Liste erstellt am 2018-11-22

References

Aktuell

Couzin-Frankel 2018

Jennifer Couzin-Frankel, *Toxin or Treatment?* science **362** (2018), 278–282.

Ingesting small doses of peanut products guards against allergic reactions—but an undercurrent of anxiety persists.

Eitam 2018

David Eitam, *Production of cereals food and bread by the Natufian in Southeastern Asia (15,000–11,500 Cal BP), Commentary: Arranz-Otaegui et al. 2018.* unknown (2018), preprint, 1–3.

The assumption that cereal food and bread was seldom occurrences as "special" food contradicts a sequence of numerous archaeological findings.

This widespread distribution of many cereal foods and bread devices point toward the constant and systematic production of cereal food and bread with regional variation in the Southern Levantine Late Epipaleolithic.

Geng 2018

Caiyun Geng, Jilai Li, Thomas Weiske & Helmut Schwarz, *Ta_2^+-mediated ammonia synthesis from N_2 and H_2 at ambient temperature.* PNAS **115** (2018), 11680–11687.

pnas115-11680-Supplement.pdf

In a full catalytic cycle, bare Ta2+ in the highly diluted gas phase is able to mediate the formation of ammonia in a Haber-Bosch-like process starting from N2 and H2 at ambient temperature. This finding is the result of extensive quantum chemical calculations supported by experiments using Fourier transform ion cyclotron resonance MS. The planar Ta2N2+, consisting of a four-membered ring of alternating Ta and N atoms, proved to be a key intermediate. It is formed in a highly exothermic process either by the reaction of Ta2+ with N2 from the educt side or with two molecules of NH3 from the product side. In the thermal reaction of Ta2+ with N2, the N-N triple bond of dinitrogen is entirely broken. A detailed analysis of the frontier orbitals involved in the rate-determining step shows that this unexpected reaction is accomplished by the interplay of vacant and doubly occupied d-orbitals, which serve as both electron acceptors and electron donors during the cleavage of the triple bond of N-N by the ditantalum center. The ability of Ta2+ to serve as a multipurpose tool is further shown by splitting the single bond of H2 in a less exothermic reaction as well. The insight into the microscopic mechanisms obtained may provide guidance for the rational design of polymetallic catalysts to bring about ammonia formation by the activation of molecular nitrogen and hydrogen at ambient conditions.

Keywords: gas-phase catalysis | ammonia synthesis | dinitrogen activation | hydrogen activation | quantum chemical calculation

Significance: A combined experimental/computational approach provides deep mechanistic insight into an unprecedented clustermediated N-H coupling mimicking the industrially extremely important ammonia synthesis from N2 and H2 (the "Haber-Bosch" process) at room temperature. Crucial steps were identified

for both the forward reactions (i.e., the activation of N2) and the backward process (i.e., the Ta2+-mediated decomposition of NH3). The central intermediate for either path corresponds to Ta2N2+, a four-membered ring with alternating Ta and N atoms. The root cause of tantalum's ability to bring about nitrogen fixation and its coupling with H2 under mild conditions has been identified by state-of-the-art quantum chemical calculations.

Gibney 2018

Elizabeth Gibney, *Metrologists ditch last physical standard units.* nature **563** (2018), 451–452.

Meet the new ampere, kilogram, kelvin and mole, now courtesy of nature's constants.

Lee 2018

Jet-Sing M. Lee, *Leaving my comfort zone.* science **362** (2018), 370.

I never thought I would venture far from home. I was a mediocre high school student from a workingclass family, and I didn't think traveling the world was in the cards for me. For my undergrad degree, I only applied to universities within an hour of my hometown in the United Kingdom. When I decided to pursue a Ph.D., I stayed at the same university. I still wasn't convinced I was a great student (even though I was near the top of my class), and staying seemed like the safe option. It allowed me to remain close to friends, and I was familiar with the department, which put me in a good position to pick my supervisor wisely. A few years later, as I was considering a postdoc, I was tempted to once again stay close to home, in the comfort of my Ph.D. lab. My experience there had been very positive, and previous doctoral students had stayed on, so why shouldn't I? It would have been so easy. But I hope to run my own lab one day, and I knew that seeing a different approach to science would be valuable.

Phillips 2018

Nicky Phillips, *Hunt for the sky's 'detergent' begins.* nature **563** (2018), 455–456.

Ice-core team heads to Antarctica to measure past levels of chemical that scrubs atmosphere of greenhouse gases.

Amerika

Callaway 2018

Ewen Callaway, *Migration to Americas traced.* nature **563** (2018), 303–304.

Genomes show that the Americas' earliest settlers moved far and fast across the continent.

The Montana baby, known as the Anzick boy, belonged to a population known as the Southern Native Americans, who are most closely related to present-day Indigenous populations from South America. They split from Northern Native Americans, who are genetically closer to many contemporary groups in eastern North America, around 14,600–17,500 years ago. And the common ancestor of those two groups split from East Asians some 25,000 years ago, as scientists established earlier this year by sequencing the genome of 11,500-year-old human remains from Alaska.

Moreno-Mayar 2018

J. Víctor Moreno-Mayar et al., *Early human dispersals within the Americas*. Science Advances (2018), preprint, 1–27. DOI:10.1126/science.aav2621.

SciAdv2018.11-Moreno-Mayar-Supplement.pdf

J. Víctor Moreno-Mayar, Lasse Vinner, Peter de Barros Damgaard, Constanza de la Fuente, Jeffrey Chan, Jeffrey P. Spence, Morten E. Allentoft, Tharsika Vimala, Fernando Racimo, Thomaz Pinotti, Simon Rasmussen, Ashot Margaryan, Miren Iraeta Orbegozo, Dorothea Mylopotamitaki, Matthew Wooller, Clement Bataille, Lorena Becerra-Valdivia, David Chivall, Daniel Comeskey, Thibaut Devièse, Donald K. Grayson, Len George, Harold Harry, Verner Alexandersen, Charlotte Primeau, Jon Erlandson, Claudia Rodrigues-Carvalho, Silvia Reis, Murilo Q. R. Bastos, Jerome Cybulski, Carlos Vullo, Flavia Morello, Miguel Vilar, Spencer Wells, Kristian Gregersen, Kasper Lykke Hansen, Niels Lynnerup, Marta Mirazón Lahr, Kurt Kjær, André Strauss, Marta Alfonso-Durruty, Antonio Salas, Hannes Schroeder, Thomas Higham, Ripan S. Malhi, Jeffrey T. Rasic, Luiz Souza, Fabricio R. Santos, Anna-Sapfo Malaspinas, Martin Sikora, Rasmus Nielsen, Yun S. Song, David J. Meltzer & Eske Willerslev

Studies of the peopling of the Americas have focused on the timing and number of initial migrations. Less attention has been paid to the subsequent spread of people within the Americas. We sequenced 15 ancient human genomes spanning Alaska to Patagonia; six are >10,000 years old (up to ≈18× coverage). All are most closely related to Native Americans, including an Ancient Beringian individual, and two morphologically distinct "Paleoamericans." We find evidence of rapid dispersal and early diversification, including previously unknown groups, as people moved south. This resulted in multiple independent, geographically uneven migrations, including one that provides clues of a Late Pleistocene Australasian genetic signal, and a later Mesoamerican-related expansion. These led to complex and dynamic population histories from North to South America.

Posth 2018

Cosimo Posth et al., *Reconstructing the Deep Population History of Central and South America*. Cell **175** (2018), 1185–1197.

Cell175-1185-Supplement1.pdf, Cell175-1185-Supplement2.pdf

In Brief: A large-scale analysis of ancient genomes from Central and South America yields insights into the peopling of the Americas, including four southward population spreads and notable population continuity in much of South America after arrival.

Highlights:

- Genome-wide analysis of 49 Central and South Americans up to ≈11,000 years old
- Two previously unknown genetic exchanges between North and South America
- Distinct link between a Clovis culture-associated genome and the oldest South Americans
- Continent-wide replacement of Clovis-associated ancestry beginning at least 9,000 years ago

Cosimo Posth, Nathan Nakatsuka, Iosif Lazaridis, Pontus Skoglund, Swapan Mallick, Thiseas C. Lamnidis, Nadin Rohland, Kathrin Nägele, Nicole Adamski, Emilie Bertolini, Nasreen Broomandkhoshbacht, Alan Cooper, Brendan J. Culleton, Tiago Ferraz, Matthew Ferry, Anja Furtwängler, Wolfgang Haak, Kelly Harkins, Thomas K. Harper, Tábita Hünemeier, Ann Marie Lawson, Bastien Llamas, Megan Michel, Elizabeth Nelson, Jonas Oppenheimer, Nick Patterson, Stephan Schiffels, Jakob Sedig, Kristin Stewardson, Sahra Talamo, Chuan-Chao Wang,

Jean-Jacques Hublin, Mark Hubbe, Katerina Harvati, Amalia Nuevo Delaunay, Judith Beier, Michael Francken, Peter Kaulicke, Hugo Reyes-Centeno, Kurt Rademaker, Willa R. Trask, Mark Robinson, Said M. Gutierrez, Keith M. Prufer, Domingo C. Salazar-García, Eliane N. Chim, Lisiane Müller Plumm Gomes, Marcony L. Alves, Andersen Liryo, Mariana Inglez, Rodrigo E. Oliveira, Danilo V. Bernardo, Alberto Barioni, Veronica Wesolowski, Nahuel A. Scheifler, Mario A. Rivera, Claudia R. Plens, Pablo G. Messineo, Levy Figuti, Daniel Corach, Clara Scabuzzo, Sabine Eggers, Paulo DeBlasis, Markus Reindel, César Méndez, Gustavo Politis, Elsa Tomasto-Cagigao, Douglas J. Kennett, AndréStrauss, Lars Fehren-Schmitz, Johannes Krause & David Reich

We report genome-wide ancient DNA from 49 individuals forming four parallel time transects in Belize, Brazil, the Central Andes, and the Southern Cone, each dating to at least ≈9,000 years ago. The common ancestral population radiated rapidly from just one of the two early branches that contributed to Native Americans today. We document two previously unappreciated streams of gene flow between North and South America. One affected the Central Andes by ≈4,200 years ago, while the other explains an affinity between the oldest North American genome associated with the Clovis culture and the oldest Central and South Americans from Chile, Brazil, and Belize. However, this was not the primary source for later South Americans, as the other ancient individuals derive from lineages without specific affinity to the Clovis-associated genome, suggesting a population replacement that began at least 9,000 years ago and was followed by substantial population continuity in multiple regions.

Tushingham 2018

Shannon Tushingham, Charles M. Snyder, Korey J. Brownstein, William J. Damitio & David R. Gang, *Biomolecular archaeology reveals ancient origins of indigenous tobacco smoking in North American Plateau*. PNAS **115** (2018), 11742–11747.

pnas115-11742-Supplement.pdf

Chemical analysis of residues contained in the matrix of stone smoking pipes reveal a substantial direct biomolecular record of ancient tobacco (Nicotiana) smoking practices in the North American interior northwest (Plateau), in an area where tobacco was often portrayed as a Euro-American–introduced postcontact trade commodity. Nicotine, a stimulant alkaloid and biomarker for tobacco, was identified via ultra-performance liquid chromatography-mass spectrometry in 8 of 12 analyzed pipes and pipe fragments from five sites in the Columbia River Basin, southeastern Washington State. The specimens date from 1200 cal BP to historic times, confirming the deep time continuity of intoxicant use and indigenous smoking practices in northwestern North America. The results indicate that hunting and gathering communities in the region, including ancestral Nez Perce peoples, established a tobacco smoking complex of wild (indigenous) tobacco well before the main domesticated tobacco (Nicotiana tabacum) was introduced by contact-era fur traders and settlers after the 1790s. This is the longest continuous biomolecular record of ancient tobacco smoking from a single region anywhere in theworld—initially during an era of pithouse development, through the late precontact equestrian era, and into the historic period. This contradicts some ethnohistorical data indicating that kinnikinnick, or bearberry (Arctostaphylos uva-ursi)was the primary precontact smoke plant in the study area. Early use likely involved the management and cultivation of indigenous tobaccos (Nicotiana quadrivalvis or Nicotiana attenuata), species that are today exceedingly rare in the region and seem to have been abandoned as smoke plants after the entry of trade tobacco.

Keywords: biomolecular archaeology | tobacco | ancient plant use | North America | indigenous health

Significance: While tobacco is one of the most heavily consumed (and abused) plant substances of the modern era, with profound global health consequences, its early use remains poorly understood. Here we report a substantial direct biomolecular record of ancient tobacco smoking by hunter-gatherers of interior northwestern North America. Nicotine-positive samples demonstrate deep time continuity of indigenous tobacco smoking in a place where tobacco has been depicted as being introduced by early Euro-American traders and explorers. The spread of domesticated trade tobacco seems to have overtaken and obscured ancient indigenous tobacco practices. The information —represented here by the longest continuous biomolecular record of tobacco use from a single region—informs programs designed to combat persistent commercial tobacco use rates among modern Tribal communities.

Waters 2018

Michael R. Waters, Joshua L. Keene, Steven L. Forman, Elton R. Prewitt, David L. Carlson & James E. Wiederhold, *Pre-Clovis projectile points at the Debra L. Friedkin site, Texas, Implications for the Late Pleistocene peopling of the Americas*. Science Advances **4** (2018), eaat4505. DOI:10.1126/sciadv.aat4505.

SciAdv04-eaat4505-Supplement.pdf

Lanceolate projectile points of the Clovis complex and stemmed projectile points of the Western Stemmed Tradition first appeared in North America by ≈13 thousand years (ka) ago. The origin, age, and chronological superposition of these stemmed and lanceolate traditions are unclear. At the Debra L. Friedkin site, Texas, below Folsom and Clovis horizons, we find stemmed projectile points dating from ≈13.5 to ≈15.5 ka ago, with a triangular lanceolate point form appearing ≈14 ka ago. The sequential relationship of stemmed projectile points followed by lanceolate forms suggests that lanceolate points are derived from stemmed forms or that they originated from two separate migrations into the Americas.

Anthropologie

Trinkaus 2018

Erik Trinkaus, *An abundance of developmental anomalies and abnormalities in Pleistocene people*. PNAS **115** (2018), 11941–11946.

pnas115-11941-Supplement.pdf

Diverse developmental abnormalities and anomalous features are evident in the Pleistocene Homo fossil record, varying from minor but rare dental, vertebral, and carpal variants to exceptional systemic disorders. There are currently 75 documented anomalies or abnormalities from 66 individuals, spanning the Pleistocene but primarily from the Late Pleistocene Middle and Upper Paleolithic with their more complete skeletal remains. The expected probabilities of finding these variants or developmental disorders vary from <5 % to <0.0001 %, based on either recent human incidences or relevant Pleistocene sample distributions. Given the modest sample sizes available for the skeletal or dental elements in question, especially if the samples are appropriately limited in time and geography, the cumulative multiplicative probability of finding these developmental changes is vanishingly small. These data raise questions regarding social survival abilities, differing mortuary treatments of the biologically unusual, the role of ubiquitous stress among these Pleistocene foragers, and their levels of consanguinity. No single

factor sufficiently accounts for the elevated level of these developmental variants or the low probability of finding them in the available paleontological record.

Keywords: paleopathology | Paleolithic | dysplasia | crania | dentition

Significance: The patterns and incidences of developmental abnormalities and anomalies through Pleistocene human evolution may provide insights into issues of survival, stress, consanguinity, and mortuary behavior among these foraging populations. A synthesis of these developmental variants through the Homo fossil record provides 75 cases from 66 individuals, an exceptional total given the small paleontological samples. These are primarily from the past 200,000 years, given better preservation through burial, but are known from up to 1.5 million years ago. One-third of them have moderately low probabilities ($P < 0.05$), yet 14 % are very rare ($P < 0.0001$), and 19 % have no known etiology. No single factor accounts for the extremely low cumulative probability of finding these abnormalities, but this raises questions concerning the natures of Pleistocene human populations.

Bibel

Galling 1950

Kurt Galling (Hrsg.), *Textbuch zur Geschichte Israels*. (Tübingen ^{2}1968).

Hensel 2018

Benedikt Hensel, *The Chronicler's Polemics towards the Samarian YHWH-Worshippers, A Fresh Approach*. In: Jan Dušek (Hrsg.), *The Samaritans in Historical, Cultural and Linguistic Perspectives*. Studia Samaritana 11 (Berlin 2018), 35–47.

The polemic in the Chronicles, which is directed at the Gerizim community, suggests that the two groups of YHWH worshippers were experiencing turbulent relations at the time the Chronicles were being written. Whilst the struggle for cultic legitimacy as well as their mutual accusations of deficient worship are constitutive factors in each group's specific narrative, there is no historical evidence before the Hasmonean period.

Schwally 1892

Friedrich Schwally, *Das Leben nach dem Tode: Nach den Vorstellungen des alten Israel und des Judentums einschließlich des Volksglaubens im Zeitalter Christi – Eine biblisch-theologische Untersuchung*. (Milton Keynes 2018).

Smelik 1985

Klaas A. D. Smelik, *Historische Dokumente aus dem alten Israel*. (Göttingen 1987). Original: Behouden schrift.

Ussishkin 2018

David Ussishkin, *The Date of Building 338 at Megiddo, Additional Comments*. Israel Exploration Journal **68** (2018), 232–236.

Recently Kleiman and Finkelstein (2018) published their response to my rejoinder (Ussishkin 2017) regarding the date of Building 338 in Megiddo. I continue to maintain my view that Building 338 should be assigned to Stratum VA–IVB, and

present here several comments referring to the response of Kleiman and Finkelstein.

Kleiman and Finkelstein (2018: 50) assign Building 338 to the Iron Age IIB and date it to the 'irst half of the eighth century BCE'. In the view of Finkelstein and Piasetzky (2010: 382) the Iron IIB at Megiddo lasted 'several decades' before the Assyrian conquest of 732 BCE. Signiicantly, in table 2 of the same paper, they date the Iron IIA to 886–760 but date the Iron IIA IIB transition to 785–748 or even to 757 BCE. These dates hardly give time for this elaborate palace — 'one of the most monumental Iron Age buildings unearthed in the southern Levant' (Kleiman and Finkelstein 2018: 50) — to have been built, used and destroyed.

Wright 2014

Paul H. Wright, *Understanding Biblical Archaeology, An Introductory Atlas.* (Jerusalem 2014).

Biologie

Zhou 2018

Haoran Zhou, Brent R. Helliker, Matthew Huber, Ashley Dicks & Erol Akçay, *C_4 photosynthesis and climate through the lens of optimality.* PNAS **115** (2018), 12057–12062.

pnas115-12057-Supplement1.pdf, pnas115-12057-Supplement2.pdf

CO2, temperature, water availability, and light intensity were all potential selective pressures that determined the competitive advantage and expansion of the C4 photosynthetic carbon-concentrating mechanism over the last ≈30 My. To tease apart how selective pressures varied along the ecological trajectory of C4 expansion and dominance, we coupled hydraulics to photosynthesis models while optimizing photosynthesis over stomatal resistance and leaf/fineroot allocation. We further examined the importance of nitrogen reallocation from the dark to the light reactions. We show here that the primary selective pressures favoring C4 dominance changed through the course of C4 evolution. The higher stomatal resistance and leaf-to-root ratios enabled by C4 led to an advantage without any initial difference in hydraulic properties. We further predict a reorganization of the hydraulic system leading to higher turgor-loss points and possibly lower hydraulic conductance. Selection on nitrogen reallocation varied with CO2 concentration. Through paleoclimate model simulations, we find that water limitation was the primary driver for a C4 advantage, with atmospheric CO2 as high as 600 ppm, thus confirming molecular-based estimates for C4 evolution in the Oligocene. Under these high-CO2 conditions, nitrogen reallocation was necessary. Low CO2 and high light, but not nitrogen reallocation, were the primary drivers for themid- to late-Miocene global expansion of C4. We also predicted the timing and spatial distribution for origins of C4 ecological dominance. The predicted origins are broadly consistent with prior estimates, but expand upon them to include a center of origin in northwest Africa and a Miocene-long origin in Australia.

Keywords: C4 evolution | optimal stomatal conductance | resource allocation | water limitation | dark/light reaction

Significance: We use a coupled photosynthesis–hydraulic optimal physiology model in conjunction with paleoclimate modeling to examine the primary selective pressures along the ecological trajectory of C4 photosynthesis and to confirm and revise likely geographical points of dominance and expansion. Water limitation was the primary driver for the initial ecological advantage of C4 over C3 in the mid-Oligocene until CO2 became low enough to, along with light intensity, drive

the global expansion of C4 in the Miocene. Our integrated modeling framework also predicts C4 evolution should be followed by a decrease in hydraulic conductance, an increase in the leaf–turgor-loss point, and CO2-dependent reallocation of nitrogen between dark and light reactions.

Energie

Chen 2018

Wei Chen, Yang Jin, Jie Zhao, Nian Liu & Yi Cui, *Nickel-hydrogen batteries for large-scale energy storage*. PNAS **115** (2018), 11694–11699.

pnas115-11694-Supplement.pdf

Large-scale energy storage is of significance to the integration of renewable energy into electric grid. Despite the dominance of pumped hydroelectricity in the market of grid energy storage, it is limited by the suitable site selection and footprint impact. Rechargeable batteries show increasing interests in the large-scale energy storage; however, the challenging requirement of low-cost materials with long cycle and calendar life restricts most battery chemistries for use in the grid storage. Recently we introduced a concept of manganese-hydrogen battery with Mn2+/MnO2 redox cathode paired with H+/H2 gas anode, which has a long life of 10,000 cycles and with potential for grid energy storage. Here we expand this concept by replacing Mn2+/MnO2 redox with a nickel-based cathode, which enables ≈10× higher areal capacity loading, reaching ≈35 mAh/cm2. We also replace high-cost Pt catalyst on the anode with a low-cost, bifunctional nickel-molybdenumcobalt alloy, which could effectively catalyze hydrogen evolution and oxidation reactions in alkaline electrolyte. Such a nickel-hydrogen battery exhibits an energy density of ≈140 Wh/kg (based on active materials) in aqueous electrolyte and excellent rechargeability with negligible capacity decay over 1,500 cycles. The estimated cost of the nickel-hydrogen battery based on active materials reaches as low as ≈ $ 83 per kilowatt-hour, demonstrating attractive characteristics for large-scale energy storage.

Keywords: battery | large-scale energy storage | hydrogen catalysts | nickel-hydrogen | nickel-molybdenum-cobalt

Significance: Rechargeable batteries offer great opportunities to target low-cost, high-capacity, and highly reliable systems for large-scale energy storage. This work introduces an aqueous nickel-hydrogen battery by using a nickel hydroxide cathode with industrial-level areal capacity of ≈35 mAh cm2 and a low-cost, bifunctional nickel-molybdenum-cobalt electrocatalyst as hydrogen anode to effectively catalyze hydrogen evolution and oxidation reactions in alkaline electrolyte. The nickel-hydrogen battery exhibits an energy density of ≈140 Wh/kg in aqueous electrolyte and excellent rechargeability without capacity decay over 1,500 cycles. The estimated cost of the nickel-hydrogen battery reaches as low as ≈ $ 83 per kilowatt-hour, demonstrating attractive potential for practical large-scale energy storage.

Grabung

Kienlin 2018

Tobias L. Kienlin, *Borsod Region Bronze Age Settlement, 'Diversity in Uniformity'*. In: Tobias L. Kienlin, Klára P. Fischl & Tamás Pusztai (Hrsg.), *Borsod Region Bronze Age Settlement (BORBAS), Catalogue of the Early to Middle Bronze Age Tell Sites*

Covered by Magnetometry and Surface Survey. Universitätsforschungen zur prähistorischen Archäologie 317 (Bonn 2018), 11–91.

It is obvious, too, that the relative standing of 'on-tell' and 'of-tell' households vis-à-vis each other did not solidify into anything like a chiefdom-type structure with a functionally and politically diferentiated population. In fact, we cannot even take it as a given that living 'on-tell' was a social phenomenon at all, at least in the narrow sense of economic prosperity or political power. Rather, it may also have involved ideological concerns of relevance to and with a bearing on the wider community that 'focused' on this particular site and its enclosed (ancestral?) centre part. The communities in question faced diferent challenges and took diferent options. As a result, we see local variation in settlement organisation and its development through time. Rather than a constant build up of social diferentiation, political rule and economic diferences, there is evidence of variable responses to contingent events and long-term trends. These may have ranged from disease and demographic development, climate and environmental parameters to economic success and the agency of groups of people or households.

Judentum

Hezser 2018

Catherine Hezser, *Interaction Between Rabbis and Non-Rabbinic Jews in Palestinian Rabbinic Literature of Late Antiquity*. unknown (2018), preprint, 1–21. .

Since rabbis had ordinary professions, they would have continuously interacted with other Jews in daily life. Through these interactions, their business partners and co-workers would have experienced their halakhic views and moral values. This means that rabbis probably had to be careful about how they acted in public and private. Whatever they did could be observed and imitated by their contemporaries and remembered and used as a precedent by their own students and scholars of later generations.

Thus, in contrast to Christianity, where the focus is on beliefs and spirituality, in rabbinic Judaism halakhic practice in daily life was the main aspect of religiosity. How to behave properly in a multitude of possible situations could not simply be read in the Torah, even if one was able to read the text. It could be determined through complex oral discussions only in which one rabbinic view agreed with or conflicted with another. Such discussions were limited to scholarly insiders of the rabbinic movement. Ordinary Jews could access that expertise through listening to rabbis and asking them for advise. Rabbis fashioned themselves as mobile repositories of halakhic knowledge who were present in the public spaces of Roman Palestine. Whether and to what extent their Jewish contemporaries valued their expertise and imitated their practice is impossible to determine from hindsight.

Klima

Amundson 2018

Ronald Amundson & Léopold Biardeau, *Soil carbon sequestration is an elusive climate mitigation tool*. PNAS **115** (2018), 11652–11656.

Academic environmental scientists are largely the value-system opposites of their rural stakeholders. They may fail to recognize that they are inherently viewed with suspicion by the people they may wish to influence. Although farm advisors, who

may be members of the local community, may help lower these cultural barriers over environmental policies, the advocacy of "best management practices" by researchers concerned largely with carbon sequestration may have little to offer farmers in dynamic and challenging economic landscapes. It is far more important for researchers to understand people, rather than soil, in the difficult process of communicating environmental risk, an activity in which most researchers lack the required expertise.

Although soils are seemingly unlikely to help us remediate climate change, they are almost essential for us to survive it. In the soil–climate research arena, the current emphasis on carbon sequestration as the primary goal—with ancillary improvements in water management, soil erosion, and food security—seems almost inverted in its prioritization. Better soil carbon management is best placed within a framework of a multifaceted effort to further improve farming methods in this century. The scientific opportunity, and societal challenge, for soil science is leading research that adapts soils and agriculture to a rapidly changing climate, allowing them to continue to produce food in a changing world. However, even this research will be subject to cultural and political scrutiny.

For farmers, we might be much more successful to frame the problem as "weather-proofing soils," with an enhanced ability to store water, recycle nutrients, and produce new types of crops in a changing, growing environment. The wins in the win–win situation of soil carbon sequestration should likely be reversed and the goals of our present research reevaluated to achieve maximum societal impact.

Boers 2018

Niklas Boers, Michael Ghil & Denis-Didier Rousseau, *Ocean circulation, ice shelf, and sea ice interactions explain Dansgaard–Oeschger cycles.* PNAS **115** (2018), E11005–E11014.

pnas115-E11005-Supplement.pdf

The last glacial interval experienced abrupt climatic changes called Dansgaard–Oeschger (DO) events. These events manifest themselves as rapid increases followed by slow decreases of oxygen isotope ratios in Greenland ice core records. Despite promising advances, a comprehensive theory of the DO cycles, with their repeated ups and downs of isotope ratios, is still lacking. Here, based on earlier hypotheses, we introduce a dynamical model that explains the DO variability by rapid retreat and slow regrowth of thick ice shelves and thin sea ice in conjunction with changing subsurface water temperatures due to insulation by the ice cover. Our model successfully reproduces observed features of the records, such as the sawtooth shape of the DO cycles, waiting times between DO events across the last glacial, and the shifted antiphase relationship between Greenland and Antarctic ice cores. Our results show that these features can be obtained via internal feedbacks alone. Warming subsurface waters could have also contributed to the triggering of Heinrich events. Our model thus offers a unified framework for explaining major features of multimillennial climate variability during glacial intervals.

Keywords: millennial climate variability | nonlinear climate modeling | north–south seesaw | Bayesian parameter estimation

Significance: Paleoclimatic proxy records from Greenland ice cores show that the last glacial interval was punctuated by abrupt climatic transitions called Dansgaard–Oeschger (DO) events. These events are characterized by temperature increases over Greenland of up to 15 °C within a few decades. The cause of these transitions and their out-of-phase relationship with corresponding records from Antarctica remains unclear. Based on earlier hypotheses, we propose a model focusing on interactions between ice shelves, sea ice, and ocean currents to explain

DO events in Greenland and their Antarctic counterparts. Our model reproduces the main features of the observations. Our study provides a potential explanation of DO events and could help assess more accurately the risk of abrupt climatic transitions in the future.

Parkes 2018

David Parkes & Ben Marzeion, *Twentieth-century contribution to sea-level rise from uncharted glaciers*. nature **563** (2018), 551–554.

Global-mean sea-level rise (GMSLR) during the twentieth century was primarily caused by glacier and ice-sheet mass loss, thermal expansion of ocean water and changes in terrestrial water storage1. Whether based on observations2 or results of climate models3,4, however, the sum of estimates of each of these contributions tends to fall short of the observed GMSLR. Current estimates of the glacier contribution to GMSLR rely on the analysis of glacier inventory data, which are known to undersample the smallest glacier size classes5,6. Here we show that from 1901 to 2015, missing and disappeared glaciers produced a sea-level equivalent (SLE) of approximately 16.7 to 48.0 millimetres. Missing glaciers are those small glaciers that we expect to exist today, owing to regional analyses and theoretical scaling relationships, but that are not represented in the inventories. These glaciers contributed approximately 12.3 to 42.7 millimetres to the historical SLE. Additionally, disappeared glaciers (those that existed in 1901 but had melted away by 2015, and that therefore cannot be included in modern global glacier inventories) made an estimated contribution of between 4.4 and 5.3 millimetres. Failure to consider these uncharted glaciers may be an important cause of difficulties in closing the GMSLR budget during the twentieth century: their contribution is on average between 0.17 and 0.53 millimetres of SLE per year, compared to a budget discrepancy of about 0.5 millimetres of GMSLR per year between 1901 and 1990. Although the uncharted glaciers will have a minimal role in sea-level rise in the future, and are less important after 1990, these findings imply that undiscovered physical processes are not required to close the historical sea-level budget.

Kultur

Lidke 2015

Gundula Lidke, Thomas Terberger & Detlef Jantzen, *Das Bronzezeitliche Schlachtfeld im Tollensetal, Fehde, Krieg oder Elitenkonflikt?* In: Harald Meller & Michael Schefzik (Hrsg.), *Krieg – Eine Archäologische Spurensuche, Begleitband zur Sonderausstellung im Landesmuseum für Vorgeschichte Halle (Saale), 6. November 2015 bis 22. Mai 2016*. (Halle 2015), 337–346.

Art und Größenordnung des Konfliktes setzen in jedem Fall eine differenzierte gesellschaftliche Ordnung mit den entsprechenden Machtstrukturen voraus.

Vor diesem Hintergrund bleibt die Frage offen, ob es sich bei den Getöteten um Soldaten im Sinne einer schon weitgehend professionellen Armee oder um Bauern und Handwerker handelt, die nur vorübergehend die Rolle als Krieger angenommen hatten. Neben dem Ausmaß des Konfliktes, der standardisierten Bewaffnung mit bronzenen Pfeilspitzen und der angenommenen Verwendung von (Reit-)Pferden sprechen auch die Dominanz junger Männer und die Vorbelastung der Individuen durch eine größere Zahl verheilter Verletzungen für eine Beteiligung von trainierten Kriegern. Wenn diese Überlegung zutrifft und sich die Argumente für eine Herkunft (eines Teils) der Konfliktbeteiligten aus dem Süden weiter untermauern lassen, dann erlauben die Überreste aus dem Tollensetal tatsächlich,

erstmals in Mitteleuropa organisierte Kriegshandlungen mit überregionalen Auswirkungen im 13. Jh. v. Chr. konkret zu fassen.

Pechtl 2013

Joachim Pechtl & Daniela Hofmann, *Irregular Burials in the LBK, All or None?* In: Nils Müller-Scheessel (Hrsg.), *‚Irreguläre' Bestattungen in der Urgeschichte – Norm, Ritual, Strafe? Akten der Internationalen Tagung in Frankfurt a. M. vom 3. bis 5. Februar 2012.* Kolloquien zur Vor- und Frühgeschichte 19 (Bonn 2013), 123–138.

Dieser Beitrag beschäftigt sich mit der Frage, ob in der frühneolithischen Linearbandkeramik (LBK) in Mitteleuropa ‚Sonderbestattungen' existierten, und wenn ja, welche Formen diese annahmen. Zunächst wird die Vielfalt der bisher bekannten Bestattungssitten beschrieben, die von Einzel- und Mehrfachbestattungen vollständiger Körper auf Gräberfeldern und in Siedlungen über Leichenverbrennung bis hin zu Teilbestattungen und intentioneller Zerlegung reichen. Meist sind es die Einzelbestattungen auf Gräberfeldern, die von der Forschung als fast selbstverständliche Norm angesehen werden. Eine detaillierte kontextuelle Studie zu taphonomischen und demographischen Faktoren am Fallbeispiel Südbayern zeigt allerdings, dass nur eine Minderheit der bandkeramischen Toten auf eine archäologisch erkennbare Weise bestattet wurde. Daraus ergeben sich zwei Konsequenzen für weitere Forschungsansätze: Erstens können Bestattungssitten (mit Ausnahme der Massengräber) nicht mehr a priori nach ‚Norm' oder ‚Abweichung' gegliedert werden. Stattdessen sind verschiedene Riten als Komponenten eines kohärenten Systems von Bräuchen und Anschauungen anzuerkennen. Zweitens sollten wir, um Veränderungen zu erklären, nicht automatisch auf das Modell einer ‚Krise' zurückgreifen. Bestattungssitten sind durchaus flexibel und passen sich sozialen Umständen an; dadurch behalten sie ihre Relevanz in prähistorischen Gesellschaften.

This contribution discusses whether 'special' or 'irregular' burials exist in the early Neolithic Linearbandkeramik culture (LBK) of central Europe, and if so, what forms they take. We begin by outlining the variety of attested practices, from single and multiple inhumations in cemeteries and settlements to cremations, partial burial and intentional disarticulation. Of these, cemetery burial has often been identified as a self-evident norm, with deviations interpreted as signs of a crisis situation. A careful contextual study of taphonomic factors and demographic parameters in southern Bavaria shows that, on the contrary, only a minority of the LBK dead was in fact interred in an archaeologically visible manner at all. This has two implications for further research. First, rather than categorising practices a priori, we can now begin to understand how diverse rites can work as part of a coherent system. Only mass graves remain excluded. Second, rather than understanding change only in terms of 'crisis', we must investigate how mortuary practices responded flexibly to wider social circumstances, and how transformation was an integral way for burial rituals to retain salience in people's lives.

Religion

Croucher 2018

Karina Croucher, *Keeping the dead close: grief and bereavement in the treatment of skulls from the Neolithic Middle East.* Mortality **23** (2018), 103–120.

Theories of Continuing Bonds, and more recently, the Dual Process of Grieving, have provided new ways of understanding the bereavement process, and have

inluenced current practice for counsellors, end-of-life care practitioners and other professionals. This paper uses these theories in a new way, exploring their relevance to archaeological interpretation, with particular reference to the phenomenon of the plastering of skulls of the deceased in the Neolithic of Southwest Asia (the Middle East/Near East), suggesting that traditional archaeological interpretations, which focus on concepts of status and social organisation, may be missing a more basic reaction to grief and a desire to keep the dead close for longer.

Keywords: Bereavement | grief and mourning | mortuary archaeology | plastered skulls | Neolithic | age and circumstance of death | continuing bonds | dual process model of grieving | artiicial cranial modiication | ancient Near East

Vaas 2009

Rüdiger Vaas & Michael Blume, *Gott, Gene und Gehirn, Warum Glaube nützt – die Evolution der Religiosität.* (Stuttgart ^{3}2012).