Liste erstellt am 2013-11-15

Literatur

Aktuell

Boslough 2013

Mark Boslough, Alan W. Harris, Clark Chapman & David Morrison, *Younger Dryas impact model confuses comet facts, defies airburst physics*. PNAS **110** (2013), E4170.

Their model diverges significantly from the original but still provides no physics-based argument and demonstrates a misunderstanding of comets, as well as the physics of airbursts.

Fu 2013

Rong Fu et al., *Increased dry-season length over southern Amazonia in recent decades and its implication for future climate projection*. PNAS **110** (2013), 18110–18115.

Rong Fu, Lei Yin, Wenhong Li, Paola A. Arias, Robert E. Dickinson, Lei Huang, Sudip Chakraborty, Katia Fernandes, Brant Liebmann, Rosie Fisher & Ranga B. Myneni

We have observed that the dry-season length (DSL) has increased over southern Amazonia since 1979, primarily owing to a delay of its ending dates (dry-season end, DSE), and is accompanied by a prolonged fire season. A poleward shift of the subtropical jet over South America and an increase of local convective inhibition energy in austral winter (June–August) seem to cause the delay of the DSE in austral spring (September–November). These changes cannot be simply linked to the variability of the tropical Pacific and Atlantic Oceans. Although they show some resemblance to the effects of anthropogenic forcings reported in the literature, we cannot attribute them to this cause because of inadequate representation of these processes in the global climate models that were presented in the Intergovernmental Panel on Climate Change's Fifth Assessment Report. These models significantly underestimate the variability of the DSE and DSL and their controlling processes. Such biases imply that the future change of the DSE and DSL may be underestimated by the climate projections provided by the Intergovernmental Panel on Climate Change's Fifth Assessment Report models. Although it is not clear whether the observed increase of the DSL will continue in the future, were it to continue at half the rate of that observed, the long DSL and fire season that contributed to the 2005 drought would become the new norm by the late 21st century. The large uncertainty shown in this study highlights the need for a focused effort to better understand and simulate these changes over southern Amazonia.

climate variability | rainforests | climate model projection

Kidd 2013

David Comer Kidd & Emanuele Castano, *Reading Literary Fiction Improves Theory of Mind*. science **342** (2013), 377–380.

s342-0377-Supplement.pdf

Understanding others' mental states is a crucial skill that enables the complex social relationships that characterize human societies. Yet little research has investigated what fosters this skill, which is known as Theory of Mind (ToM), in

adults. We present five experiments showing that reading literary fiction led to better performance on tests of affective ToM (experiments 1 to 5) and cognitive ToM (experiments 4 and 5) compared with reading nonfiction (experiments 1), popular fiction (experiments 2 to 5), or nothing at all (experiments 2 and 5). Specifically, these results show that reading literary fiction temporarily enhances ToM. More broadly, they suggest that ToM may be influenced by engagement with works of art.

Napier 2013

William M. Napier et al., *Decades of comet research counter their claims, Reply to Boslough et al.* PNAS **110** (2013), E4171.

William M. Napier, Ted E. Bunch, James P. Kennett, James H. Wittke, Kenneth B. Tankersley, Gunther Kletetschka, George A. Howard & Allen West

Schiermeier 2013

Quirin Schiermeier, *Farmers dig into soil quality*. nature **502** (2013), 607.

Analytical technique promises to match fertilizers to soil in bid to boost yields in Africa.

Farmers in some areas of Africa have begun to adopt fertilizers only in the past decade. And, on average, they use just 9 kilograms per hectare each year, compared with more than 200 kilograms used in high-intensity agriculture, such as in Germany. Yields are typically 30–80 % lower as a result.

Others are unconvinced. Although soil analysis is "very important", says Johannes Kotschi, a soil scientist at the Association for Agriculture and Ecology in Marburg, Germany, "the notion that intricate and expensive lab technology will influence farming practices in sub-Saharan Africa is far-fetched". Soil nutrients and soil acidity can be easily determined with readily available, cheap test strips, he adds. Kotschi also thinks that organic fertilizers such as manure, compost and plant residues should play a greater part in efforts to increase productivity. "Nitrogen fertilizer isn't a quick fix to soil problems," he says. "Its use produces greenhouse gases and it ruins soil fertility rather than improving it." He points out that many smallholders in sub-Saharan Africa can scarcely afford to buy mineral fertilizers anyway.

Sebilo 2013

Mathieu Sebilo, Bernhard Mayer, Bernard Nicolardot, Gilles Pinay & André Mariotti, *Long-term fate of nitrate fertilizer in agricultural soils*. PNAS **110** (2013), 18185–18189.

Increasing diffuse nitrate loading of surface waters and groundwater has emerged as a major problem in many agricultural areas of the world, resulting in contamination of drinking water resources in aquifers as well as eutrophication of freshwaters and coastal marine ecosystems. Although empirical correlations between application rates of N fertilizers to agricultural soils and nitrate contamination of adjacent hydrological systems have been demonstrated, the transit times of fertilizer N in the pedosphere–hydrosphere system are poorly understood. We investigated the fate of isotopically labeled nitrogen fertilizers in a three–decade-long in situ tracer experiment that quantified not only fertilizer N uptake by plants and retention in soils, but also determined to which extent and over which time periods fertilizer N stored in soil organic matter is rereleased for either uptake in crops or export into the hydrosphere.We found that 61–65 % of the applied fertilizers N were taken up by plants,whereas 12–15 % of the labeled fertilizer Nwere still residing

in the soil organic matter more than a quarter century after tracer application. Between 8–12 % of the applied fertilizer had leaked toward the hydrosphere during the 30-y observation period. We predict that additional exports of 15N-labeled nitrate from the tracer application in 1982 toward the hydrosphere will continue for at least another five decades. Therefore, attempts to reduce agricultural nitrate contamination of aquatic systems must consider the long-term legacy of past applications of synthetic fertilizers in agricultural systems and the nitrogen retention capacity of agricultural soils.
nitrogen cycle | nitrate leaching | isotopic biogeochemistry

Starr 2013

Ariel Starr, Melissa E. Libertus & Elizabeth M. Brannon, *Number sense in infancy predicts mathematical abilities in childhood*. PNAS **110** (2013), 18116–18120.
pnas110-18116-Supplement1.m1v
Human infants in the first year of life possess an intuitive sense of number. This preverbal number sense may serve as a developmental building block for the uniquely human capacity for mathematics. In support of this idea, several studies have demonstrated that nonverbal number sense is correlated with mathematical abilities in children and adults. However, there has been no direct evidence that infant numerical abilities are related to mathematical abilities later in childhood. Here, we provide evidence that preverbal number sense in infancy predicts mathematical abilities in preschool-aged children. Numerical preference scores at 6 months of age correlated with both standardized math test scores and nonsymbolic number comparison scores at 3.5 years of age, suggesting that preverbal number sense facilitates the acquisition of numerical symbols and mathematical abilities. This relationship held even after controlling for general intelligence, indicating that preverbal number sense imparts a unique contribution to mathematical ability. These results validate the many prior studies purporting to show number sense in infancy and support the hypothesis that mathematics is built upon an intuitive sense of number that predates language.
analog magnitudes | approximate number system | cognitive development | mathematical cognition

Amerika

Dillehay 1988

Tom D. Dillehay & Michael B. Collins, *Early cultural evidence from Monte Verde in Chile*. nature **332** (1988), 150–152.
The entry of the first Asians into the New World is generally thought to have occurred no earlier than 12,000 years ago. Recent archaeological evidence from South America suggests that the migration from Asia to North America might have taken place much earlier. This evidence comes from the Brazilian site of Boqueirao do Sitio da Pedra Furada, with a long cultural sequence possibly extending as far back as 32,000 yr BP, and the Chilean site of Monte Verde. This latter site has one well-documented cultural episode radiocarbon dated at 13,000 yr BP and another possible one at 33,000 yr BP. We report here two carbon-14 dates from charcoal taken from cultural features associated with the older materials of ≈ 33,000 yr BP. These findings provide additional evidence that people colonized the Americas much earlier than was previously thought.

Dillehay 1991

Tom D. Dillehay & Michael B. Collins, *Monte Verde, Chile, A comment on Lynch*. American Antiquity **56** (1991), 333–341.

A recent review by Lynch of late Pleistocene sites in South America is impaired by numerous errors and misrepresentations. Although Lynch omits several important sites and often selectively uses data to support his own position, this comment addresses his review of the Monte Verde site in Chile. Although Lynch has not visited Monte Verde and has inspected few artifacts from the site, he questions the Pleistocene association of artifacts and the "hand of humans" in the site. Lynch's interpretations are refuted on the grounds that he is unfamiliar with the site, that he reviewed obsolete publications, and that he often misrepresented material in these publications. The archaeological evidence for late Pleistocene human activity at Monte Verde is reviewed in terms of the site stratigraphy, chronology, and artifacts.

Dillehay 1992

Tom D. Dillehay, Gerardo Ardila Calderón, Gustavo Politis & Maria da Conceicao de Moraes Coutinho Beltrão, *Earliest Hunters and Gatherers of South America*. Journal of World Prehistory **6** (1992), 145–204.

Traditional syntheses of the archaeology of the late Pleistocene period in South America have focused primarily on the peopling of the continent by North American cultural groups and on identifying associations among regional sites. This focus has tended to ignore the widesplead culture diversity of the period and the possible effects of different paleolandscapes on human migration and colonization, such as the presence of unglaciated tropical and temperate environments in the northern lowlands, the gateway to the interior. The earliest known cultural assemblages ate characterized by various unifacial and bifacial lithic industries that may represent regional processes reminiscent of an Archaic lifeway. The major archaeological sites and associated artifact assemblages are examined in terms of regional and continental patterns of environmental and cultural change. Results suggest that the Pleistocene archaeological record of South America must be explained in its own terms and that the events and processes producing this record either occurred earlier than previously thought or are very different from those in North America.

Keywords: human colonization; Pleistocene; hunter-gatherers; South America; tithic analysis; paleoecology; animal extinction; Andes; Amazonia

Fiedel 2000

Stuart J. Fiedel, *The Peopling of the New World, Present Evidence, New Theories, and Future Directions*. Journal of Archaeological Research **8** (2000), 39–103.

The prevailing archaeological consensus on Paleoindian origins and colonization of the Americas has been shaken by recent wide acknowledgment of pre-Clovis occupation at Monte Verde, Chile, and by claims that ostensibly non-Mongoloid skeletal remains might represent a precursor population. Recent mitochondrial DNA studies have been interpreted by some as indicating an earlier and more complex peopling of the continent. This paper reviews the current archaeological and biological evidence, in America and northern Asia, for the origins of Native Americans, assesses models of the colonization process in the light of new data and a revised chronology, and suggests avenues for future research.

Keywords: Paleoindian; Clovis; migration routes; peopling; colonization; Late Pleistocene; America; Northeast Asia.

Gruhn 1991

Ruth Gruhn & Alan L. Bryan, *A review of Lynch's descriptions of South American Pleistocene sites.* American Antiquity **56** (1991), 342–348.

The description of major South American Pleistocene sites by Lynch (1990) contains significant errors and omissions. The artifact assemblage at the Colombian site of Tibit6, dated at 11,740 ± 140 B.P., is much larger than indicated by Lynch and well represents the Abriense industry, which features small unifacially retouched flake tools and core tools, with no stone projectile points. Lynch did not describe the 1976 stratigraphic profile at the Venezuelan site of Taima-Taima, and he failed to refer to the evidence for butchering of the juvenile mastodon with which an El Jobo projectile point fragment and a utilized flake were associated directly. The descriptions of Brazilian sites also feature serious mistakes. For the site of Alice Boër, Lynch overlooked a thick sterile stratigraphic unit (Bed IV) that intervenes between Bed III, with its thermoluminescence dates as early as 10,970 ± 1020 B.P. and radiocarbon dates as early as 14,200 ± 1150 B.P., and the artifact-bearing surface of Bed V. For Lapa Vermelha, Lynch failed to indicate that several artifacts were recovered from an older cemented cave fill that yielded radiocarbon dates of 22,410 B.P. and > 25,000 B.P. Lynch's description of the site of Toca do Boqueirdo da Pedra Furada does not correspond to eyewitness reports, and his description of the nearby Toca do Sitio do Meio was incomplete and confused. Finally, in his description of the stratigraphy of the Patagonian site of Los Toldos, Cueva 3, Lynch misquoted and misconstrued the original reports, which indicate clearly the stratigraphic priority and integrity of the Level 11 industry. For accurate descriptions of early South American archaeological sites, readers are urged to examine the original sources.

Lynch 1991

Thomas F. Lynch, *Lack of evidence for glacial-age settlement of South America, Reply to Dillehay and Collins and to Gruhn and Bryan.* American Antiquity **56** (1991), 348–355.

Dillehay and Collins (1991) and Gruhn and Bryan (1991) claim that my review (Lynch 1990) was impaired by errors and misrepresentations, yet they identify only one significant error-the too-early date attributed to Toca do Sitio do Meio. Inspection of the sources shows that my article contained no misrepresentations of the public record available to me at the time of writing. Selective use of sources is necessary in a review of this scale. A careful reading of the primary sources, as well as the other papers cited, will show that I have not misquoted, misconstrued, or taken statements out of context. We are dealing with differences of interpretation and emphasis. There is no such thing as an "obsolete publication, " at least until the information in it has been retractedformally. Understandably, Gruhn and Bryan have been zealots for their pre-Paleoindian cause. Hardly neutral or dispassionate, they have over-reacted to my bringing the other side forward.

Anthropologie

Brunet 2010

Michel Brunet, *Two new Mio-Pliocene Chadian hominids enlighten Charles Darwin's 1871 prediction.* Phil. Trans. Royal Society B **365** (2010), 3315–3321.

The idea of an evolutionary sequence for humans is quite recent. Over the last 150 years, we have discovered unexpected ancestors, numerous close relatives and our deep evolutionary roots in Africa. In the last decade, three Late Miocene hominids have been described, two about 6Ma (Ardipithecus and Orrorin) in East Africa and the third dated to about 7Ma (Sahelanthropus) in Central Africa. The specimens are too few to propose definite relationship to other species, but clearly these belong to a new evolutive grade distinct from Australopithecus and Homo. Moreover, all of them were probably habitual bipeds and lived in woodlands, thus falsifying the savannah hypothesis of human origins. In light of all this recent knowledge, Charles Darwin predicted correctly in 1871 that Africa is the birthplace of humans, chimpanzees and our close relatives.

Keywords: earliest hominids; central Africa; evolutionary grade; woodland origin

Cooper 2013

A. Cooper & C. B. Stringer, *Did the Denisovans Cross Wallace's Line?* science **342** (2013), 321–323.

The distribution of Denisovan DNA in modern human populations raises questions about where these ancient humans lived and where they interbred with modern humans.

We thus infer that H. floresiensis was an endemic species whose lineage originated at least 1 million years ago, restricted to a small region of Wallacea, whereas the Denisovans probably arrived during the mid-Pleistocene (after 600,000 years ago) and spread more widely in the region. The Denisovans east of the Wallace line may be represented by the Philippines Callao specimen, or have not yet been recognized. Other enigmatic hominin remains in Asia—from Narmada (India) and Dali, Jinniushan, Maba, and Xujiayao (China)—may represent the apparently once more extensive Denisovan population, or perhaps yet other species.

Why did gene flow between Denisovans and modern human populations occur primarily east of Wallace's Line and not on the Asian mainland? Given that intentional dispersal to Wallacea required the use of watercraft, the first modern human groups encountering the established Denisovan populations were likely to have been of very limited size. Either interbreeding may be more likely under these circumstances, or any interbreeding that does occur is more likely to be preserved as a signal in descendants. The genomic evidence suggests that gene flow from the Denisovans may have been largely male-mediated, providing some clues about the nature of the interactions. In addition, rapid dispersal by modern humans into tropical Wallacea is likely to have led to exposure to a wide range of new pathogens, such that disease resistance alleles obtained through hybridization with native populations may have been selectively advantageous.

Crompton 2010

Robin Huw Crompton, William I. Sellers & Susannah K. S. Thorpe, *Arboreality, terrestriality and bipedalism.* Phil. Trans. Royal Society B **365** (2010), 3301–3314.

The full publication of Ardipithecus ramidus has particular importance for the origins of hominin bipedality, and strengthens the growing case for an arboreal origin. Palaeontological techniques however inevitably concentrate on details of fragmentary postcranial bones and can benefit from a whole-animal perspective. This can be provided by field studies of locomotor behaviour, which provide a real-world perspective of adaptive context, against which conclusions drawn from palaeontology and comparative osteology may be assessed and honed. Increasingly sophisticated dynamic modelling techniques, validated against experimental data for living animals, offer a different perspective where evolutionary and virtual

ablation experiments, impossible for living mammals, may be run in silico, and these can analyse not only the interactions and behaviour of rigid segments but increasingly the effects of compliance, which are of crucial importance in guiding the evolution of an arboreally derived lineage.
Keywords: bipedalism; biomechanics; evolution; field studies

Dean 2010

M. Christopher Dean, *Retrieving chronological age from dental remains of early fossil hominins to reconstruct human growth in the past*. Phil. Trans. Royal Society B **365** (2010), 3397–3410.
A chronology of dental development in Pan troglodytes is arguably the best available model with which to compare and contrast reconstructed dental chronologies of the earliest fossil hominins. Establishing a time scale for growth is a requirement for being able to make further comparative observations about timing and rate during both dento-skeletal growth and brain growth. The absolute timing of anterior tooth crown and root formation appears not to reflect the period of somatic growth. In contrast, the molar dentition best reflects changes to the total growth period. Earlier initiation of molar mineralization, shorter crown formation times, less root length formed at gingival emergence into functional occlusion are cumulatively expressed as earlier ages at molar eruption. Things that are similar in modern humans and Pan, such as the total length of time taken to form individual teeth, raise expectations that these would also have been the same in fossil hominins. The best evidence there is from the youngest fossil hominin specimens suggests a close resemblance to the model for Pan but also hints that Gorilla may be a better developmental model for some. A mosaic of great ape-like features currently best describes the timing of early hominin dental development.
Keywords: hominin evolution; dental development; incremental markings; tooth root growth; enamel; dentine

Fu 2013

Qiaomei Fu, Matthias Meyer, Xing Gao, Udo Stenzel, Hernán A. Burbano, Janet Kelso & Svante Pääbo, *DNA analysis of an early modern human from Tianyuan Cave, China*. PNAS **110** (2013), 2223–2227.
Hominins with morphology similar to present-day humans appear in the fossil record across Eurasia between 40,000 and 50,000 y ago. The genetic relationships between these early modern humans and present-day human populations have not been established. We have extracted DNA from a 40,000-y-old anatomically modern human from Tianyuan Cave outside Beijing, China. Using a highly scalable hybridization enrichment strategy, we determined the DNA sequences of the mitochondrial genome, the entire nonrepetitive portion of chromosome 21 (≈30 Mbp), and over 3,000 polymorphic sites across the nuclear genome of this individual. The nuclear DNA sequences determined from this early modern human reveal that the Tianyuan individual derived from a population that was ancestral to many present-day Asians and Native Americans but postdated the divergence of Asians from Europeans. They also show that this individual carried proportions of DNA variants derived from archaic humans similar to present-day people in mainland Asia.
ancient DNA | human evolution | nuclear capture strategy | paleogenetics

Gibbons 2013

Ann Gibbons, *Stunning Skull Gives a Fresh Portrait of Early Humans*. science **342** (2013), 297–298.

All five individuals were found in underground dens where carnivores had probably dragged their carcasses. Ferring thinks the skeletons were all deposited "within a couple centuries, at most," after which the dens collapsed. By analyzing the skull shapes with 3D computer-based methods, the researchers found that the range of variation in the group at Dmanisi was no greater than within living humans or chimps. The team concluded that all five skulls belong to a single, variable species.

Gómez-Robles 2013

Aida Gómez-Robles, José María Bermúdez de Castro, Juan-Luis Arsuaga, Eudald Carbonell & P. David Polly, *No known hominin species matches the expected dental morphology of the last common ancestor of Neanderthals and modern humans*. PNAS **110** (2013), 18196–18201.
pnas110-18196-Supplement1.txt
A central problem in paleoanthropology is the identity of the last common ancestor of Neanderthals and modern humans ([N-MH] LCA). Recently developed analytical techniques now allow this problem to be addressed using a probabilistic morphological framework. This study provides a quantitative reconstruction of the expected dental morphology of the [N-MH]LCA and an assessment of whether known fossil species are compatible with this ancestral position. We show that no known fossil species is a suitable candidate for being the [N-MH]LCA and that all late Early and Middle Pleistocene taxa from Europe have Neanderthal dental affinities, pointing to the existence of a European clade originated around 1 Ma. These results are incongruent with younger molecular divergence estimates and suggest at least one of the following must be true: (i) European fossils and the [N-MH]LCA selectively retained primitive dental traits; (ii) molecular estimates of the divergence between Neanderthals and modern humans are underestimated; or (iii) phenotypic divergence and speciation between both species were decoupled such that phenotypic differentiation, at least in dental morphology, predated speciation.
phylogeny | node reconstruction | geometric morphometrics | morphospace | European Pleistocene

Haile-Selassie 2010

Yohannes Haile-Selassie, *Phylogeny of early Australopithecus, New fossil evidence from the Woranso-Mille (central Afar, Ethiopia)*. Phil. Trans. Royal Society B **365** (2010), 3323–3331.
The earliest evidence of Australopithecus goes back to ca 4.2 Ma with the first recorded appearance of Australopithecus 'anamensis' at Kanapoi, Kenya. Australopithecus afarensis is well documented between 3.6 and 3.0 Ma mainly from deposits at Laetoli (Tanzania) and Hadar (Ethiopia). The phylogenetic relationship of these two 'species' is hypothesized as ancestor–descendant. However, the lack of fossil evidence from the time between 3.6 and 3.9 Ma has been one of its weakest points. Recent fieldwork in the Woranso-Mille study area in the Afar region of Ethiopia has yielded fossil hominids dated between 3.6 and 3.8 Ma. These new fossils play a significant role in testing the proposed relationship between Au. anamensis and Au. afarensis. The Woranso-Mille hominids (3.6–3.8 Ma) show a mosaic of primitive, predominantly Au. anamensis-like, and some derived (Au. afarensis-like) dentognathic features. Furthermore, they show that, as currently known, there are no discrete and functionally significant anatomical differences between Au. anamensis and Au. afarensis. Based on the currently available evidence, it appears that there is no compelling evidence to falsify the hypothesis of 'chronospecies pair' or ancestor–descendant relationship between Au. anamensis and Au. afarensis. Most importantly, however, the temporally and morphologically

intermediateWoranso-Mille hominids indicate that the species names Au. afarensis and Au. anamensis do not refer to two real species, but rather to earlier and later representatives of a single phyletically evolving lineage. However, if retaining these two names is necessary for communication purposes, the Woranso-Mille hominids are best referred to as Au. anamensis based on new dentognathic evidence.
Keywords: Australopithecus afarensis; Australopithecus 'anamensis'; phylogeny; Woranso-Mille; Ethiopia

KIMBEL 2010

William H. Kimbel & Yoel Rak, *The cranial base of Australopithecus afarensis: new insights from the female skull*. Phil. Trans. Royal Society B **365** (2010), 3365–3376.

Cranial base morphology differs among hominoids in ways that are usually attributed to some combination of an enlarged brain, retracted face and upright locomotion in humans. The human foramen magnum is anteriorly inclined and, with the occipital condyles, is forwardly located on a broad, short and flexed basicranium; the petrous elements are coronally rotated; the glenoid region is topographically complex; the nuchal lines are low; and the nuchal plane is horizontal. Australopithecus afarensis (3.7–3.0 Ma) is the earliest known species of the australopith grade in which the adult cranial base can be assessed comprehensively. This region of the adult skull was known from fragments in the 1970s, but renewed fieldwork beginning in the 1990s at the Hadar site, Ethiopia (3.4–3.0 Ma), recovered two nearly complete crania and major portions of a third, each associated with a mandible. These new specimens confirm that in small-brained, bipedal Australopithecus the foramen magnum and occipital condyles were anteriorly sited, as in humans, but without the foramen's forward inclination. In the large male A.L. 444-2 this is associated with a short basal axis, a bilateral expansion of the base, and an inferiorly rotated, flexed occipital squama—all derived characters shared by later australopiths and humans. However, in A.L. 822-1 (a female) a more primitive morphology is present: although the foramen and condyles reside anteriorly on a short base, the nuchal lines are very high, the nuchal plane is very steep, and the base is as relatively narrow centrally. A.L. 822-1 illuminates fragmentary specimens in the 1970s Hadar collection that hint at aspects of this primitive suite, suggesting that it is a common pattern in the A. afarensis hypodigm. We explore the implications of these specimens for sexual dimorphism and evolutionary scenarios of functional integration in the hominin cranial base.
Keywords: Australopithecus; cranial base; bipedality

LEE-THORP 2010

Julia A. Lee-Thorp, Matt Sponheimer, Benjamin H. Passey, Darryl J. de Ruiter & Thure E. Cerling, *Stable isotopes in fossil hominin tooth enamel suggest a fundamental dietary shift in the Pliocene*. Phil. Trans. Royal Society B **365** (2010), 3389–3396.

Accumulating isotopic evidence from fossil hominin tooth enamel has provided unexpected insights into early hominin dietary ecology. Among the South African australopiths, these data demonstrate significant contributions to the diet of carbon originally fixed by C4 photosynthesis, consisting of C4 tropical/savannah grasses and certain sedges, and/or animals eating C4 foods. Moreover, high-resolution analysis of tooth enamel reveals strong intra-tooth variability in many cases, suggesting seasonal-scale dietary shifts. This pattern is quite unlike that seen in any great apes, even 'savannah' chimpanzees. The overall proportions of C4 input persisted for well over a million years, even while environments shifted from relatively

closed (ca 3 Ma) to open conditions after ca 1.8 Ma. Data from East Africa suggest a more extreme scenario, where results for Paranthropus boisei indicate a diet dominated (approx. 80 %) by C4 plants, in spite of indications from their powerful 'nutcracker' morphology for diets of hard objects. We argue that such evidence for engagement with C4 food resources may mark a fundamental transition in the evolution of hominin lineages, and that the pattern had antecedents prior to the emergence of Australopithecus africanus. Since new isotopic evidence from Aramis suggests that it was not present in Ardipithecus ramidus at 4.4 Ma, we suggest that the origins lie in the period between 3 and 4Myr ago.
Keywords: carbon isotopes; enamel; C4 resources; australopiths

Lordkipanidze 2013

David Lordkipanidze et al., *A Complete Skull from Dmanisi, Georgia, and the Evolutionary Biology of Early Homo*. science **342** (2013), 326–331.

s342-0326-Supplement.pdf

David Lordkipanidze, Marcia S. Ponce de León, Ann Margvelashvili, Yoel Rak, G. Philip Rightmire, Abesalom Vekua & Christoph P. E. Zollikofer

The site of Dmanisi, Georgia, has yielded an impressive sample of hominid cranial and postcranial remains, documenting the presence of Homo outside Africa around 1.8 million years ago. Here we report on a new cranium from Dmanisi (D4500) that, together with its mandible (D2600), represents the world's first completely preserved adult hominid skull from the early Pleistocene. D4500/D2600 combines a small braincase (546 cubic centimeters) with a large prognathic face and exhibits close morphological affinities with the earliest known Homo fossils from Africa. The Dmanisi sample, which now comprises five crania, provides direct evidence for wide morphological variation within and among early Homo paleodemes. This implies the existence of a single evolving lineage of early Homo, with phylogeographic continuity across continents.

Lovejoy 2010

C. Owen Lovejoy & Melanie A. McCollum, *Spinopelvic pathways to bipedality, Why no hominids ever relied on a bent-hip–bent-knee gait*. Phil. Trans. Royal Society B **365** (2010), 3289–3299.

Until recently, the last common ancestor of African apes and humans was presumed to resemble living chimpanzees and bonobos. This was frequently extended to their locomotor pattern leading to the presumption that knuckle-walking was a likely ancestral pattern, requiring bipedality to have emerged as a modification of their bent-hip-bent-knee gait used during erect walking. Research on the development and anatomy of the vertebral column, coupled with new revelations from the fossil record (in particular, Ardipithecus ramidus), now demonstrate that these presumptions have been in error. Reassessment of the potential pathway to early hominid bipedality now reveals an entirely novel sequence of likely morphological events leading to the emergence of upright walking.
Keywords: Australopithecus; bipedality; bent-hip–bent-knee; Ardipithecus; human evolution

McGrew 2010

W. C. McGrew, *In search of the last common ancestor, New findings on wild chimpanzees*. Phil. Trans. Royal Society B **365** (2010), 3267–3276.

Modelling the behaviour of extinct hominins is essential in order to devise useful hypotheses of our species' evolutionary origins for testing in the palaeontological

and archaeological records. One approach is to model the last common ancestor (LCA) of living apes and humans, based on current ethological and ecological knowledge of our closest living relations. Such referential modelling is based on rigorous, ongoing field studies of the chimpanzee (Pan troglodytes) and the bonobo (Pan paniscus). This paper reviews recent findings from nature, focusing on those with direct implications for hominin evolution, e.g. apes, using elementary technology to access basic resources such as food and water, or sheltering in caves or bathing as thermoregulatory adaptations. I give preference to studies that directly address key issues, such as whether stone artefacts are detectible before the Oldowan, based on the percussive technology of hammer and anvil use by living apes. Detailed comparative studies of chimpanzees living in varied habitats, from rainforest to savannah, reveal that some behavioural patterns are universal (e.g. shelter construction), while others show marked (e.g. extractive foraging) or nuanced (e.g. courtship) cross-populational variation. These findings allow us to distinguish between retained, primitive traits of the LCA versus derived ones in the human lineage.

Keywords: tool use; shelter; diet; ranging; last common ancestor; chimpanzee

Pickford 2001

Martin Pickford & Brigitte Senut, *The geological and faunal context of Late Miocene hominid remains from Lukeino, Kenya.* C. R. Acad. Sci. Paris, série II A, Sc. de la Terre et des planètes **332** (2001), 145–152.

Hominid fossils have been recovered from four localities within the Late Miocene Lukeino Formation, Tugen Hills, Kenya. The sediments from which the fossils came consist of fluvial and shallow lacustrine deposits. Some of the specimens are coated in a thin layer of carbonate of organic origin, suggesting deposition and preservation in slightly alkaline water, while others are riddled with superficial cracks indicating exposure at the surface prior to burial. Radioisotopic age determinations from lavas underlying and overlying the Lukeino Formation, and from crystals from the sediments themselves, indicate an age of ca 6 Ma for these hominids.

hominid / Late Miocene / Kenya / stratigraphy / depositional environment

Pinhasi 2012

Ron Pinhasi, Mark G. Thomas, Michael Hofreiter, Mathias Currat & Joachim Burger, *The genetic history of Europeans.* Trends in Genetics **28** (2012), 496–505.

The evolutionary history of modern humans is characterized by numerous migrations driven by environmental change, population pressures, and cultural innovations. In Europe, the events most widely considered to have had a major impact on patterns of genetic diversity are the initial colonization of the continent by anatomically modern humans (AMH), the last glacial maximum, and the Neolithic transition. For some decades it was assumed that the geographical structuring of genetic diversity within Europe was mainly the result of gene flow during and soon after the Neolithic transition, but recent advances in next-generation sequencing (NGS) technologies, computer simulation modeling, and ancient DNA (aDNA) analyses are challenging this simplistic view. Here we review the current knowledge on the evolutionary history of humans in Europe based on archaeological and genetic data.

Reno 2010

Philip L. Reno, Melanie A. McCollum, Richard S. Meindl & C. Owen Lovejoy, *An enlarged postcranial sample confirms Australopithecus*

afarensis dimorphism was similar to modern humans. Phil. Trans. Royal Society B **365** (2010), 3355–3363.
In a previous study, we introduced the template method as a means of enlarging the Australopithecus afarensis postcranial sample to more accurately estimate its skeletal dimorphism. Results indicated dimorphism to be largely comparable to that of Homo sapiens. Some have since argued that our results were biased by artificial homogeneity in our Au. afarensis sample. Here we report the results from inclusion of 12 additional, newly reported, specimens. The results are consistent with those of our original study and with the hypothesis that early hominid demographic success derived from a reproductive strategy involving male provisioning of pair-bonded females.
Keywords: A.L. 333; taphonomy; monogamy; skeletal dimorphism; modelling

Rolian 2013

Campbell Rolian & Adam D. Gordon, *Reassessing Manual Proportions in Australopithecus afarensis*. American Journal of Physical Anthropology **152** (2013), 393–406.
AmJPhysAnth152-0393-Supplement1.docx, AmJPhysAnth152-0393-Supplement2.pdf
Previous analyses of hand morphology in Australopithecus afarensis have concluded that this taxon had modern human-like manual proportions, with relatively long thumbs and short fingers. These conclusions are based on the A.L.333 composite fossil assemblage from Hadar, Ethiopia, and are premised on the ability to assign phalanges to a single individual, and to the correct side and digit. Neither assignment is secure, however, given the taphonomy and sample composition at A.L.333. We use a resampling approach that includes the entire assemblage of complete hand elements at Hadar, and takes into account uncertainties in identifying phalanges by individual, side and digit number. This approach provides the most conservative estimates of manual proportions in Au. afarensis. We resampled hand long bone lengths in Au. afarensis and extant hominoids, and obtained confidence limits for distributions of manual proportions in the latter. Results confirm that intrinsic manual proportions in Au. afarensis are dissimilar to Pan and Pongo. However, manual proportions in Au. afarensis often fall at the upper end of the distribution in Gorilla, and very lower end in Homo, corresponding to disproportionately short thumbs and long medial digits in Homo. This suggests that manual proportions in Au. afarensis, particularly metacarpal proportions, were not as derived towards Homo as previously described, but rather are intermediate between gorillas and humans. Functionally, these results suggest Au. afarensis could not produce precision grips with the same efficiency as modern humans, which may in part account for the absence of lithic technology in this fossil taxon.
Keywords: resampling methods; manual proportions; Australopithecus afarensis; Hadar formation; manipulative ability

Senut 2001

Brigitte Senut, Martin Pickford, Dominique Gommery, Pierre Mein, Kiptalam Cheboi & Yves Coppens, *First hominid from the Miocene (Lukeino Formation, Kenya)*. C. R. Acad. Sci. Paris, série II A, Sc. de la Terre et des planètes **332** (2001), 137–144.
Remains of an early hominid have been recovered from four localities in the Lukeino Formation, Tugen Hills, Kenya, in sediments aged ca 6 Ma. 13 fossils are known,belonging to at least five individuals. The femora indicate that the Lukeino hominid was a biped when on the ground, whilst its humerus and manual phalanx

show that it possessed some arboreal adaptations. The upper central incisor is large and robust, the upper canine is large for a hominid and retains a narrow and shallow anterior groove, the lower fourth premolar is ape-like, with offset roots and oblique crown, and the molars are relatively small, with thick enamel. A new genus and species is erected for the remains.
Hominoidea / Hominidae / Tugen Hills / Upper Miocene / Kenya

Spoor 1994

Fred Spoor, Bernard Wood & Frans Zonneveld, *Implications of early hominid labyrinthine morphology for evolution of human bipedal locomotion*. nature **369** (1994), 645–648.

The upright posture and obligatory bipedalism of modern humans are unique among living primates. The evolutionary history of this behaviour has traditionally been pursued by functional analysis of the postcranial skeleton and the preserved footprint trails of fossil hominids. Here we report a systematic attempt to reconstruct the locomotor behaviour of early hominids by looking at a major component of the mechanism for the unconscious perception of movement, namely by examining the vestibular system of living primates and early hominids. High-resolution computed tomography was used to generate cross-sectional images of the bony labyrinth. Among the fossil hominids the earliest species to demonstrate the modern human morphology is Homo erectus. In contrast, the semicircular canal dimensions in crania from southern Africa attributed to Australopithecus and Paranthropus resemble those of the extant great apes. Among early Homo specimens, the canal dimensions of Stw 53 are unlike those seen in any of the hominids or great apes, whereas those of SK 847 are modern-human-like.

Spoor 2010

Fred Spoor, Meave G. Leakey & Louise N. Leakey, *Hominin diversity in the Middle Pliocene of eastern Africa: the maxilla of KNM-WT 40000*. Phil. Trans. Royal Society B **365** (2010), 3377–3388.

PhilTransRSocB365-3377-Supplement1.pdf, PhilTransRSocB365-3377-Supplement2.pdf, PhilTransRSocB365-3377-Supplement3.pdf

The 3.5-Myr-old hominin cranium KNM-WT 40000 from Lomekwi, west of Lake Turkana, has been assigned to a new hominin genus and species, Kenyanthropus platyops, on the basis of a unique combination of derived facial and primitive neurocranial features. Central to the diagnosis of K. platyops is the morphology of the maxilla, characterized by a flat and relatively orthognathic subnasal region, anteriorly placed zygomatic processes and small molars. To study this morphology in more detail, we compare the maxillae of African Plio-Pleistocene hominin fossils and samples of modern humans, chimpanzees and gorillas, using conventional and geometric morphometric methods. Computed tomography scans and detailed preparation of the KNM-WT 40000 maxilla enable comprehensive assessment of post-mortem changes, so that landmark data characterizing the morphology can be corrected for distortion. Based on a substantially larger comparative sample than previously available, the results of statistical analyses show that KNM-WT 40000 is indeed significantly different from and falls outside the known range of variation of species of Australopithecus and Paranthropus, contemporary Australopithecus afarensis in particular. These results support the attribution of KNM-WT 40000 to a separate species and the notion that hominin taxonomic diversity in Africa extends back well into the Middle Pliocene.

Keywords: human evolution; Pliocene; Africa; Kenyanthropus platyops; maxilla; geometric morphometrics

Stone 2010

Anne C. Stone, Fabia U. Battistuzzi, Laura S. Kubatko, George H. Perry Jr, Evan Trudeau, Hsiuman Lin & Sudhir Kumar, *More reliable estimates of divergence times in Pan using complete mtDNA sequences and accounting for population structure*. Phil. Trans. Royal Society B **365** (2010), 3277–3288.

PhilTransRSocB365-3277-Supplement1.xls

Here, we report the sequencing and analysis of eight complete mitochondrial genomes of chimpanzees (Pan troglodytes) from each of the three established subspecies (P. t. troglodytes, P. t. schweinfurthii and P. t. verus) and the proposed fourth subspecies (P. t. ellioti). Our population genetic analyses are consistent with neutral patterns of evolution that have been shaped by demography. The high levels of mtDNA diversity in western chimpanzees are unlike those seen at nuclear loci, which may reflect a demographic history of greater female to male effective population sizes possibly owing to the characteristics of the founding population. By using relaxed-clock methods, we have inferred a timetree of chimpanzee species and subspecies. The absolute divergence times vary based on the methods and calibration used, but relative divergence times show extensive uniformity. Overall, mtDNA produces consistently older times than those known from nuclear markers, a discrepancy that is reduced significantly by explicitly accounting for chimpanzee population structures in time estimation. Assuming the human–chimpanzee split to be between 7 and 5Ma, chimpanzee time estimates are 2.1–1.5, 1.1–0.76 and 0.25–0.18 Ma for the chimpanzee/bonobo, western/ (eastern ^{3} central) and eastern/central chimpanzee divergences, respectively.

Keywords: mitochondrial genome; Pan troglodytes; Pan paniscus; divergence time

Ungar 2010

Peter S. Ungar, Robert S. Scott, Frederick E. Grine & Mark F. Teaford, *Molar microwear textures and the diets of Australopithecus anamensis and Australopithecus afarensis*. Phil. Trans. Royal Society B **365** (2010), 3345–3354.

Many researchers have suggested that Australopithecus anamensis and Australopithecus afarensis were among the earliest hominins to have diets that included hard, brittle items. Here we examine dental microwear textures of these hominins for evidence of this. The molars of three Au. anamensis and 19 Au. afarensis specimens examined preserve unobscured antemortem microwear. Microwear textures of these individuals closely resemble those of Paranthropus boisei, having lower complexity values than Australopithecus africanus and especially Paranthropus robustus. The microwear texture complexity values for Au. anamensis and Au. afarensis are similar to those of the grass-eating Theropithecus gelada and folivorous Alouatta palliata and Trachypithecus cristatus. This implies that these Au. anamensis and Au. afarensis individuals did not have diets dominated by hard, brittle foods shortly before their deaths. On the other hand, microwear texture anisotropy values for these taxa are lower on average than those of Theropithecus, Alouatta or Trachypithecus. This suggests that the fossil taxa did not have diets dominated by tough foods either, or if they did that directions of tooth–tooth movement were less constrained than in higher cusped and sharper crested extant primate grass eaters and folivores.

Keywords: Australopithecus; molar; diet; microwear textures

Ward 2010

Carol V. Ward, J. Michael Plavcan & Fredrick K. Manthi, *Anterior*

dental evolution in the Australopithecus anamensis–afarensis lineage. Phil. Trans. Royal Society B **365** (2010), 3333–3344.

Australopithecus anamensis is the earliest known species of the Australopithecus–human clade and is the likely ancestor of Australopithecus afarensis. Investigating possible selective pressures underlying these changes is key to understanding the patterns of selection shaping the origins and early evolution of the Australopithecus–human clade. During the course of the Au. anamensis–afarensis lineage, significant changes appear to occur particularly in the anterior dentition, but also in jaw structure and molar form, suggesting selection for altered diet and/or food processing. Specifically, canine tooth crown height does not change, but maxillary canines and P3s become shorter mesiodistally, canine tooth crowns become more symmetrical in profile and P3s less unicuspid. Canine roots diminish in size and dimorphism, especially relative to the size of the postcanine teeth. Molar crowns become higher. Tooth rows become more divergent and symphyseal form changes. Dietary change involving anterior dental use is also suggested by less intense anterior tooth wear in Au. afarensis. These dental changes signal selection for altered dietary behaviour and explain some differences in craniofacial form between these taxa. These data identify Au. anamensis not just as a more primitive version of Au. afarensis, but as a dynamic member of an evolving lineage leading to Au. afarensis, and raise intriguing questions about what other evolutionary changes occurred during the early evolution of the Australopithecus–human clade, and what characterized the origins of the group.

Keywords: Australopithecus anamensis; Australopithecus afarensis; dental evolution

Bibel

Erskine 2013

Neil Erskine, *Judges to Monarchs: Transition in The Books of Samuel*. (unpublished 2013).

The books of Samuel can be attributed to the reign of Josiah and to a Judahite author; they do not accurately reflect the rise of monarchy in ancient Israel; the historical context of Josiah's reign created an opportunity to create a unified Israel; the texts provide a precedent and mandate for this unified empire. Although a more lengthy work would allow an assessment of some of the oddities of the text, such as the negative aspects of David's character which seem out of place in a narrative that seeks to justify the place of his supposed descendants, we can make a conclusion as to the theme of the books of Samuel. It is not a description of the rise of monarchy itself that is the primary goal, or a study of the justness of monarchic rule, but the establishment of a picture of a divinely mandated unified kingdom which a king like Josiah can rightfully rule.

Krüger 2013

Thomas Krüger, *Law and Wisdom according to Deut 4:5–8*. In: Bernd U. Schipper & D. Andrew Teeter (Hrsg.), *Wisdom and Torah, The Reception of 'Torah' in the Wisdom Literature of the Second Temple Period*. Supplements to the Journal for the Study of Judaism 163 (Leiden 2013), 35–54.

If the reflections presented above are correct, Deut 4:5–8 is not a discussion of the relationship between Wisdom and Torah in principle. Rather, the verses express the desire that Israel's obedience to the Mosaic Law will lead to its recognition by the nations. Moses is, to be sure, of the opinion that the laws taught by him

are superior to the legislation of the nations (4:8). He expects nothing more of the nations, however, than that they regard the observance of those laws by the Israelites as reasonable, as a mark of wisdom and insight (4:6), and that, on this basis, they tolerate the laws, if not promote them.
Such an expectation fits well in the Persian period. Here at least an influential intellectual group in the province Yehud cherished the hope that the Mosaic Law (whatever its concrete form) would be accepted by the Achaemenid rulers as a local order of life. That this hope was fulfilled is reported (in a historically questionable way) in Ezra 7:11ff. Later on, the religious politics of Antiochus IV directed against such local laws, according to 1 Maccabees 1, led to the Maccabean revolt. Even though Deut 4:5–8 is not a statement about the relationship between Wisdom and Torah in principle, the text probably initiated deeper and more exact reflection about this relationship—especially since, owing not least to the increasing knowledge of the laws and customs of other peoples, the question would, over the course of time, unavoidably arise as to whether all Mosaic laws are indeed as just and reasonable as Deut 4:5–8 claims.

Biologie

Ho 2011

Simon Y. W. Ho, Robert Lanfear, Lindell Bromham, Matthew J. Phillips, Julien Soubrier, Allen G. Rodrigo & Alan Cooper, *Time-dependent rates of molecular evolution*. Molecular Ecology **20** (2011), 3087–3101.
For over half a century, it has been known that the rate of morphological evolution appears to vary with the time frame of measurement. Rates of microevolutionary change, measured between successive generations, were found to be far higher than rates of macroevolutionary change inferred from the fossil record. More recently, it has been suggested that rates of molecular evolution are also time dependent, with the estimated rate depending on the timescale of measurement. This followed surprising observations that estimates of mutation rates, obtained in studies of pedigrees and laboratory mutation-accumulation lines, exceeded long-term substitution rates by an order of magnitude or more. Although a range of studies have provided evidence for such a pattern, the hypothesis remains relatively contentious. Furthermore, there is ongoing discussion about the factors that can cause molecular rate estimates to be dependent on time. Here we present an overview of our current understanding of time-dependent rates. We provide a summary of the evidence for time-dependent rates in animals, bacteria and viruses. We review the various biological and methodological factors that can cause rates to be time dependent, including the effects of natural selection, calibration errors, model misspecification and other artefacts. We also describe the challenges in calibrating estimates of molecular rates, particularly on the intermediate timescales that are critical for an accurate characterization of time-dependent rates. This has important consequences for the use of molecular-clock methods to estimate timescales of recent evolutionary events.
Keywords: calibrations, divergence times, molecular clock, mutation rate, purifying selection, substitution rate

Datierung

Walker 2005

Mike Walker, *Quaternary Dating Methods*. (Chichester 2005).

Grundlagen

Whelan 2013

Carly S. Whelan, Adrian R. Whitaker, Jeffrey S. Rosenthal & Eric Wohlgemuth, *Hunter-gatherer storage, settlement, and the opportunity costs of women's foraging*. American Antiquity **78** (2013), 662–678.

Food storage is a crucial adaptation for hunter-gatherers who face seasonal resource shortfalls, but the extra time that hunter-gatherers must spend accumulating food surpluses has the potential to conflict with the time they need for other activities during seasons of abundance. Since the activities that conflict with storage may be different for women and men, it is important to consider which gender is responsible for storage. We argue that when women perform most storage tasks, the tradeoff between foraging and childcare is likely to shape storage behavior, particularly the decision of which foods to store. Our analysis of storage food preferences among the prehistoric hunter-gatherers of California's Sierra Nevada suggests that women altered their storage strategy during the late Holocene when the shift to a semi-sedentary settlement system increased the conflict they faced between foraging and providing childcare. The adoption of an acorn-based storage economy during this period allowed women to minimize the time they spent foraging away from their residential bases, so they could better accommodate their childcare needs. This study demonstrates the utility of considering issues beyond the rate of caloric return from foraging to develop more complete models of hunter-gatherer behavior and explanations of the archaeological record.

Jungpaläolithikum

Snow 2013

Dean R. Snow, *Sexual dimorphism in European Upper Paleolithic cave art*. American Antiquity **78** (2013), 746–761.

Preliminary research on hand stencils found in the Upper Paleolithic cave sites of France and Spain showed that sexual dimorphism in human hands is expressed strongly enough to allow empirical determination of the sexes of the individuals who made some of them. Further research increased the sample of measurable cases from 6 to 32, a large enough sample to show that persons who made hand stencils in the caves were predominantly females. This finding rebuts the traditional assumption that human hand stencils in European parietal art were made by male artists, either adults or subadults. Findings further suggest that the sexual dimorphism of hands was more pronounced during the Upper Paleolithic than it is in modern Europeans. Attempts to apply the same algorithms to a sample of North American Indian handprints confirms the view that different populations require separate analyses.

Klima

Wagner 1999

Friederike Wagner, Sjoerd J. P. Bohncke, David L. Dilcher, Wolfram M. Kürschner, Bas van Geel & Henk Visscher, *Century-Scale Shifts in Early Holocene Atmospheric CO_2 Concentration*. science **284** (1999), 1971–1973.

s284-1971-Comment.pdf

The inverse relation between atmospheric carbon dioxide concentration and stomatal frequency in tree leaves provides an accurate method for detecting and quantifying century-scale carbon dioxide fluctuations. Stomatal frequency signatures of fossil birch leaves reflect an abrupt carbon dioxide increase at the beginning of the Holocene. A succeeding carbon dioxide decline matches the Preboreal Oscillation, a 150-year cooling pulse that occurred about 300 years after the onset of the Holocene. In contrast to conventional ice core estimates of 270 to 280 parts per million by volume (ppmv), the stomatal frequency signal suggests that early Holocene carbon dioxide concentrations were well above 300 ppmv.

Wagner 2002

Friederike Wagner, Bent Aaby & Henk Visscher, *Rapid atmospheric CO_2 changes associated with the 8,200-years-B.P. cooling event*. PNAS **99** (2002), 12011–12014.

By applying the inverse relation between numbers of leaf stomata and atmospheric CO2 concentration, stomatal frequency analysis of fossil birch leaves from lake deposits in Denmark reveals a century-scale CO2 change during the prominent Holocene cooling event that occurred in the North Atlantic region between 8,400 and 8,100 years B.P. In contrast to conventional CO2 reconstructions based on ice cores from Antarctica, quantification of the stomatal frequency signal corroborates a distinctive temperature–CO2 correlation. Results indicate a global CO2 decline of ≈25 ppm by volume over ≈300 years. This reduction is in harmony with observed and modeled lowering of North Atlantic sea-surface temperatures associated with a short-term weakening of thermohaline circulation.

Wickert 2013

Andrew D. Wickert, Jerry X. Mitrovica, Carlie Williams & Robert S. Anderson, *Gradual demise of a thin southern Laurentide ice sheet recorded by Mississippi drainage*. nature **502** (2013), 668–671.

At the Last Glacial Maximum (LGM), about 21,000 years before present, land-based ice sheets held enough water to reduce global mean sea level by 130 metres. Yet after decades of study, major uncertainties remain as to the distribution of that ice. Here we test four reconstructions of North American deglacial ice-sheet history by quantitatively connecting themto high-resolution oxygen isotope (d18O) records from the Gulf of Mexico using a water mixing model. For each reconstruction, we route meltwater and seasonal runoff through the time-evolving Mississippi drainage basin, which co-evolves with ice geometry and changing topography as ice loads deform the solid Earth and produce spatially variable sea level in a process known as glacial isostatic adjustment. The d18O records show that the Mississippi-drained southern Laurentide ice sheet contributed only 5.4±2.1 metres to global sea level rise, of which 0.66±0.07 metres were released during the meltwater pulse 1A event 14,650–14,310 years before present, far less water than previously thought. In contrast, the three reconstructions based on glacial isostatic adjustment overpredict the d18O-based post-LGM meltwater volume by a factor of 1.6 to 3.6. The fourth reconstruction6, which is based on ice physics, has a low enough Mississippi-routed meltwater discharge to be consistent with d18O constraints, but also contains the largest LGM North American ice volume. This suggests that modelling based on ice physics may be the best way of matching isotopic records while also sequestering enough water in the North American ice sheets to match the observed LGM sea level fall.

Kultur

Carneiro 2012

Robert L. Carneiro, *The Circumscription Theory, A Clarification, Amplification, and Reformulation.* Social Evolution & History **11** (2012), 5–30.

Erskine 2012

Neil Erskine, *What can the burials of the Royal Cemetery at Ur tell us about society in third millennium BC south Mesopotamia?* (unpublished 2012).

Having assessed the evidence for social stratification, craft specialisation, spacial hierarchy and ritual elaboration it has been concluded that the Royal Tombs at Ur are indicative of a complex society. Furthermore, evidence has been found to suggest that this complex society was ruled over by a brief dynasty who used state theater and divine motifs to present an authoritative and justified mandate for their rule, but failed to prevent their final disappearance.

[...] [I]t is possible that other cemeteries exist or that bodies were disposed of in other fashions. More evidence for non-royal burials would help paint a fuller picture of the society of Ur and the assessment of some of the remaining burials which have received less attention than the more enigmatic royal tombs would help develop a demographic of the city and build a broader understanding of the layers of society between the rulers and those low enough to find themselves in the position of sacrificial victims.

Erskine 2012

Neil Erskine, *What role did imported alcohol, drinking vessels and drinking practices play in maintaining the status of the Hallstatt elite?* (unpublished 2012).

We have observed the restricted volume and variety of imports into Hallstatt Europe in contrast to the surrounding area, how this indicates deliberate limitation of access to these imports and how this limitation could maintain the status of the elite. We have also seen that there is little evidence of an exchange network between top tier elites and their subordinates. With these factors in mind we can see that the previously presented theories regarding the use of imported alcohol and alcohol vessels and the use of drinking practices amongst the Hallstatt elite are only partly correct. The imports were indeed used to sustain elite status, but were not distributed amongst the lower-elite in return for support.

Methoden

Carpenter 2013

Meredith L. Carpenter et al., *Pulling out the 1 %, Whole-Genome Capture for the Targeted Enrichment of Ancient DNA Sequencing Libraries.* American Journal of Human Genetics (2013), preprint, 1–13. DOI:10.1016/j.ajhg.2013.10.002.

Meredith L. Carpenter, Jason D. Buenrostro, Cristina Valdiosera, Hannes Schroeder, Morten E. Allentoft, Martin Sikora, Morten Rasmussen, Simon Gravel & Sonia Guillén

Most ancient specimens contain very low levels of endogenous DNA, precluding the shotgun sequencing of many interesting samples because of cost. Ancient DNA

(aDNA) libraries often contain <1 % endogenous DNA, with the majority of sequencing capacity taken up by environmental DNA. Here we present a capture-based method for enriching the endogenous component of aDNA sequencing libraries. By using biotinylated RNA baits transcribed from genomic DNA libraries, we are able to capture DNA fragments from across the human genome. We demonstrate this method on libraries created from four Iron Age and Bronze Age human teeth from Bulgaria, as well as bone samples from seven Peruvian mummies and a Bronze Age hair sample from Denmark. Prior to capture, shotgun sequencing of these libraries yielded an average of 1.2 % of reads mapping to the human genome (including duplicates). After capture, this fraction increased substantially, with up to 59 % of reads mapped to human and enrichment ranging from 6- to 159-fold. Furthermore, we maintained coverage of the majority of regions sequenced in the precapture library. Intersection with the 1000 Genomes Project reference panel yielded an average of 50,723 SNPs (range 3,062–147,243) for the postcapture libraries sequenced with 1 million reads, compared with 13,280 SNPs (range 217–73,266) for the precapture libraries, increasing resolution in population genetic analyses. Our whole-genome capture approach makes it less costly to sequence aDNA from specimens containing very low levels of endogenous DNA, enabling the analysis of larger numbers of samples.

Mittelpaläolithikum

Hublin 1996

Jean-Jacques Hublin, Fred Spoor, Marc Braun, Frans Zonneveld & Silvana Condemi, *A late Neanderthal associated with Upper Palaeolithic artefacts*. nature **381** (1996), 224–226.

n381-0224-Correction.pdf

The French site of Arcy-sur-Cure is a key locality in documenting the Middle-Upper Palaeolithic transition in Europe. Reliable attribution of the fragmentary hominid fossils associated with its early Upper Palaeolithic Chatelperronian industry has not been possible. Here we report the first conclusive identification of one of these fossils as Neanderthal on the basis of newly discovered derived features of the bony labyrinth. Dated at about thirty-four thousand years (34 kyr) ago, the fossil is representative of the youngest known Neanderthal populations, and its archaeological context indicates that these hominids used a rich bone industry as well as personal ornaments. The evidence supports the hypothesis of a long term coexistence with technocultural interactions between the first modern humans and the last Neanderthals in Europe. However, the complete absence of the derived Neanderthal traits in labyrinths of modern Upper Palaeolithic specimens from western Europe argues against phylogenetic continuity between the two populations in this region.

Neolithikum

Masson 2013

Muriel Masson et al., *Osteological and Biomolecular Evidence of a 7000-Year-Old Case of Hypertrophic Pulmonary Osteopathy Secondary to Tuberculosis from Neolithic Hungary*. PLoS ONE **8** (2013), e78252. DOI:10.1371/journal.pone.0078252.

pone08-e78252-Supplement1.pdf, pone08-e78252-Supplement2.pdf, pone08-e78252-Supplement3.pdf, pone08-e78252-Supplement4.pdf

Muriel Masson, Erika Molnár, Helen D. Donoghue, Gurdyal S. Besra, David E. Minnikin, Houdini H. T. Wu, Oona Y-C. Lee, Ian D. Bull & György Pálfi
Seventy-one individuals from the late Neolithic population of the 7000-year-old site of Hódmezővásárhely-Gorzsa were examined for their skeletal palaeopathology. This revealed numerous cases of infections and non-specific stress indicators in juveniles and adults, metabolic diseases in juveniles, and evidence of trauma and mechanical changes in adults. Several cases showed potential signs of tuberculosis, particularly the remains of the individual HGO-53. This is an important finding that has significant implications for our understanding of this community. The aim of the present study was to seek biomolecular evidence to confirm this diagnosis. HGO-53 was a young male with a striking case of hypertrophic pulmonary osteopathy (HPO), revealing rib changes and cavitations in the vertebral bodies. The initial macroscopic diagnosis of HPO secondary to tuberculosis was confirmed by analysis of Mycobacterium tuberculosis complex specific cell wall lipid biomarkers and corroborated by ancient DNA (aDNA) analysis. This case is the earliest known classical case of HPO on an adult human skeleton and is one of the oldest palaeopathological and palaeomicrobiological tuberculosis cases to date.

Zilhão 2001

João Zilhão, *Radiocarbon evidence for maritime pioneer colonization at the origins of farming in west Mediterranean Europe*. PNAS **98** (2001), 14180–14185.
Most radiocarbon dates for the earliest Neolithic cultures of west Mediterranean Europe are on samples of unidentified charcoal. If only results obtained on short lived samples (seeds, shells, and bone) of diagnostic material (domesticates, artifacts, and human remains) are considered, then the dates for the first appearance of the Neolithic package are indistinguishable statistically from central Italy to Portugal and cluster around 5400 calendar B.C. This rapidity of spread, no more than six generations, can be best explained in the framework of a maritime pioneer colonization model.
cardial | Neolithic | radiocarbon

Story or Book

Dillehay 1988

Thomas D. Dillehay, *How new is the New World?* Antiquity **62** (1988), 94–97.
The first settlement of the Americus is one of those research questions in which convictions have sometimes seemed as important a s data. There has recently been encouragement both for True Believers, in the very early sequence of dates reported by the French from a Brazilian rock-shelter, and for True Sceptics, in the revised and more recent dates now given to some of the olderfinds from North America after further study by AMS carbon dating. Here, a review of a major new book is the opportunity to review the issues.
Brian M. Fagan. The great journey: the peopling of ancient America. v + 288 puges, 78 plutes, 48 figures. 1987. London & New York: Thames & Hudson; ISBN 0-500-05045-7 hardback £14.95 & $19.95.
Traditional theory has it that the initial migration occurred no earlier than 12,000 years ago. It is common knowledge that in recent years this thinking has been seriously challenged by the discovery of several alleged pre-Clovis sites which are primarily characterized by unifacial stone tools and/or wood and bone artefacts

and by a generalized economy. Fagan has a long career of synthesizing and interpreting a wide range of archaeological topics for the general public. The great journey: the peopling of ancient America again shows his skill in the synthesis of popular themes. Fagan is not a specialist on Early Man in the New World. Nonetheless, he has done an admirable job in presenting an often emotionally charged and highly controversial theme. Brian M. Fagan has never researched Early Man in the Americas. The scope of his book makes it important for anyone interested in the subject. It constitutes the only major synthesis of the state of enquiry into Early Man in the Americas. Although it avoids in-depth consideration of epistemological and methodological issues, it is a much-welcomed and healthy contribution to the field by a non-specialist.

Oliver 1991

Jose R. Oliver, *Monte Verde: A Late Pleistocene Settlement in Chile*. Man, New Series **26** (1991), 165.

Dillehay, Tom D. Monte Verde: a Late Pleistocene settlement in Chile. 1, Palaeoenvironment and site context. xxiv, 306 pp., illus., maps, tables, bibliogr. Washington, London: Smithsonian Institution Press, 1989

Dillehay et al. present overwhelming, indisputable evidence of the 'hand of Man' in Monte Verde by 13,000 B.P., and without the need for detailed artefact analysis. The analysis of the absolute dates and the reasoning for favouring the older 12,500 to 13,000 B.P. dates are flawless: all the younger dates are closest to or within the old shoreline of the Chinchihuapi Creek and, thus, most likely to be contaminated.

Whitfield 2013

John Whitfield, *The appetite for right*. nature **502** (2013), 622–623.

John Whitfield explores two studies that take us from infant ethics to moral choices faced by adults in society.

Moral Tribes: Emotion, Reason, and the Gap Between Us and Them. Joshua Greene. Penguin: 2013.

Greene argues that we have two moral systems that engage different parts of the brain. A fast, automatic, 'tribal' one operates through the emotions and is well suited for solving problems within groups; a slower, deliberative one allows a more impartial perspective. In place of moral absolutes, Greene carries a flag for utilitarianism. This pragmatic philosophy, developed in the eighteenth and nineteenth centuries by Jeremy Bentham and John Stuart Mill, argues that, to quote Bentham, "it is the greatest happiness of the greatest number that is the measure of right and wrong". The brain's slow moral system, Greene says, naturally arrives at utilitarian decisions, and the philosophy's universality and impartiality transcend faster 'tribal' thinking.

Whitfield 2013

John Whitfield, *The appetite for right*. nature **502** (2013), 622–623.

John Whitfield explores two studies that take us from infant ethics to moral choices faced by adults in society.

Just Babies: The Origins of Good and Evil. Paul Bloom. Crown: 2013.

Bloom, ever brisk and authoritative, generally focuses on how things are rather than on how developmental psychology might inform philosophy. His discussion of disgust is particularly good. This is partly because the experiments he describes are nifty. Moral purity, for example, is a value associated with conservative philosophies, and students' political views have been shown to move rightwards when they are standing next to a hand-sanitizer dispenser. And it is partly because he pursues the implications further, arguing that disgust is a poor guide to right and wrong and is liable to make people prejudiced and abusive.