Liste erstellt am 2014-07-18

References

Aktuell

Austin 2014

Jim Austin, *What it takes*. science **344** (2014), 1422.

None of these results is terribly surprising, but they are more than a little depressing. These four factors, all of which were found to be among the most important ingredients of academic career success, are at best indirectly linked—and at worst not linked at all—to rigorous, serious, and significant science. The real value of the PI-predictor widget, then, is not that it can help early-career scientists plan their careers; in fact, we should hope they don't use it that way. Its real value, rather, is that it so clearly demonstrates the wide gap between science's ideals and incentives. If we want young scientists to remain idealistic, then we need to figure out how to do a better job rewarding the things that really matter: discovery (often as part of a team) and solutions to society's most compelling problems.

Bohannon 2014

John Bohannon, *Secret bundles of profit*. science **344** (2014), 1332–1332.

Study lifts veil on journal price negotiations.

Also missing are data about how many journal articles are actually downloaded over the course of a year. "Our use-analysis of the Springer packages shows we got a good deal," says Elizabeth Fish, a librarian at the University of Miami. "A recent internal study showed our cost for a Springer article download at about $ 2.00."

"We have a collective-action problem," says Tim Gowers, a mathematician at the University of Cambridge in the United Kingdom who launched a petition calling for a boycott of Elsevier. "If all libraries were simultaneously to refuse to sign any more Big Deals and switched instead to paying for journal subscriptions individually, then the market rate for the journals would be at a level where they reflected the actual value of the subscriptions to the universities, which is much lower than the current list prices."

Cerling 2014

Thure E. Cerling, Francis H. Brown & Jonathan G. Wynn, *On the Environment of Aramis, A Comment on White in Domínguez-Rodrigo*. Current Anthropology **55** (2014), 469–470.

Thus, all methods indicate the dominant biome was "wooded grassland" using the White (1983) classification for African vegetation. For comparison, median percent woody cover at Kanapoi and Kanjera calculated using method 1 are ca. 50 % and ! 10 %, respectively, indicating wood/ bush/shrubland and grassland, respectively.

Chaddah 2014

Praveen Chaddah, *Not all plagiarism requires a retraction*. nature **511** (2014), 127.

Papers that plagiarize only text can still contribute to the literature, but any errors or omissions should be prominently corrected, says Praveen Chaddah.

To scientists, plagiarism of an idea strikes at the heart of research as a creative enterprise. An idea could be a hypothesis to explain observations, or an experiment designed to test a hypothesis. Such plagiarism is difficult to uncover unless errant authors make fortuitous slip-ups, or it is accompanied by text plagiarism.

Copied text in a paper's introduction or concluding paragraph may happen simply because the authors lacked sufficient command over the language (usually English) to express the concept in a different way, or had read previous works that left an indelible mark on their subconscious.

There is a third form of copying: results plagiarism. This is different from fraud, in which the claimed experiments are often not carried out. In results plagiarism, scientists can repeat an experiment and obtain valid data. Such reproduction is, of course, a useful and common feature of science. The deception comes when they fail to mention the original work.

Cho 2014

Adrian Cho, *Quantum or not, controversial computer yields no speedup, Conventional computer ties D-Wave machine.* science **344** (2014), 1330–1331.

However, some researchers doubt that a quantum annealer will ever produce a useful quantum speedup. Although computer scientists have proved that a dreamed-of universal quantum computer should excel at factoring, theory strongly suggests that in actuality a quantum annealer will produce no similar speedup for any problem, says Umesh Vazirani, a computer scientist at the University of California, Berkeley. "I would bet that there's not a speedup," he says. Neven counters that he is "convinced that we will be able to find problem classes for which a next-generation quantum annealer will outperform any classical algorithm."

Gremillion 2014

Kristen J. Gremillion, Loukas Barton & Dolores R. Piperno, *Maintaining a diverse scientific toolkit is not an act of faith, Reply to Zeder.* PNAS **111** (2014), E2828.

Gremillion 2014

Kristen J. Gremillion, Loukas Barton & Dolores R. Piperno, *On distinguishing between models, hypotheses, and theoretical frameworks, Reply to Smith.* PNAS **111** (2014), E2830.

Smith's prediction of OFT's demise is at best premature. In all likelihood, OFT will continue to contribute to OA research, as well as to diverse disciplinary efforts outside of archaeology.

Kaspari 2014

Michael Kaspari, *Road salt offers insights into the connections between diet and neural development.* PNAS **111** (2014), 10033–10034.

When resources are in chronic short supply, perhaps the benefits of resource bonanzas are so rare that organisms lose the ability to say "enough."

Resing 2014

Joseph A. Resing & Pamela M. Barrett, *Fingerprints of a trace nutrient.* nature **511** (2014), 164–165.

Lack of dissolved iron in the sea limits biological productivity and the uptake of carbon dioxide. The sources of dissolved iron in the North Atlantic Ocean have been identified from isotopic variations of this trace nutrient.

Smaglik 2014

Paul Smaglik, *Entertaining science*. nature **511** (2014), 113–115.

Scientific advisers for films and television help to bring credibility to the screen – and take some tangible and intangible benefits back to the lab.

Smith 2014

Bruce D. Smith, *Failure of optimal foraging theory to appeal to researchers working on the origins of agriculture worldwide*. PNAS **111** (2014), E2829.

Although I generally agree with Gremillion et al. that combining NCT with other evolutionary approaches to OA will provide for a better future understanding of OA, I doubt very much that OFT/DBM will be included in that mix.

Snell-Rood 2014

Emilie C. Snell-Rood, Anne Espeset, Christopher J. Boser, William A. White & Rhea Smykalski, *Anthropogenic changes in sodium affect neural and muscle development in butterflies*. PNAS **111** (2014), 10221–10226.

The development of organisms is changing drastically because of anthropogenic changes in once-limited nutrients. Although the importance of changing macronutrients, such as nitrogen and phosphorus, is well-established, it is less clear how anthropogenic changes in micronutrients will affect organismal development, potentially changing dynamics of selection. We use butterflies as a study system to test whether changes in sodium availability due to road salt runoff have significant effects on the development of sodium-limited traits, such as neural and muscle tissue. We first document how road salt runoff can elevate sodium concentrations in the tissue of some plant groups by 1.5–30 times. Using monarch butterflies reared on roadside- and prairie-collected milkweed, we then show that road salt runoff can result in increased muscle mass (in males) and neural investment (in females). Finally, we use an artificial diet manipulation in cabbage white butterflies to show that variation in sodium chloride per se positively affects male flight muscle and female brain size. Variation in sodium not only has different effects depending on sex, but also can have opposing effects on the same tissue: across both species, males increase investment in flight muscle with increasing sodium, whereas females show the opposite pattern. Taken together, our results show that anthropogenic changes in sodium availability can affect the development of traits in roadside-feeding herbivores. This research suggests that changing micronutrient availability could alter selection on foraging behavior for some roadside-developing invertebrates.

nutritional ecology | Danaus plexippus | Pieris rapae | ecological stoichiometry

Suwa 2014

Gen Suwa & Stanley H. Ambrose, *Reply to Cerling et al.* Current Anthropology **55** (2014), 473–474.

Although they now accept the existence of patches of closed forests, we must note that we have never interpreted Ar. ramidus as having preferred a closed canopy forest habitat (only that some colobine monkeys did). Ar. ramidus may have ranged into such, but its entire paleobiology suggests a predominantly forest margin to woodland adaptation, a niche that involved terrestrial bipedality and routine dependence on arboreal substrates and resources. Tooth enamel carbon isotope analysis shows that hominids began foraging in open environments with higher intake of C4 resources only after 3.8 Ma.

White 2014

Tim D. White, *Reply to Cerling et al.* Current Anthropology **55** (2014), 471–472.

This contextual evidence for Ardipithecus habitat preference has forced savannaphilic paleoanthropologists and geologists to dig deeper in defense of a faulty, centuriesold scenario. But the most pertinent evidence is even more direct. The craniodental apparatus, postcranial anatomy, dental wear, and enamel isotopes of Ardipithcus ramidus all indicate that this most-arboreally-adept of all early hominids was poorly adapted to utilizing grassland substrates and resources.

Each independent line of anatomical, geochemical, geological, and paleontological evidence is inconvenient for a "savanna hypothesis" positing a riparian or grassland adaptation for the earliest hominids. Together, they are fatal for the concept. Our integration of these and other independent lines of evidence constituted a particularly robust test of that "hypothesis." It took 2 centuries, but falsification has arrived.

Zeder 2014

Melinda A. Zeder, *Alternative to faith-based science.* PNAS **111** (2014), E2827.

In the absence of this overarching optimal foraging theory (OFT) framework, researchers working at this level of analysis are characterized as grasping at a "hodgepodge" of inductively derived just-so stories. Although Gremillion et al. acknowledge that origins of agriculture (OA) will vary from region to region, our increasing ability to identify and monitor these regional contingencies is dismissed as making "trivial," "common sense" observations.

Anthropologie

Arsuaga 2014

J. L. Arsuaga et al., *Neandertal roots, Cranial and chronological evidence from Sima de los Huesos.* science **344** (2014), 1358–1363.

s344-1358-Supplement.pdf

J. L. Arsuaga, I. Martínez, L. J. Arnold, A. Aranburu, A. Gracia-Téllez, W. D. Sharp, R. M. Quam, C. Falguères, A. Pantoja-Pérez, J. Bischoff, E. Poza-Rey, J. M. Parés, J. M. Carretero, M. Demuro, C. Lorenzo, N. Sala, M. Martinón-Torres, N. García, A. Alcázar de Velasco, G. Cuenca-Bescós, A. Gómez-Olivencia, D. Moreno, A. Pablos, C.-C. Shen, L. Rodríguez, A. I. Ortega, R. García, A. Bonmatí, J. M. Bermúdez de Castro & E. Carbonell

Seventeen Middle Pleistocene crania from the Sima de los Huesos site (Atapuerca, Spain) are analyzed, including seven new specimens. This sample makes it possible to thoroughly characterize a Middle Pleistocene hominin paleodeme and to address hypotheses about the origin and evolution of the Neandertals. Using a variety of techniques, the hominin-bearing layer could be reassigned to a period around 430,000 years ago. The sample shows a consistent morphological pattern with derived Neandertal features present in the face and anterior vault, many of which are related to the masticatory apparatus. This suggests that facial modification was the first step in the evolution of the Neandertal lineage, pointing to a mosaic pattern of evolution, with different anatomical and functional modules evolving at different rates.

Cieri 2014

Robert L. Cieri, Steven E. Churchill, Robert G. Franciscus, Jingzhi Tan & Brian Hare, *Craniofacial Feminization, Social Tolerance, and the Origins of Behavioral Modernity*. Current Anthropology **55** (2014), 419–443.

Comments by: Sheela Athreya, Trenton W. Holliday, April Nowell, Teresa E. Steele and Timothy D. Weaver, Richard Wrangham

The past 200,000 years of human cultural evolution have witnessed the persistent establishment of behaviors involving innovation, planning depth, and abstract and symbolic thought, or what has been called "behavioral modernity." Demographic models based on increased human population density from the late Pleistocene onward have been increasingly invoked to understand the emergence of behavioral modernity. However, high levels of social tolerance, as seen among living humans, are a necessary prerequisite to life at higher population densities and to the kinds of cooperative cultural behaviors essential to these demographic models. Here we provide data on craniofacial feminization (reduction in average brow ridge projection and shortening of the upper facial skeleton) in Homo sapiens from the Middle Pleistocene to recent times. We argue that temporal changes in human craniofacial morphology reflect reductions in average androgen reactivity (lower levels of adult circulating testosterone or reduced androgen receptor densities), which in turn reflect the evolution of enhanced social tolerance since the Middle Pleistocene.

Heyes 2014

Cecilia M. Heyes & Chris D. Frith, *The cultural evolution of mind reading*. science **344** (2014), 1357. DOI:10.1126/science.1243091.

It is not just a manner of speaking: "Mind reading," or working out what others are thinking and feeling, is markedly similar to print reading. Both of these distinctly human skills recover meaning from signs, depend on dedicated cortical areas, are subject to genetically heritable disorders, show cultural variation around a universal core, and regulate how people behave. But when it comes to development, the evidence is conflicting. Some studies show that, like learning to read print, learning to read minds is a long, hard process that depends on tuition. Others indicate that even very young, nonliterate infants are already capable of mind reading. Here, we propose a resolution to this conflict.We suggest that infants are equipped with neurocognitive mechanisms that yield accurate expectations about behavior ("automatic" or "implicit" mind reading), whereas "explicit" mind reading, like literacy, is a culturally inherited skill; it is passed from one generation to the next by verbal instruction.

Hublin 2014

Jean-Jacques Hublin, *How to build a Neandertal, Fossils from Sima de los Huesos show a mixture of Neandertal and more ancient features*. science **344** (2014), 1338–1339.

Newman 1970

Russell W. Newman, *Why man is such a sweaty and thirsty naked animal, A speculative review*. Human Biology **42** (1970), 12–27.

A shift in habitat from forest to tropical grasslands by man's early ancestors in Tertiary times resulted in a rather distinctive reaction to external heat loads. If our ancestors had already lost most of their body hair or were in the process of doing so, the combination of increased solar exposure in open country and greater

absorption of solar energy by the naked skin magnified the total heat load. This must have constituted a disadvantage which required some compensation; in man it has taken the form of dependence on thermal sweating for heat dissipation to the point where Homo sapiens has the greatest sweating capacity for a given surface area of any known animal. Heavy sweating without simultaneous drinking inevitably leads to tissue dehydration. Man is very intolerant of dehydration and has limited capacity to rehydrate rapidly. He is dependent on frequent and relatively small drinks of water under hot conditions. This must have influenced species behavior, at least until water containers were invented. Unfortunately, our present knowledge of how our non-human primate relatives react to heat stress is fragmentary and contradictory. We can't be sure that our modern specializations are uniquely human or are part of a general primate pattern.

Reynolds 2011

Sally C. Reynolds, Geoff N. Bailey & Geoffrey C. P. King, *Landscapes and their relation to hominin habitats, Case studies from Australopithecus sites in eastern and southern Africa.* Journal of Human Evolution **60** (2011), 281–298.

We examine the links between geomorphological processes, specific landscape features, surface water drainage, and the creation of suitable habitats for hominins. The existence of mosaic (i.e., heterogeneous) habitats within hominin site landscape reconstructions is typically explained using models of the riverine and gallery forest settings, or the pan or lake setting. We propose a different model: the Tectonic Landscape Model (TLM), where tectonic faulting and volcanism disrupts existing pan or river settings at small-scales (≈10–25 km). Our model encompasses the interpretation of the landscape features, the role of tectonics in creating these landscapes, and the implications for hominins. In particular, the model explains the underlying mechanism for the creation and maintenance of heterogeneous habitats in regions of active tectonics. We illustrate how areas with faulting and disturbed drainage patterns would have been attractive habitats for hominins, such as Australopithecus, and other fauna. Wetland areas are an important characteristic of surface water disturbance by fault activity; therefore we examine the tectonically-controlled Okavango Delta (Botswana) and the Nylsvley wetland (South Africa) as modern examples of how tectonics in a riverine setting significantly enhance the faunal and floral biodiversity. While tectonic landscapes may not have been the only type of attractive habitats to hominins, we propose a suite of landscape, faunal, and floral indicators, which when recovered together suggest that site environments may have been influenced by tectonic and/or volcanic activity while hominins were present. For the fossil sites, we interpret the faulting and landscapes around australopithecine-bearing sites of the Middle Awash (Ethiopia) and Makapansgat, Taung, and Sterkfontein (South Africa) to illustrate these relationships between landscape features and surface water bodies. Exploitation of tectonically active landscapes may explain why the paleoenvironmental signals, anatomy, diets, as well as the fauna associated with Australopithecus appear largely heterogeneous through time and space. This hypothesis is discussed in light of potential preservation and time-averaging effects which may affect patterns visible in the fossil record. The model, however, offers insight into the landscape processes of how such habitats are formed. The landscape features and range of habitat conditions, specifically the wetter, down-dropped plains and drier, uplifted flanks persist in close proximity for as long as the fault motion continues. The Tectonic Landscape Model provides an alternative explanation of why mixed habitats may be represented at certain sites over longer timescales.

Keywords: Ethiopia | Tectonism | Volcanism | Taung | Sterkfontein valley | Makapansgat | Mosaic environments | Hominins

Steudel-Numbers 2004

Karen L. Steudel-Numbers & Michael J. Tilkens, *The effect of lower limb length on the energetic cost of locomotion: implications for fossil hominins*. Journal of Human Evolution **47** (2004), 95–109.

The consequences of the relatively short lower limbs characteristic of AL 288-1 have been widely discussed, as have the causes and consequences of the short limbs of Neanderthals. Previous studies of the effect of limb length on the energetic cost of locomotion have reported no relationship; however, limb length could have accounted for as much as 19 % of the variation in cost and gone undetected (Steudel and Beattie, 1995; Steudel, 1994, 1996). Kramer (1999) and Kramer and Eck (2000) have recently used a theoretical model to predict the effect of the shorter limbs of early hominids, concluding that the shorter limbs may actually have been energetically advantageous.

Here, we took an experimental approach. Twenty-one human subjects, of varying limb lengths, walked on a treadmill at 2.6, 2.8, 3.0 and 3.2 m.p.h., while their expired gases were analyzed. The subjects walked for 12 minutes at each speed and their rates of oxygen consumption (VO2) over four minutes were averaged to estimate VO2. We also measured each subject's height, weight and lower limb length. Lean body mass and % fat were determined using dual-energy x-ray absorptiometry.

ANCOVA with total VO2 at either speed as the dependent variable and total lean mass, % fat and lower limb length as covariates resulted in all three covariates having a significant positive effect on VO2 at $p<0.01$. Subjects with relatively longer lower limbs had lower locomotor costs. Thus the short lower limbs characteristic of some hominid taxa would have resulted in more costly locomotion, barring some physiological anomaly. The magnitude of this effect is substantial; Neanderthals are estimated to have had locomotor costs 30 % greater than those of contemporary anatomically modern humans. By contrast the increase in lower limb length seen in H. erectus would have mitigated the increase in locomotor costs produced by the increase in body size.

Keywords: limb length; cost of transport; Australopithecus; Neanderthal; hominids

Steudel-Numbers 2006

Karen L. Steudel-Numbers, *Energetics in Homo erectus and other early hominins, The consequences of increased lower-limb length*. Journal of Human Evolution **51** (2006), 445–453.

Previous studies of daily energy expenditure (DEE) in hominin fossils have estimated locomotor costs using a formula that was based on six species, all 18 kg or less in mass, including no primates, and that has a number of other problems when applied in an ecological context. It is well established that the energetic cost of human walking is lower than that of representative mammals, particularly for individuals with long lower limbs. The current study reevaluates the daily energy expenditures of a variety of hominin species using more appropriate approaches to estimating locomotor costs. To estimate DEE for primates, I relied on published data on body mass, day range, and the percentage of time spent in various activities. Based on those data, I calculated a value for nonlocomotor DEE. I then used a variant of a method that I have suggested elsewhere to calculate the daily cost due to locomotion (DEEL) and summed the two to calculate total DEE. The more up-to-date methods for calculating the cost of travel result in lower estimates of

this aspect of the energy budget than seen in previous studies. Values obtained here for DEE in various representatives of Australopithecus are lower than reported previously by around 200 kcal/day. Taking into account the greater economy of human walking, particularly the effect of the longer lower limbs found in many later Homo species, also results in lowered estimates of DEE. Elongation of the lower limbs in H. erectus reduced relative travel costs nearly 50 % in comparison to A.L. 288-1 (A. afarensis). The present method for calculating DEE indicates that female H. erectus DEE was 84 % greater than that of female Australopithecus; this disparity is even larger than that suggested by previous workers.

Keywords: Homo erectus; Energetics; Leg length; Human evolution; Locomotion

Steudel-Numbers 2007

Karen L. Steudel-Numbers, Timothy D. Weaver & Cara M. Wall-Scheffler, *The evolution of human running, Effects of changes in lower-limb length on locomotor economy.* Journal of Human Evolution **53** (2007), 191–196.

Previous studies have differed in expectations about whether long limbs should increase or decrease the energetic cost of locomotion. It has recently been shown that relatively longer lower limbs (relative to body mass) reduce the energetic cost of human walking. Here we report on whether a relationship exists between limb length and cost of human running. Subjects whose measured lower-limb lengths were relatively long or short for their mass (as judged by deviations from predicted values based on a regression of lower-limb length on body mass) were selected. Eighteen human subjects rested in a seated position and ran on a treadmill at 2.68 m s-1 while their expired gases were collected and analyzed; stride length was determined from videotapes. We found significant negative relationships between relative lower-limb length and two measures of cost. The partial correlation between net cost of transport and lower-limb length controlling for body mass was r=-0.69 ($p = 0.002$). The partial correlation between the gross cost of locomotion at 2.68 m s-1 and lower-limb length controlling for body mass was r=-0.61 ($p = 0.009$). Thus, subjects with relatively longer lower limbs tend to have lower locomotor costs than those with relatively shorter lower limbs, similar to the results found for human walking. Contrary to general expectation, a linear relationship between stride length and lower-limb length was not found.

Keywords: Limb length; Energetics; Human running

Swisher 1994

C. C. Swisher III, G. H. Curtis, T. Jacob, A. G. Getty & A. Suprijo, Widiasmoro, *Age of the Earliest Known Hominids in Java, Indonesia.* science **263** (1994), 1118–1121.

40Ar/39Ar laser-incremental heating of hornblende separated from pumice recovered at two hominid sites in Java, Indonesia, has yielded well-defined plateaus with weighted mean ages of 1.81 ± 0.04 and 1.66 ± 0.04 million years ago (Ma). The hominid fossils, a juvenile calvaria of Pithecanthropus and a partial face and cranial fragments of Meganthropus, commonly considered part of the Asian Homo erectus hypodigm, are at least 0.6 million years older than fossils referred to as Homo erectus (OH-9) from Olduvai Gorge, Tanzania, and comparable in age with the oldest Koobi Fora Homo cf. erectus (Homo ergaster) in Kenya. These ages lend further credence to the view that Homo erectus may have evolved outside of Africa. If the ancestor of Homo erectus ventured out of Africa before 1.8 Ma, the dispersal would have predated the advent of the Acheulean culture at 1.4 Ma, possibly explaining the absence of these characteristic stone cleavers and hand axes in East Asia.

Biologie

Whiten 1999

A. Whiten et al., *Cultures in chimpanzees.* nature **399** (1999), 682–685.

n399-0682-Supplement.doc

A. Whiten, J. Goodall, W. C. McGrew, T. Nishida, V. Reynolds, Y. Sugiyama, C. E. G. Tutin, R. W. Wrangham & C. Boesch

As an increasing number of field studies of chimpanzees (Pan troglodytes) have achieved long-term status across Africa, differences in the behavioural repertoires described have become apparent that suggest there is significant cultural variation1–7. Here we present a systematic synthesis of this information from the seven most long-term studies, which together have accumulated 151 years of chimpanzee observation. This comprehensive analysis reveals patterns of variation that are far more extensive than have previously been documented for any animal species except humans8–11. We find that 39 different behaviour patterns, including tool usage, grooming and courtship behaviours, are customary or habitual in some communities but are absent in others where ecological explanations have been discounted. Among mammalian and avian species, cultural variation has previously been identified only for single behaviour patterns, such as the local dialects of songbirds12,13. The extensive, multiple variations now documented for chimpanzees are thus without parallel. Moreover, the combined repertoire of these behaviour patterns in each chimpanzee community is itself highly distinctive, a phenomenon characteristic of human cultures14 but previously unrecognised in non-human species.

Grabung

Goren-Inbar 2000

Naama Goren-Inbar et al., *Pleistocene Milestones on the Out-of-Africa Corridor at Gesher Benot Ya'aqov, Israel.* science **289** (2000), 944–947.

Naama Goren-Inbar, Craig S. Feibel, Kenneth L. Verosub, Yoel Melamed, Mordechai E. Kislev, Eitan Tchernov & Idit Saragusti

The Acheulean site of Gesher Benot Ya'aqov in the Dead Sea Rift of Israel documents hominin movements and technological development on a corridor between Africa and Eurasia. New age data place the site at 780,000 years ago (oxygen isotope stage 19), considerably older than previous estimates. The archaeological data from the site portray strong affinities with African stone tool traditions. The findings also reflect adroit technical skills and in-depth planning abilities, more advanced and complex than those of earlier archaeological occurrences in the Levant.

Goren-Inbar 2002

Naama Goren-Inbar, Gonen Sharon, Yoel Melamed & Mordechai Kislev, *Nuts, nut cracking, and pitted stones at Gesher Benot Ya'aqov, Israel.* PNAS **99** (2002), 2455–2460.

The Acheulian site of Gesher Benot Ya'aqov (Israel) has revealed a unique association of edible nuts with pitted hammers and anvils. Located in the Dead Sea rift, on the boundary between the Arabian and African plates, the site dates to the Early-Middle Pleistocene, oxygen isotope stage 19. In a series of strata, seven species of nuts, most of which can be cracked open only by a hard hammer, were uncovered. Five of the species are extant terrestrial nuts, and two are aquatic nuts now extinct in the Levant. In addition, the site yielded an assemblage of pitted hammers and anvils similar in pit morphology to those used by chimpanzees

and contemporary hunter–gatherers. This is the first time, to our knowledge, that a site has offered both paleobotanical and lithic evidence of plant foods eaten by early hominins and technologies used for processing these foods. The evidence also sheds light on the structure of the community: ethnographic analogies suggest that mixed-gender groups may have been active on the shores of paleo-Lake Hula.

Goren-Inbar 2004

Naama Goren-Inbar, Nira Alperson, Mordechai E. Kislev, Orit Simchoni, Yoel Melamed, Adi Ben-Nun & Ella Werker, *Evidence of Hominin Control of Fire at Gesher Benot Ya'aqov, Israel.* science **304** (2004), 725–727.

s304-725-Supplement.pdf

The presence of burned seeds, wood, and flint at the Acheulian site of Gesher Benot Ya'aqov in Israel is suggestive of the control of fire by humans nearly 790,000 years ago. The distribution of the site's small burned flint fragments suggests that burning occurred in specific spots, possibly indicating hearth locations. Wood of six taxa was burned at the site, at least three of which are edible—olive, wild barley, and wild grape.

Isotope

Salazar-García 2014

D. C. Salazar-García, M. P. Richards, O. Nehlich & A. G. Henry, *Dental calculus is not equivalent to bone collagen for isotope analysis, A comparison between carbon and nitrogen stable isotope analysis from same individuals.* Journal of Archaeological Science **47** (2014), 70–77.

JAS047-0070-Supplement.pdf

A comparison between carbon and nitrogen stable isotope analysis of bulk dental calculus, bone and dentine collagen from same individuals from the Medieval site of El Raval (Alicante, Spain)

Palaeodietary reconstruction using the carbon and nitrogen isotope values of bone and dentine collagen is a well-established method and the biochemical processes involved are well known. Researchers have recently explored using bulk samples of dental calculus as a substitute for bone and dentine collagen in dietary analyses, because calculus can be sampled without causing damage to the teeth, and may be useful in situations where more destructive analyses are not possible, or where collagen is poorly preserved. Several questions remain about the use of bulk calculus as a source of carbon and nitrogen isotope data, however. It is not yet clear how much of an individual's life span dental calculus represents, what portions of the diet it records, and how diagenesis effects the carbon and nitrogen isotope values of this material. Most importantly, there have been no comparative studies of collagen and calculus isotope values, which are necessary to establish the value of bulk calculus as a source of accurate isotope values. Here we report the comparison of carbon and nitrogen stable isotope analyses of bulk calculus to those from bone and dentine collagen. These analyses have been performed on individuals from the El Raval Mudéjar Medieval Cemetery (Eastern Iberia, 15th century A.D.). Although calculus isotope values may be broadly similar to expected values at the population level, we report here no correlation between collagen and bulk dental calculus values at the individual level. As a result, we recommend that carbon and nitrogen analysis on bulk dental calculus should only be used as a last resource archaeological dietary marker, if at all.

Keywords: Stable isotopes | Collagen | Dental calculus | Diet | Medieval period

Sealy 2014

Judith Sealy, Malia Johnson, Michael Richards & Olaf Nehlich, *Comparison of two methods of extracting bone collagen for stable carbon and nitrogen isotope analysis, Comparing whole bone demineralization with gelatinization and ultrafiltration.* Journal of Archaeological Science **47** (2014), 64–69.

We compare two methods of isolating bone collagen for stable carbon and nitrogen isotope analysis. The older method (as practised at the University of Cape Town) demineralizes bone 'chunks', while the newer method (as practised at the Max Planck Institute for Evolutionary Anthropology in Leipzig) involves demineralization, gelatinization and ultra-filtration to select only higher molecular weight protein fragments for isotopic analysis. The latter method was developed for problematic (i.e. poorly-preserved) samples and while it is more rigorous, it is also significantly more expensive and more labor-intensive. Our aim is to find out whether there is any difference between the d13C and d15N of bone collagen isolated from relatively well-preserved bones using the two methods. Our sample set consists of 5 modern and 47 archaeological animal and human bones from the southern and western parts of South Africa. Archaeological specimens range in age from a few hundred to approximately six thousand years old. Collagenwas extracted, its quality assessed using %C, %N and C:N, and d13C and d15N values measured independently in both laboratories. There are no statistically significant differences between the sets of d13C and d15N values from the two laboratories. For relatively well-preserved bones, the 'chunk' method of collagen preparation continues to be an acceptable alternative to more sophisticated collagen extraction protocols for C and N isotope analysis.

Keywords: Palaeodiet | Stable isotope | Carbon | Nitrogen | Collagen extraction method

Judentum

Loffreda 1993

Stanislao Loffreda, *Recovering Capharnaum.* (Jerusalem ^{2}1993).

Kapernaum, Kfar Naum

Klima

Conway 2014

Tim M. Conway & Seth G. John, *Quantification of dissolved iron sources to the North Atlantic Ocean.* nature **511** (2014), 212–215.

n511-0212-Supplement.xls

Dissolved iron is an essential micronutrient formarine phytoplankton, and its availability controls patterns of primary productivity and carbon cycling throughout the oceans1,2.The relative importance of different sources of iron to the oceans is not well known, however, and flux estimates from atmospheric dust, hydrothermal vents and oceanic sediments vary by orders of magnitude. Here we present a high-resolution transect of dissolved stable iron isotope ratios (d56Fe) and iron concentrations ([Fe]) along a section of the North Atlantic Ocean. The different iron sources can be identified by their unique d56Fe signatures, which persist throughout the water column. This allows us to calculate the relative contribution fromdust, hydrothermal venting and reductive and non-reductive sedimentary release to the dissolved phase. We find that Saharan dust aerosol is the dominant

source of dissolved iron along the section, contributing 71–87 per cent of dissolved iron. Additional sources of iron are non-reductive release from oxygenated sediments on the North American margin (10–19 per cent), reductive sedimentary dissolution on the African margin (1–4 per cent) and hydrothermal venting at the Mid-Atlantic Ridge (2–6 per cent). Our data also indicate that hydrothermal vents in the North Atlantic are a source of isotopically light iron, which travels thousands of kilometres from vent sites, potentially influencing surface productivity. Changes in the relative importance of the different iron sources through time may affect interactions between the carbon cycle and climate.

Gennaretti 2014

Fabio Gennaretti, Dominique Arseneault, Antoine Nicault, Luc Perreault & Yves Bégin, *Volcano-induced regime shifts in millennial tree-ring chronologies from northeastern North America*. PNAS **111** (2014), 10077–10082.

pnas111-10077-Supplement.xlsx

Dated records of ice-cap growth from Arctic Canada recently suggested that a succession of strong volcanic eruptions forced an abrupt onset of the Little Ice Age between A.D. 1275 and 1300 [Miller GH, et al. (2012) Geophys Res Lett 39(2):L02708, 10.1029/ 2011GL050168]. Although this idea is supported by simulation experiments with general circulation models, additional support from field data are limited. In particular, the Northern Hemisphere network of temperature-sensitive millennial tree-ring chronologies, which principally comprises Eurasian sites, suggests that the strongest eruptions only caused cooling episodes lasting less than about 10 y. Here we present a new network of millennial tree-ring chronologies from the taiga of northeastern North America, which fills a wide gap in the network of the Northern Hemisphere's chronologies suitable for temperature reconstructions and supports the hypothesis that volcanoes triggered both the onset and the coldest episode of the Little Ice Age. Following the well-expressed Medieval Climate Anomaly (approximately A.D. 910–1257), which comprised the warmest decades of the last millennium, our tree-ring-based temperature reconstruction displays an abrupt regime shift toward lower average summer temperatures precisely coinciding with a series of 13th century eruptions centered around the 1257 Samalas event and closely preceding ice-cap expansion in Arctic Canada. Furthermore, the successive 1809 (unknown volcano) and 1815 (Tambora) eruptions triggered a subsequent shift to the coldest 40-y period of the last 1100 y. These results confirm that series of large eruptions may cause region-specific regime shifts in the climate system and that the climate of northeastern North America is especially sensitive to volcanic forcing.

black spruce | dendroclimatology | lake subfossil trees | Picea mariana | temperature regime shifts

Potts 1999

Richard Potts, Anna K. Behrensmeyer & Peter Ditchfield, *Paleolandscape variation and Early Pleistocene hominid activities, Members 1 and 7, Olorgesailie Formation, Kenya*. Journal of Human Evolution **37** (1999), 747–788.

Paleolandscape research tests for variation in the spatial distribution of hominid artefacts and establishes the association of hominid activities with paleoenvironmental features over distances of 100s to 1000s of meters. This approach requires (1) precise definition of narrow stratigraphic intervals based on sedimentary criteria that can be documented over a broad area, and (2) excavation of these intervals

in order to establish taphonomic and paleoenvironmental contexts. In this report, excavations of three target intervals within the early Pleistocene deposits (992 to 780 ka) of the Olorgesailie basin are described. Assessment of time-averaging and paleolandscape structure shows that each target interval represents a relatively brief period ($\leq$ 1000 yrs) and exhibits a unique distribution of environmental features (e.g., topographic gradients, channels, soil development). Stone artefacts and fossilized animal bones are distributed nonrandomly in each interval, and include clusters that were five to 293 times more densely concentrated than the laterally equivalent background scatter. A paleosol in upper Member 1 preserves a relatively continuous distribution of artefacts and fossils, in contrast with the more patchy distribution in two intervals of lower Member 7. We infer that the difference between the two members reflects a real variation in hominid land use—either a response to local environmental differences or perhaps a change through time in hominid interaction with the environment. By expanding the comparative analysis to diverse basins, it should be possible to test for broader evolutionary change in hominid activities. Examples drawn from East African Pliocene and early Pleistocene sites suggest that evolutionary change in land use entailed (1) wider ranging of hominids and longer distances of stone transport, (2) expansion of tool-assisted behaviors to a wider diversity of environmental settings, and (3) more strongly focused placement of particular artefact forms (e.g., bifaces) in different areas of the landscape in response to specific environmental features, such as lava outcrops, stream channels, and lake margins.

Keywords: early hominid behavior, paleolandscape, land use, paleoecology, Olorgesailie, Acheulean, stone tools, fossilized bones, paleosol, fluvial deposition, taphonomy.

Thiagarajan 2014

Nivedita Thiagarajan, Adam V. Subhas, John R. Southon, John M. Eiler & Jess F. Adkins, *Abrupt pre-Bølling-Allerød warming and circulation changes in the deep ocean*. nature **511** (2014), 75–78.

n511-0075-Supplement.xlsx

Several large and rapid changes in atmospheric temperature and the partial pressure of carbon dioxide in the atmosphere—probably linked to changes in deep ocean circulation—occurredduring the last deglaciation. The abrupt temperature rise in the Northern Hemisphere and the restart of the Atlantic meridional overturning circulation at the start of the Bølling–Allerød interstadial, 14,700 years ago, are among the most dramatic deglacial events, but their underlying physical causes are not known. Here we show that the release of heat from warm waters in the deep North Atlantic Ocean probably triggered the Bølling–Allerød warming and reinvigoration of the Atlantic meridional overturning circulation.Our results are based on coupled radiocarbon and uranium-series dates, along with clumped isotope temperature estimates, from water column profiles of fossil deep-sea corals in a limited area of the westernNorth Atlantic.We find that during Heinrich stadial 1 (the cool period immediately before the Bølling–Allerød interstadial), the deep ocean was about three degrees Celsius warmer than shallower waters above. This reversal of the ocean's usual thermal stratification pre-dates the Bølling–Allerød warming and must have been associated with increased salinity at depth to preserve the static stability of the water column. The depleted radiocarbon content of the warm and salty water mass implies a long-term disconnect from rapid surface exchanges, and, although uncertainties remain, is most consistent with a Southern Ocean source. The Heinrich stadial 1 ocean profile is distinct from the modern water column, that for the Last Glacial Maximum and that for the Younger Dryas, suggesting that the patterns we observe are a unique feature of

the deglacial climate system. Our observations indicate that the deep ocean influenced dramatic Northern Hemisphere warming by storing heat at depth that preconditioned the system for a subsequent abrupt overturning event during the Bølling–Allerød interstadial.

Mesolithikum

Buckley 2014

Stephen Buckley, Donatella Usai, Tina Jakob, Anita Radini & Karen Hardy, *Dental Calculus Reveals Unique Insights into Food Items, Cooking and Plant Processing in Prehistoric Central Sudan*. PLoS ONE **9** (2014), e100808. DOI:10.1371/journal.pone.0100808.

Accessing information on plant consumption before the adoption of agriculture is challenging. However, there is growing evidence for use of locally available wild plants from an increasing number of pre-agrarian sites, suggesting broad ecological knowledge. The extraction of chemical compounds and microfossils from dental calculus removed from ancient teeth offers an entirely new perspective on dietary reconstruction, as it provides empirical results on material that is already in the mouth. Here we present a suite of results from the multi-period Central Sudanese site of Al Khiday. We demonstrate the ingestion in both pre-agricultural and agricultural periods of Cyperus rotundus tubers. This plant is a good source of carbohydrates and has many useful medicinal and aromatic qualities, though today it is considered to be the world's most costly weed. Its ability to inhibit Streptococcus mutans may have contributed to the unexpectedly low level of caries found in the agricultural population. Other evidence extracted from the dental calculus includes smoke inhalation, dry (roasting) and wet (heating in water) cooking, a second plant possibly from the Triticaceae tribe and plant fibres suggestive of raw material preparation through chewing.

Metallzeiten

Lawler 2014

Andrew Lawler, *Sailing Sinbad's seas*. science **344** (2014), 1440–1445.

Archaeologists are rediscovering the ancient Maritime Silk Road, which once powered more East-West commerce than the famed Central Asian land route.

This single site could have produced thousands of tons of finished iron as well as high-carbon steel, smelted in 2-meter-high furnaces fired by ranks of monsoon-powered windmills. "The technological knowledge is very high," says Mogren, who estimates that hundreds of such sites may exist. "This has fantastic implications" for long-distance trade in metals, he adds. The Sri Lankan wreck confirms that metals were made for export, not just smallscale domestic consumption. Thus, an island once considered a rural society was also an industrial powerhouse. "Hinduwane," the Arab term for steel in the 6th and 7th centuries C.E., may reflect that role, Mogren notes: "Wane" is the word for steel in Sri Lanka's native tongue, Sinhalese.

"East Africa is the missing story," says Mark Horton, an archaeologist at the University of Bristol in the United Kingdom. Few ancient texts clarify Africa's role, and archaeology there lags behind work on Asian coasts. The Periplus mentions extensive trade between Mediterranean and African ports. But excavators have yet to identify any ports predating 700 C.E., and "Greco-Roman" beads found on the African coast turned out to be medieval, according to analyses by archaeologist

Marilee Wood of the University of the Witwatersrand in Johannesburg, South Africa. Evidence is growing that East Africa south of Somalia did not play a major role in Indian Ocean trade until after that time.

Methoden

Evans 2014

Adrian Anthony Evans, *On the importance of blind testing in archaeological science, The example from lithic functional studies*. Journal of Archaeological Science **48** (2014), 5–14.

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

Ibáñez 2014

J. J. Ibáñez, J. E. González-Urquijo & J. Gibaja, *Discriminating wild vs domestic cereal harvesting micropolish through laser confocal microscopy*. Journal of Archaeological Science **48** (2014), 96–103.

Though it is well established that cereal domestication took place in the Near East, between 10,000 and 7000 cal BC., there are still many open questions about when, where and how this process took place. As one way to advance these questions, we propose focusing on the use-wear analysis of sickle elements. Wild cereals must be harvested before the complete maturation of the plant, while domestic cereals are harvested ripe. This difference in the degree in humidity when harvesting provokes differences in the characteristics of the use-wear polish. In this paper we measure both types of use-wear polish in experimental tools through laser confocal microscopy. Later, the discriminant function which distinguishes both types of use-wear polishes is used to classify four archaeological sickle elements from Late PPNB, Middle PPNB, PPNA and Natufian archaeological levels. Preliminary results show that the classification of the archaeological sickle elements according to the wild/semi-green vs domestic/ripe experimental tools is coherent with archaeobotanical data.

Keywords: Use wear analysis | Micropolish quantification | Laser confocal microscopy | Neolithic | Agriculture | Cereal harvesting | Near East

Iovita 2014

Radu Iovita, Holger Schönekeß, Sabine Gaudzinski-Windheuser & Frank Jäger, *Projectile impact fractures and launching mechanisms, Results of a controlled ballistic experiment using replica Levallois points.* Journal of Archaeological Science **48** (2014), 73–83.

JAS048-0073-Supplement.mp4

Identifying the use of stone-tipped projectile weapons in prehistory is important for understanding hominin strategic behavior and cognitive capacities. Such identifications are based on 'diagnostic impact fractures' (DIFs), assumed to form as a result of collisions between the tips and organic materials in the prey body. However, demonstrating weapon use requires documenting an impact speed and/or kinetic energy beyond those likely to occur accidentally or as a by-product of other tasks. We present a new experiment aimed at investigating the influence of speed on impact fracture formation in controlled conditions. Using an air-gun, we fired 234 nearly identical spears tipped with copies of a Levallois point cast in soda-lime glass into a composite target made of polyurethane bone-like plates, ballistic gelatin, and leather. The impact speed ranged from ≈7 to ≈30 m/s and the impact angle (IA) varied in increments of 15°, from 90° to -45°. We show that realistic DIFs can be produced under these controlled conditions. The frequency of longitudinal tip macrofractures is directly proportional to the impact speed but inversely proportional to the IA. The relationship between the tip fracture type and the type of damage left on the target explains the contact conditions for the formation of different DIFs. No relationship between either initiation or termination type and speed could be established. Therefore, we conclude that 'step-terminating bending fractures' should not be considered diagnostic of weapon use without further supporting evidence. Further, although fracture length increases with speed when IA is held constant, a great deal of overlap exists between trials with different IAs. Given the expected high variance in IA in real hunting situations, large longitudinal macrofractures on the tips of archaeologically recovered lithics should not automatically be interpreted as resulting from the use of high-speed projectiles. We discuss the study's implications for the differentiation of prehistoric weapon-delivery systems, especially regarding recognizing stonetipped weapon use by Neandertals.

Keywords: Controlled experiments | Ballistics | Diagnostic impact fractures | Projectile technology | Middle Paleolithic | Levallois points

Mittelalter

Stone 2014

Richard Stone, *Was America 'discovered' in medieval Central Asia?* science **344** (2014), 1331–1332.

Ancient texts suggest Silk Road polymath inferred the existence of unknown continents.

After plotting out the known world—possibly on a 5-meter-tall globe he is said to have constructed— he found that threefifths of Earth's surface was unaccounted for. The most obvious way to account for this enormous gap was to invoke the explanation that all geographers from antiquity down to Biruni's day had accepted, namely, that the Eurasian land mass was surrounded by a 'world ocean,'. Biruni argued that the same forces that gave rise to land on two-fifths of our planet must have been at work in the other three-fifths. He concluded that one or more landmasses must lie between Europe and Asia, writing, "There is nothing to prohibit the existence of inhabited lands."

Physik

Sellentin 2014

Elena Sellentin & Matthias Bartelmann, *Was das Universum auseinandertreibt*. Spektrum der Wissenschaft **2014**, viii, 38–47.

Die Entdeckung der Dunklen Energie hat unser Bild vom Universum in kürzester Zeit grundlegend verändert. Obwohl mittlerweile vielfach bestätigt, wissen wir erstaunlicherweise immer noch sehr wenig über dieses Phänomen, welches den Kosmos einst in tiefer Nacht versinken lassen könnte.

Diese Interpretation kann auch einleuchtend erklären, warum wir weit abgelegene Galaxien beobachten, die sich mit Überlichtgeschwindigkeit von uns zu entfernen scheinen. Sie bewegen sich nicht schneller als das Licht durch den Raum – was Einsteins Theorie ohnehin "verbieten" würde –, sondern werden stattdessen durch die Expansion des Raums von uns fortgetragen.

Vielleicht verbirgt sich aber etwas völlig anderes hinter der Dunklen Energie. Interpretieren wir die astronomischen Daten möglicherweise in einem falschen theoretischen Rahmen? Tatsächlich können wir nicht ganz sicher sein, ob die beschleunigte Expansion das ganze Universum erfasst oder sich nur auf die Umgebung unserer Galaxie beschränkt. Der Grund dafür ist leicht einsichtig. War nämlich das Licht eines Objekts, das wir heute beobachten, mehr als sechs Milliarden Jahre zu uns unterwegs, wurde es zu einem Zeitpunkt emittiert, als die beschleunigte Expan sion noch nicht wirksam war – für Raumregionen in entsprechend großer Entfernung können wir also prinzipiell nicht entscheiden, ob sich die beschleunigte Expansion auch dort bemerkbar macht.

Story or Book

Grant 2014

John Grant, *Benjy's Birthday*, *Time to be creative*. nature **511** (2014), 258.