the Western Cape of South Africa with respect to an important macronutrient (protein) and an essential micronutrient (iron) and introduce a framework for assessing the relative utility of marine and terrestrial resources. Whilst the ability to extract nutrients from the environment has always been a lynchpin in archaeologists' reconstructions of human evolution, a recent paradigm shift has recognized the role of marine resources in encephalization. Nutritional research indicates that marine ecosystems are the best source for long chain polyunsaturated fatty acids essential for proper brain development, and excavations at securely dated archaeological sites in South Africa provide firm evidence for the exploitation of marine resources by Middle Stone Age hunter-gatherers from at least Marine Isotope Stage 5 (130 ka), and possibly even earlier. Because marine molluscs are abundant, predictably located and easily harvested, they would have been readily available to all members of the community, in contrast to terrestrial resources. The improving archaeological record gives important clues to resource choice, but many more nutritional observations are needed to determine the extent to which marine resources could have met the nutrient requirements of prehistoric people. Our observations indicate that marine and terrestrial fauna are both excellent sources of protein, and that marine molluscs have higher iron concentrations than we expected for invertebrate fauna. We calculate the number of individual food items from a selection of marine and terrestrial species needed to provide the protein and iron requirements of a hypothetical group of hunter-gatherers, identify contrasts in peoples' requirements for and access to nutrients and resources, and discuss the implications for prehistoric subsistence strategies and human evolution.

Keywords: Marine and terrestrial resources | Diet | Encephalization | Protein | Iron | Pleistocene | Subsistence | Mollusc | Limpet | Long chain polyunsaturated fatty acids

Marean 2014

Curtis W. Marean, *The origins and significance of coastal resource use in Africa and Western Eurasia.* Journal of Human Evolution **77** (2014), 17–40.

The systematic exploitation of marine foods by terrestrial mammals lacking aquatic morphologies is rare. Widespread ethnographic and archaeological evidence from many areas of the world shows that modern humans living on coastlines often ratchet up the use of marine foods and develop social and technological characteristics unusual to hunter-gatherers and more consistent with small scale food producing societies. Consistent use of marine resources often is associated with reduced mobility, larger group size, population packing, smaller territories, complex technologies, increased economic and social differentiation, and more intense and wide-ranging gifting and exchange. The commitment to temporally and spatially predictable and dense coastal foods stimulates investment in boundary defense resulting in inter-group conflict as predicted by theory and documented by ethnography. Inter-group conflict provides an ideal context for the proliferation of intra-group cooperative behaviors beneficial to the group but not to the altruist (Bowles, 2009). The origins of this coastal adaptation marks a transformative point for the hominin lineage in Africa since all previous adaptive systems were likely characterized by highly mobile, low-density, egalitarian populations with large territories and little boundary defense. It is important to separate occasional uses of marine foods, present among several primate species, from systematic and

committed coastal adaptations. This paper provides a critical review of where and when systematic use of coastal resources and coastal adaptations appeared in the Old World by a comparison of the records from Africa and Europe. It is found that during the Middle Stone Age in South Africa there is evidence that true coastal adaptations developed while there is, so far, a lack of evidence for even the lowest levels of systematic coastal resource use by Neanderthals in Europe. Differences in preservation, sample size, and productivity between these regions do not explain the pattern.

Keywords: Middle Stone Age | Middle Paleolithic | Modern human origins | Coastal adaptation | Shell midden | Marine foods

Mateos 2014

Ana Mateos, Idoia Goikoetxea, William R. Leonard, Jesús IJngel Martín-González, Guillermo Rodríguez-Gómez & Jesús Rodríguez, *Neandertal growth: What are the costs?* Journal of Human Evolution **77** (2014), 167–178.

JHumEvo077-0167-Supplement.pdf

Energetic approaches have been increasingly used to address key issues in Neandertal palaeoecology and palaeobiology. Previous research has focused exclusively on the energy requirements of adults and highlights the high energy demands of these individuals compared with modern humans. Less attention has been paid to the energy requirements of sub-adult Neandertals, even though this age group could provide clues for a better understanding of Neandertal life history. Accordingly, herein, we estimate the energy costs of maintenance and growth in Neandertal infants and children from one to six years of age and compare these costs with values for modern humans. Statural growth models for two modern human populations (Beasain and Evenki) and an average Neandertal model population are used to establish weight growth models. In turn, these models of body weight growth are used to estimate key components of energetic variables (basal metabolic rate, total energy expenditure, energy of growth and daily energy requirements). Between three and six years of age, Neandertal children have slightly lower basal and growth energy costs than do modern humans of the same age, due primarily to their smaller body mass and slower growth rates. The reduction in energy allocated to growth is likely the result of metabolic adaptations to other somatic factors and thermal stress. Data from contemporary human infants and children suggest that even mild cold stress increases non-shivering thermogenesis, thus elevating metabolic needs by 50 % or more. These results suggest that thermal stress likely played a strong role in shaping the delayed developmental patterns and lower energy allocated to growth during early life in Neandertals relative to Homo sapiens.

Keywords: Homo neanderthalensis | Basal metabolic rate | Total energy expenditure | Energy of growth | Daily energy requirements

Seguin-Orlando 2014

Andaine Seguin-Orlando et al., *Genomic structure in Europeans dating back at least 36,200 years.* science **346** (2014), 1113–1118.

s346-1113-Supplement.pdf

Andaine Seguin-Orlando, Thorfinn S. Korneliussen, Martin Sikora, Anna-Sapfo Malaspinas, Andrea Manica, Ida Moltke, Anders Albrechtsen, Amy Ko, Ashot Margaryan, Vyacheslav Moiseyev, Ted Goebel, MichaelWestaway, David Lambert, Valeri Khartanovich, Jeffrey D.Wall, Philip R. Nigst, Robert A. Foley, Marta Mirazon Lahr, Rasmus Nielsen, Ludovic Orlando & Eske Willerslev

The origin of contemporary Europeans remains contentious.We obtained a genome sequence from Kostenki 14 in European Russia dating from 38,700 to 36,200 years ago, one of the oldest fossils of anatomically modern humans from Europe.We find that Kostenki 14 shares a close ancestry with the 24,000-year-old Mal'ta boy fromcentral Siberia, European Mesolithic hunter-gatherers, some contemporarywestern Siberians, andmany Europeans, but not eastern Asians. Additionally, the Kostenki 14 genome shows evidence of shared ancestry with a population basal to all Eurasians that also relates to later European Neolithic farmers.We find that Kostenki 14 contains more Neandertal DNA that is contained in longer tracts than present Europeans. Our findings reveal the timing of divergence of western Eurasians and East Asians to be more than 36,200 years ago and that European genomic structure today dates back to the Upper Paleolithic and derives from a metapopulation that at times stretched from Europe to central Asia.

Shimelmitz 2014

Ron Shimelmitz, Steven L. Kuhn, Arthur J. Jelinek, Avraham Ronen, Amy E. Clark & Mina Weinstein-Evron, *'Fire at will': The emergence of habitual fire use 350,000 years ago.* Journal of Human Evolution **77** (2014), 196–203.

The use of fire is central to human survival and to the processes of becoming human. The earliest evidence for hominin use of fire dates to more than a million years ago. However, only when fire use became a regular part of human behavioral adaptations could its benefits be fully realized and its evolutionary consequences fully expressed. It remains an open question when the use of fire shifted from occasional and opportunistic to habitual and planned. Understanding the time frame of this 'technological mutation' will help explain aspects of our anatomical evolution and encephalization over the last million years. It will also provide an important perspective on hominin dispersals out of Africa and the colonization of temperate environments, as well as the origins of social developments such as the formation of provisioned base camps. Frequencies of burnt flints from a 16-m-deep sequence of archaeological deposits at Tabun Cave, Israel, together with data from the broader Levantine archaeological record, demonstrate that regular or habitual fire use developed in the region between 350,000–320,000 years ago. While hominins may have used fire occasionally, perhaps opportunistically, for some million years, we argue here that it only became a consistent element in behavioral adaptations during the second part of the Middle Pleistocene.

Keywords: Habitual fire | Lower Paleolithic | Acheulo-Yabrudian | Tabun Cave | Mount Carmel

Stewart 2014

Kathlyn M. Stewart, *Environmental change and hominin exploitation of C4-based resources in wetland/savanna mosaics.* Journal of Human Evolution **77** (2014), 1–16.

Eastern and southern Africa experienced ongoing climatic and tectonic instability in the Plio-Pleistocene, alongside declining forests and expanding grasslands. Most known hominin genera (Australopithecus spp., Kenyanthropus, Paranthropus spp., Homo spp.) appear roughly between 4.2 and 1.8 Ma (millions of years ago). Explanations for these speciation events have focused on adaptations to environmental change, particularly in terrestrial biomes. However, the links between environmental change and hominin adaptations have not always been clear. Often overlooked is that Plio-Pleistocene vegetation included not just terrestrial

environments, but a large component of edaphic (wet) C4 grasses and sedges. In this paper it is suggested that in response to environmental fluctuations, hominins engaged in conservative long-term ecological and dietary patterns, based on predictable C4/C3 wetland and terrestrial resources. Data are presented from six hominin locales, which demonstrate reliance on plant-based resources (sedges, grasses, and other vegetation) in C4-inclusive wetland/savanna mosaics. After roughly 2.4 Ma, severe climate variability is associated with early Homo and perhaps Paranthropus boisei broadening their diet to familiar but less preferred foods: vertebrates and invertebrates. These foods consistently provided early Homo with essential nutrients, which reduced selection pressures and allowed for increases in brain size. After 1.65 Ma, a 20 % increase in the C4 dietary component of Homo occurs alongside increased relative brain size. P. boisei also increases its C4 dietary component by 15 % after 1.65 Ma. These increases imply that both taxa continued to broaden their diet within the C4-based wetlands/savanna biome, with Homo putting a greater emphasis on mammals.

Keywords: Diet | Paleoenvironment | Plio-Pleistocene Africa | Encephalization | Climate change

Tattersall 2014

Ian Tattersall, *Diet as driver and constraint in human evolution.* Journal of Human Evolution **77** (2014), 141–142.

There is little doubt that the hominid family first differentiated after an already orthograde arboreal hominoid began spending increasing amounts of time on the ground, presumably attracted by terrestrial resources. This initial association with terra firma has tended to focus our attention on strictly terrestrial foodstuffs in reconstructing the nature of early hominid diets. But the contributions to this Special Issue of JHE togetheradd upto a strong argument for broadening this focus. The diverse perspectives gathered here provide a compelling array of reasons why we should seriously consider the key role that aquatic foods may have played in supplying nutrients essential to sustaining the remarkable observed enlargement of hominid brains over the course of the Pleistocene.

Wang 2014

Shu Pei Wang, Hao Yang, Jiang Wei Wu, Nicolas Gauthier, Toshiyuki Fukao & Grant A. Mitchell, *Metabolism as a tool for understanding human brain evolution, Lipid energy metabolism as an example.* Journal of Human Evolution **77** (2014), 41–49.

Genes and the environment both influence the metabolic processes that determine fitness. To illustrate the importance of metabolism for human brain evolution and health, we use the example of lipid energy metabolism, i.e. the use of fat (lipid) to produce energy and the advantages that this metabolic pathway provides for the brain during environmental energy shortage. We briefly describe some features of metabolism in ancestral organisms, which provided a molecular toolkit for later development. In modern humans, lipid energy metabolism is a regulated multi-organ pathway that links triglycerides in fat tissue to the mitochondria of many tissues including the brain. Three important control points are each suppressed by insulin. (1) Lipid reserves in adipose tissue are released by lipolysis during fasting and stress, producing fatty acids (FAs) which circulate in the blood and are taken up by cells. (2) FA oxidation. Mitochondrial entry is controlled by carnitine palmitoyl transferase 1 (CPT1). Inside the mitochondria, FAs undergo beta oxidation and energy production in the Krebs cycle and respiratory chain. (3) In liver mitochondria, the 3-hydroxy-3-methylglutaryl-CoA (HMG-CoA) pathway produces ketone bodies for the brain and other organs. Unlike most tissues,

the brain does not capture and metabolize circulating FAs for energy production. However, the brain can use ketone bodies for energy. We discuss two examples of genetic metabolic traits that may be advantageous under most conditions but deleterious in others. (1) A CPT1A variant prevalent in Inuit people may allow increased FA oxidation under nonfasting conditions but also predispose to hypoglycemic episodes. (2) The thrifty genotype theory, which holds that energy expenditure is efficient so as to maximize energy stores, predicts that these adaptations may enhance survival in periods of famine but predispose to obesity in modern dietary environments.

Keywords: Triglycerides | Fatty acids | Ketone bodies | Brain evolution | Thrifty genotype | Inuit | Carnitine palmitoyl transferase

Zink 2014

Katherine D. Zink, Daniel E. Lieberman & Peter W. Lucas, *Food material properties and early hominin processing techniques*. Journal of Human Evolution **77** (2014), 155–166.

Although early Homo is hypothesized to have used tools more than australopiths to process foods prior to consumption, it is unknown how much the food processing techniques they used altered the material properties of foods, and therefore the masticatory forces they generated, and how well they were able to comminute foods. This study presents experimental data on changes to food material properties caused by mechanical tenderization (pounding with a stone tool) and cooking (dry roasting) of two foods likely to have been important components of the hominin diet: meat and tubers. Mechanical tenderization significantly decreased tuber toughness by 42 %, but had no effect on meat toughness. Roasting significantly decreased several material properties of tubers correlated with masticatory effort including toughness (49 %), fracture stress (28 %) and elastic modulus (45 %), but increased the toughness (77 %), fracture stress (50 %–222 %), and elastic modulus of muscle fibers in meat (308 %). Despite increasing many material properties of meat associated with higher masticatory forces, roasting also decreased measured energy loss by 28 %, which likely makes it easier to chew. These results suggest that the use of food processing techniques by early Homo probably differed for meat and tubers, but together would have reduced masticatory effort, helping to relax selection to maintain large, robust faces and large, thickly enameled teeth.

Keywords: Diet | Food processing | Cooking | Tenderizing | Early Homo | Oldowan | Fire

Biologie

Bauernfeind 2014

Amy L. Bauernfeind & Courtney C. Babbitt, *The appropriation of glucose through primate neurodevelopment*. Journal of Human Evolution **77** (2014), 132–140.

The human brain is considerably larger and more energetically costly than that of other primate species. As such, discovering how human ancestors were able to provide sufficient energy to their brains is a central theme in the study of hominin evolution. However, many discussions of metabolism frequently omit the different ways in which energy, primarily glucose, is used once made available to the brain. In this review, we discuss two glucose metabolic pathways, oxidative phosphorylation and aerobic glycolysis, and their respective contributions to the energetic and anabolic budgets of the brain. While oxidative phosphorylation is a more efficient producer of energy, aerobic glycolysis contributes essential molecules for

the growth of the brain and maintaining the structure of its cells. Although both pathways occur in the brain throughout the lifetime, aerobic glycolysis is a critical pathway during development, and oxidative phosphorylation is highest during adulthood. We outline how elevated levels of aerobic glycolysis may support the protracted neurodevelopmental sequence of humans compared with other primates. Finally, we review the genetic evidence for differences in metabolic function in the brains of primates and explore genes that may provide insight into how glucose metabolism may differ across species.

Keywords: Aerobic glycolysis | Oxidative phosphorylation | Brain energetics | Development | Human evolution | Comparative genetics

Russon 2014

Anne E. Russon, Alain Compost, Purwo Kuncoro & Agnes Ferisa, *Orangutan fish eating, primate aquatic fauna eating, and their implications for the origins of ancestral hominin fish eating.* Journal of Human Evolution **77** (2014), 50–63.

JHumEvo077-0050-Supplement.pdf

This paper presents new evidence of fish eating in rehabilitant orangutans living on two Bornean islands and explores its contributions to understanding nonhuman primates' aquatic fauna eating and the origins of ancestral hominin fish eating. We assessed the prevalence of orangutans' fish eating, their techniques for obtaining fish, and possible contributors (ecology, individual differences, humans). We identified 61 events in which orangutans tried to obtain fish, including 19 in which they ate fish. All the orangutans were juvenile-adolescent; all the fish were disabled catfish; and most were obtained and eaten in drier seasons in or near shallow, slow-moving water. Orangutans used several techniques to obtain fish (inadvertent, opportunistic and deliberate hand-catch, scrounge, tool-assisted catch) and probably learned them in that order. Probable contributing factors were orangutan traits (age, preexisting water or tool skills), island features (social density, water accessibility), and local human fishing. Our review of primates' aquatic fauna eating showed orangutans to be one of 20 species that eat aquatic fauna, one of nine confirmed to eat fish, and one of three that use tools to obtain fish. Primate fish eating is also site-specific within species, partly as a function of habitat (e.g., marine-freshwater, seasonality) and human influence (possibly fostered eating fish or other aquatic fauna at most sites, clearly induced it at some). At tropical freshwater sites, fish eating occurred most often in drier seasons around shallow water. Orangutan and primate findings are generally consistent with Stewart's (2010) reconstruction of the origins of ancestral hominin fish eating, but suggest that it, and tool-assisted fish catching, were possible much earlier.

Keywords: Pongo | Borneo | Primate diets | Early hominin diets | Innovation | Aquatic resources

Datierung

Manning 2014

Katie Manning, Adrian Timpson, Sue Colledge, Enrico Crema, Kevan Edinborough, Tim Kerig & Stephen Shennan, *The chronology of culture, A comparative assessment of European Neolithic dating approaches.* Antiquity **88** (2014), 1065–1080.

Archaeologists have long sought appropriate ways to describe the duration and floruit of archaeological cultures in statistical terms. Thus far, chronological reasoning has been largely reliant on typological sequences. Using summed probability

distributions, the authors here compare radiocarbon dates for a series of European Neolithic cultures with their generally accepted 'standard' date ranges and with the greater precision afforded by dendrochronology, where that is available. The resulting analysis gives a new and more accurate description of the duration and intensity of European Neolithic cultures.

Keywords: Neolithic, culture, chronologies, dendrochronology, radiocarbon dating, Bayesian analysis

Manning 2014

Sturt W. Manning et al., *Dating the Thera (Santorini) eruption, Archaeological and scientific evidence supporting a high chronology.* Antiquity **88** (2014), 1164–1179.

Sturt W. Manning, Felix Höflmayer, Nadine Moeller, Michael W. Dee, Christopher Bronk Ramsey, Dominik Fleitmann, Thomas Higham, Walter Kutschera & EvaMaria Wild

The date of the Late Bronze Age Minoan eruption of the Thera volcano has provoked much debate among archaeologists, not least in a recent issue of Antiquity ('Bronze Age catastrophe and modern controversy: dating the Santorini eruption', March 2014). Here, the authors respond to those recent contributions, citing evidence that closes the gap between the conclusions offered by previous typological, stratigraphic and radiometric dating techniques. They reject the need to choose between alternative approaches to the problem and make a case for the synchronisation of eastern Mediterranean and Egyptian chronologies with agreement on a 'high' date in the late seventeenth century BC for the Thera eruption.

Keywords: Santorini, Thera, Late Bronze Age, Minoan eruption, radiocarbon dating, chronology

Grabung

Kersting 1995

Thomas Kersting & Claudia Giovanna Holtschneider-Peschke, *Vorgeschichtliche und mittelalterliche bis neuzeitliche Besiedlungsspuren in Düsseldorf-Rath, Vorbericht über die Ausgrabungen 1991/92.* Bonner Jahrbücher **195** (1995), 351–370.

Lommerzheim 1995

Ralf Lommerzheim & Bernd C. Oesterwind, *Die hallstattzeitliche Siedlung von Düsseldorf-Rath, Mit einem Beitrag von Wolfgang und Ursula Schirmer.* Rheinische Ausgrabungen 38 (Bonn 1995), 22–27.

Päffgen 2000

Bernd Päffgen & Karl Peter Wendt, *Ein spätlatenezeitlicher Opferplatz der Eburonen bei Inden.* Archäologie im Rheinland **2000**, 61–62.

Schwellnus 1983

Winrich Schwellnus, Jakob Hermanns & Alan Brown, *Ein spätbronzezeitlicher Siedlungsplatz im Vorfeld des Tagebaus Inden, Stadt Eschweiler-Lohn, Kr. Aachen.* Ausgrabungen im Rheinland **1981/82** (1983), 98–99.

Simons 1983
Angela Simons, *Eine spätlatenezeitliche Siedlung von Niederzier-Hambach, Kreis Düren (Hambach 490).* In: Gerhard Bauchhenss (Hrsg.), *Archäologie in den rheinischen Lössbörden, Beiträge zur Siedlungsgeschichte im Rheinland.* Rheinische Ausgrabungen 24 (Bonn 1983), 317–329.

Kultur

Diamond 2014
Jared Diamond, *Reversals of national fortune, and social science methodologies.* PNAS **111** (2014), 17709–17714.
Among non-European regions colonized by Europeans, regions that were relatively richer five centuries ago (like Mexico, Peru, and India) tend to be poorer today, while regions that originally were relatively poorer (like the United States, Chile, and Australia) tend now to be richer. Acemoglu, Johnson, and Robinson (abbreviated AJR) established the generality of this reversal of fortune. Chanda, Cook, and Putterman (abbreviated CCP) have now reanalyzed it, taking as a unit of analysis populations rather than geographic regions. That is, India's population was Indian 500 y ago and is still overwhelmingly Indian today, whereas the United States' population was Native American 500 years ago but is overwhelmingly Old World (especially European) today. Reversals of fortune disappeared when CCP analyzed populations rather than geographic regions: for instance, the geographic region of the modern United States has become relatively richer since AD 1500, but the predominantly European population now occupying the United States was already relatively rich in AD 1500. Evidently, European colonists carried ingredients of wealth with them. I discuss the biological and cultural baggage transported by European immigrants and associated with wealth. Among that baggage, AJR emphasize institutions, CCP emphasize social capital, and I identify many different elements only loosely coupled to each other. This paper discusses the problem, especially acute in the social sciences, of "operationalizing" intuitive concepts (such as mass, temperature, wealth, and innovation) so that they can be measured. Basic concepts tend to be harder to define, operationalize, and measure in the social sciences than in the laboratory sciences.
wealth of nations | operationalize | colonies | immigrant baggage

Roediger 2014
H. L. Roediger III & K. A. DeSoto, *Forgetting the presidents.* science **346** (2014), 1106–1109.
s346-1106-Supplement.pdf
Two studies examined how U.S. presidents are forgotten. A total of 415 undergraduates in 1974, 1991, and 2009 recalled as many presidents as possible and attempted to place them in their correct ordinal positions. All showed roughly linear forgetting of the eight or nine presidents prior to the president holding office at the time, and recall of presidents without respect to ordinal position also showed a regular pattern of forgetting. Similar outcomes occurred with 497 adults (ages 18 to 69) tested in 2014. We fit forgetting functions to the data to predict when six relatively recent presidents will recede in memory to the level of most middle presidents (e.g., we predict that Truman will be forgotten to the same extent as McKinley by about 2040). These studies show that forgetting from collective memory can be studied empirically, as with forgetting in other forms of memory.

Rubin 2014
David C. Rubin, *How quickly we forget*. science **346** (2014), 1058–1059.

Watkins 2006
Trevor Watkins, *Architecture and the symbolic construction of new worlds*. In: E. J. Banning & M. Chazan (Hrsg.), *Domesticating Space, Construction, Community, and Cosmology in the Late Prehistoric Near East*. SENEPSE 12 (Berlin 2006), 15–24.
The construct of community became possible for humans only with the emergence of minds that were capable of operating in terms of symbolic culture. This capacity to build and maintain communities that were larger than the circle of immediate kin was necessary for the ability of early Neolithic groups to live together, for the first time in human history, in co-resident groups of several hundred or several thousand people in permanent settlements. Once the challenge of the symbolic construction of community had been met, the opportunities offered by the new facility with symbolic culture could be explored.

Watkins 2008
Trevor Watkins, *Natural environment versus cultural environment, The implications of creating a built environment*. In: Joaquín M. Córdoba, Miquel Molist, M. Carmen Pérez, Isabel Rubio & Sergio Martínez (Hrsg.), *Proceedings of the 5th International Congress on the Archaeology of the Ancient Near East, Madrid, April 3–8 2006, Vol. III*. (Madrid 2008), 427–437.
There is a widespread tendency to ascribe a causal role to environmental change in the explanation of the major processes in human prehistory, but no modern historians explain major events in recent history in terms of global or regional climatic change. Our experience is that we operate almost entirely within the constraints and facilities of a culturally formed environment. If our earliest hominid ancestors were constrained within their physical and biological environments, we need to define the point within human history when symbolic cultural environments emerged. Drawing on the work of cognitive and developmental psychologists, I make the case that the earliest Neolithic in southwest Asia was the first time in human history that the cultural environment was more important than the natural environment in human affairs.
Keywords: environment, culture, theory.

Kupfer

Kienlin 2012
Tobias L. Kienlin, *Working Copper in the Chalcolithic, A long-term perspective on the development of metallurgical knowledge in central Europe and the Carpathian Basin*. In: Michael J. Allen, Julie Gardiner & Alison Sheridan (Hrsg.), *Is there a British Chalcolithic? People, place and polity in the later 3rd millennium*. Prehistoric Society Research Paper 4 (Oxford 2012), 126–143.
In this contribution attention is drawn to some shortcomings of our conventional approach to early metalworking. It is argued that we employ notions of progress and evolution to account for long-term technological change that fall short rf representing a more complex ancient reality. With the benefit of hindsight we see

'progress' and increasingly better solutions in terms of the working and properties of copper and copper alloys whereas, in fact, there were alternative trajectories, and change towards the 'better' (in modern terms) was far from immediately apparent. As a result our approaches are often reductionist. We fail to understand adequately the technological choices taken through time by the countless individuals who depended on their local cultural background as much as they did on the laws of nature involved in the production and working of copper. The examples drawn upon cover the development of early metallurgy in the Carpathian Basin and central Europe from what is locally termed the Late Neolithic, Chalcolithic, or Copper Age. Some aspects touched upon in this brief review of the development of metallurgical knowledge are specific to the time and area under consideration. But it is proposed that some of the points raised may be of wider relevance to the study of early metallurgy – in particular the need for a long-term perspective on the development of metallurgical knowledge that allows for contingency in technological choices and a context-specific approach to early metalworking bryond our own modern science-based understanding of technological progress.

Šljivar 2014

Duško Šljivar & Dušan Borić; Miljana Radivojević et al., *Context is everything: comments on Radivojević et al. (2013)*, *Context is everything indeed: a response to Šljivar and Borić*. Antiquity **88** (2014), 1310–1319.

Miljana Radivojević, Thilo Rehren, Julka Kuzmanović-Cvetković & Marija Jovanović

Contrary to the statement made in the article, this object was not found in "an undisturbed context, on the floor of a dwelling structure next to a copper workshop [...] approximately 1m from a fireplace" (Radivojević et al. 2013: 1032), but in the spoil heap above section CD, which is on the opposite side of the excavated area from the find spot indicated in their fig. 2. The metal foil was noticed by the excavators and collected from the spoil heap; it was provisionally assigned to spit 5, which was being excavated on the day it was found. A note about the metal foil was made in the official field journal of excavations at Plo¡cnik on 23 September 2008. The metal foil object (inv. C–397) could belong to a possible horizon of 0.75m of cultural deposits; that is between 301.98m, the height of spit 1, and 301.23m, the bottom of spit 5. Only below this horizon, at the level of spits 7 and 8, was the burnt structure shown in their fig. 2 completely exposed. The floor of the burnt structure had not been revealed on the day this object was found.

Mathematik

Zhang 2014

Ruixun Zhang, Thomas J. Brennan & Andrew W. Lo, *The origin of risk aversion*. PNAS **111** (2014), 17777–17782.

Risk aversion is one of the most basic assumptions of economic behavior, but few studies have addressed the question of where risk preferences come from and why they differ from one individual to the next. Here, we propose an evolutionary explanation for the origin of risk aversion. In the context of a simple binary-choice model, we show that risk aversion emerges by natural selection if reproductive risk is systematic (i.e., correlated across individuals in a given generation). In contrast, risk neutrality emerges if reproductive risk is idiosyncratic (i.e., uncorrelated across each given generation). More generally, our framework implies that the degree of risk aversion is determined by the stochastic nature of reproductive rates, and we

show that different statistical properties lead to different utility functions. The simplicity and generality of our model suggest that these implications are primitive and cut across species, physiology, and genetic origins.

risk aversion | risk preferences | expected utility theory | risk-sensitive foraging | evolution

Politik

Spiegel 1973

„Die Türken kommen – rette sich, wer kann“. Der Spiegel **1973**, 31, 24–34.

So ist denn auch die Aussagekraft der polizeilichen Statistik begrenzt. Der vom Bundeskiriminalamt errechnete Delikt-Anteil der Ausländer von 11,5 Prozent ließe im Vergleich zur Gesamtbevölkerung (Ausländeranteil: etwa sieben .Prozent) auf eine um zwei Drittel höhere Kriminalität der fremden schließen. Doch die Statistik täuscht schon deshalb, weil die Ausländer durchweg zu den jüngeren, kriminell aktiven Jahrgängen zählen.

Eine deutsche Bezugsgruppe von ähnlich kriminogenem Zuschnitt müßte auf eine wesentlich höhere Verbrechensrate kommen. Statt dessen wird das Kriminalitätsbild der Deutschen durch zahlenstarke gesetzesfromme Gruppen — Greise, Säuglinge, Besitzbürger — im Vergleich zu den Fremden geschönt.

Dieses Hemmnis, in Wahrheit nach überwiegender Pädagogenmeinung für mindestens die Hälfte der Kinder wirksam, verstärkt sich noch in den Gettos. Nach Schweizer Beobachtungen leidet das zunächst einer Schutzhaltung vergleichbare Motiv, sich anzupassen und die Sprache zu erlernen, gerade dort, wo die Minderheiten zu relativer Größe kommen.

In den Klassen der Slumviertel mit einem Ausländerkind auf jeder dritten oder zweiten Schulbank wachsen fast zwangsläufig “Analphabeten in zwei Sprachen” heran (so ein türkischer Lehrer in Frankfurt). “Sie sind”, wie Soziologe Nezih Manyas protokolliert, “am Ende ein reiner Verlust für die Türkei und bestimmt kein Gewinn für Deutschland.”

Spiegel 1989

Fettleibig mit Dauerwelle – DDR-Flüchtlinge, Westdeutsche Linke, von grünen Alternativen bis hin zu sozialdemokratischen Ideologen, haben ein neues Feindbild. Der Spiegel **1989**, 43, 46–53.

Die Übersiedler „verdienen keinen Respekt“, befindet auch die Marxistische Gruppe in einem Flugblatt, das sie bundesweit verteilen ließ. Die Zuwanderer hätten für ihre Flucht Gründe, „daß es einer Sau graust“.

Die Ost-Flüchtlinge müßten, meint der AL-Politiker, künftig Asylanträge stellen und politische Verfolgung geltend machen. „Für diejenigen, die endlich mal keinen Trabi mehr fahren wollen, sondern ein schöneres Auto, hätte das zur Folge, daß sie nicht mehr übersiedeln könnten“, erklärte Lohauß.

Für Verstimmung hatte vor allem die Lohauß-Anregung gesorgt, künftig sorgsam zwischen Wirtschaftsflüchtlingen und politisch Verfolgten zu differenzieren – eine Unterscheidung, gegen die sich die Grünen in der Diskussion um die Asylgesetzgebung immer gewehrt hatten.