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References

Afrika

Huffman 2022

Thomas N. Huffman & Mike Main, *Zimbabwe Ruins in Botswana, Settlement Hierarchies, Political Boundaries and Symbolic Statements*. Cambridge Archaeological Journal **32** (2022), 361–388.

At its peak in the sixteenth century, the Zimbabwe Culture encompassed an area the size of France. The greater Tuli area in east-central Botswana formed the western extent of this culture area. Here many dzimbahwe mark the residences of sacred leaders in the later Khami period (1400–1840 AD). These stone-walled headquarters formed a pyramid of political importance, with district chiefs (Level 4) and petty chiefs (Level 3) at the top and headmen (Level 2) and commoners (Level 1) at the base. Commoners and their headmen lived near arable land, while petty chiefs placed their administrative centres at the boundaries of their small chiefdoms. In death, sacred leaders rested in dzimbahwe on special hills, while ordinary villagers were buried in their homesteads. During the Khami period in Botswana, these various settlements were part of only one Level 4 district: Level 5 and Level 6 capitals were located elsewhere. After the collapse of the powerful Torwa state at Khami, decorative symbols changed from emphasizing the majesty of kingship (Khami) to the responsibilities of sacred leaders (Zinjanja), and then back again to kingship in the Rozvi state (Danangombe). The powerful Rozvi state did not extend to the Tuli area, probably because it was too dry.

Quintana Morales 2022

Eréndira M. Quintana Morales et al., *Diet, economy, and culinary practices at the height of precolonial Swahili urbanism*. Journal of Anthropological Archaeology **66** (2022), 101406, 1–12.

Swahili cuisine is known across Africa and globally as a highly distinctive product of a cosmopolitan, coastal, urban society. Here we present a comprehensive study of precolonial Swahili diet and culinary practices at the coastal town of Songo Mnara, positioning archaeological and ethnographic understandings of cuisine in a longterm coastal tradition. We explore contemporary food cultures and then present the first direct evidence for precolonial cuisine by combining ceramic lipid residue analysis with archaeobotanical, zooarchaeological, and faunal and human stable isotopic data. Integrating these datasets produces a detailed picture of diet at the site of Songo Mnara during the peak of precolonial Swahili urbanism. Lipid residue analysis demonstrates how plant and animal products were consumed and valued in ways not discernible from plant and animal remains alone. We also note special treatment for particular foodstuffs, including an association of fish consumption with highstatus spaces and vessels, and preferential management of cattle for milk. A more complex picture of urban life emerges, recognizing influences of taste, class, and culture. Our findings demonstrate the potential of multilayered anthropological studies for exploring cuisine and urban life in coastal contexts across the globe.

Keywords: Lipid residue analysis | Stable isotope analysis | Eastern Africa | Cuisine | Zooarchaeology | Archaeobotany

Eréndira M. Quintana Morales, Oliver E. Craig, Mary E. Prendergast, Sarah Walshaw, Christina Cartaciano, Ogeto Mwebi, Esther Nguta, Veronicah Onduso, Jeffrey Fleisher & Stephanie Wynne-Jones

Aktuell

Aleta 2022

Alberto Aleta et al., *Quantifying the importance and location of SARS-CoV-2 transmission events in large metropolitan areas*. PNAS **119** (2022), e2112182119. DOI:10.1073/pnas.2112182119.

pnas119-e2112182119-Supplement.pdf

Detailed characterization of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) transmission across diferent settings can help design less disruptive interventions. We used real-time, privacy-enhanced mobility data in the New York City, NY and Seattle, WA metropolitan areas to build a detailed agent-based model of SARS-CoV-2 infection to estimate the where, when, and magnitude of transmission events during the pandemic's irst wave. We estimate that only 18 % of individuals produce most infections (80 %), with about 10 % of events that can be considered superspreading events (SSEs). Although mass gatherings present an important risk for SSEs, we estimate that the bulk of transmission occurred in smaller events in settings like workplaces, grocery stores, or food venues. The places most important for transmission change during the pandemic and are diferent across cities, signaling the large underlying behavioral component underneath them. Our modeling complements case studies and epidemiological data and indicates that real-time tracking of transmission events could help evaluate and deine targeted mitigation policies.

Keywords: COVID-19 | mobility | location | superspreading event

Alberto Aleta, David Martín-Corral, Michiel A. Bakker, Ana Pastore y Piontti, Marco Ajelli, Maria Litvinova, Matteo Chinazzi, Natalie E. Dean, M. Elizabeth Halloran, Ira M. Longin, Jr., Alex Pentland, Alessandro Vespignani, Yamir Moreno & Esteban Moro

Significance: The characterization of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) transmission risks across different settings remains unclear, including the roles of individual and setting heterogeneity. We integrate anonymized time-resolved mobility data with census and demographic data in the New York City, NY and Seattle, WA metropolitan areas to characterize the magnitude and heterogeneity of transmission events during the first COVID-19 wave. We simulate COVID-19 epidemic trajectories to study the impact of interventions, the part played by different settings in the infection spreading, and the role of superspreading events. Our Results indicate that places are not dangerous on their own; instead, transmission risk is a combination of both the characteristics of the place/setting and the behavior of individuals who visit it.

Boucau 2022

Julie Boucau et al., *Duration of Shedding of Culturable Virus in SARS-CoV-2 Omicron (BA.1) Infection*. New England Journal of Medicine (2022), preprint, 1–3. DOI:10.1056/NEJMc2202092.

Bova 2022

Samantha Bova, Yair Rosenthal, Zhengyu Liu, Mi Yan, Anthony J. Broccoli, Shital P. Godad, Cheng Zeng & Weipeng Zheng, *Concerns*

of assuming linearity in the reconstruction of thermal maxima, *Reply.* nature **607** (2022), e15–e18.

We show that a simple linear response of SST to local insolation produces SST estimates consistent with climate models that include feedbacks and nonlinear dependencies, thereby resolving the Holocene temperature conundrum. Furthermore, seasonal biases detected using SAT can resolve the second conundrum, that is, proxy–proxy discrepancies. In our opinion, these results provide strong support for the hypothesis that local insolation is dominant, at least over much of the low to mid-latitudes and for the seasonal response. Nonetheless, we emphasize again that this method will only perform well in places where the underlying assumptions discussed above are met.

Laepple 2022

T. Laepple, J. Shakun, F. He & S. Marcott, *Concerns of assuming linearity in the reconstruction of thermal maxima*, *Arising from S. Bova et al. Nature http://doi.org/10.1038/s41586-020-03155-x (2021).* nature **607** (2022), e12–e14.

The SAT method spuriously assigns the trend to some seasonal insolation ('overfits') and largely removes the trend, always resulting in a flat LIG temperature curve regardless of the 'true' annual mean climate (Fig. 2). Owing to the similarity of the insolation in the LIG and Holocene, the spurious removal of thermal maxima also extends to the Holocene time period. The lack of thermal maxima during the LIG and Holocene suggested by Bova et al. is therefore probably an artefact of the SAT method itself.

Leech 2022

Gavin Leech et al., *Mask wearing in community settings reduces SARS-CoV-2 transmission.* PNAS **119** (2022), e2119266119. DOI:10.1073/pnas.2119266119.

pnas119-e2119266119-Supplement.pdf

The efectiveness of mask wearing at controlling severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) transmission has been unclear. While masks are known to substantially reduce disease transmission in healthcare settings [D. K. Chu et al., Lancet 395, 1973–1987 (2020); J. Howard et al., Proc. Natl. Acad. Sci. U.S.A. 118, –2014564118 (2021); Y. Cheng et al., Science eabg6296 (2021)], studies in community settings report inconsistent results [H. M. Ollila et al., medRxiv (2020); J. Brainard et al., Eurosurveillance 25, 2000725 (2020); T. Jeferson et al., Cochrane Database Syst. Rev. 11, CD006207 (2020)]. Most such studies focus on how masks impact transmission, by analyzing how efective government mask mandates are. However, we ind that widespread voluntary mask wearing, and other data limitations, make mandate efectiveness a poor proxy for mask-wearing efectiveness. We directly analyze the efect of mask wearing on SARS-CoV-2 transmission, drawing on several datasets covering 92 regions on six continents, including the largest survey of wearing behavior (n = 20 million) [F. Kreuter et al., http://gisumd.github.io/COVID-19-API-Documentation (2020)]. Using a Bayesian hierarchical model, we estimate the efect of mask wearing on transmission, by linking reported wearing levels to reported cases in each region, while adjusting for mobility and nonpharmaceutical interventions (NPIs), such as bans on large gatherings. Our estimates imply that the mean observed level of mask wearing corresponds to a 19 % decrease in the reproduction number R. We also assess the robustness of our results in 60 tests spanning 20 sensitivity analyses. In light of these Results, policy makers can efectively reduce transmission by intervening to increasemask wearing.

Keywords: COVID-19 | epidemiology | Bayesian modeling | hierarchical modeling | face masks

Gavin Leech, Charlie Rogers-Smith, Joshua Teperowski Monrad, Jonas B. Sandbrink, Benedict Snodin, Robert Zinkov, Benjamin Rader, John S. Brownstein, Yarin Gal, Samir Bhatt, Mrinank Sharma, Sören Mindermann, Jan M. Brauner & Laurence Aitchison

Significance: We resolve conflicting results regarding mask wearing against COVID-19. Most previous work focused on mask mandates; we study the effect of mask wearing directly. We find that population mask wearing notably reduced SARS-CoV-2 transmission (mean mask-wearing levels corresponding to a 19 % decrease in R). We use the largest wearing survey (n = 20 million) and obtain our estimates from regions across six continents. We account for nonpharmaceutical interventions and time spent in public, and quantify our uncertainty. Factors additional to mask mandates influenced the worldwide early uptake of mask wearing. Our analysis goes further than past work in the quality of wearing data–100 times the size with random sampling–geographical Scope, a semimechanistic infection model, and the validation of our results.

Löndahl 2022

Jakob Löndahl & Malin Alsved, *Abrupt decreases in infectivity of SARS-CoV-2 in aerosols*. PNAS **119** (2022), e2208742119. DOI:10.1073/pnas.2208742119.

Oswin 2022

Henry P. Oswin et al., *The dynamics of SARS-CoV-2 infectivity with changes in aerosol microenvironment*. PNAS **119** (2022), e2200109119. DOI:10.1073/pnas.2200109119.

pnas119-e2200109119-Supplement.pdf

Understanding the factors that influence the airborne survival of viruses such as severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) in aerosols is important for identifying routes of transmission and the value of various mitigation strategies for preventing transmission. We present measurements of the stability of SARS-CoV-2 in aerosol droplets (≈5 to 10 um equilibrated radius) over timescales spanning 5 s to 20 min using an instrument to probe survival in a small population of droplets (typically 5 to 10) containing ≈1 virus/droplet. Measurements of airborne infectivity change are coupled with a detailed physicochemical analysis of the airborne droplets containing the virus. A decrease in infectivity to ≈10 % of the starting value was observable for SARS-CoV-2 over 20 min, with a large proportion of the loss occurring within the first 5 min after aerosolization. The initial rate of infectivity loss was found to correlate with physical transformation of the equilibrating droplet; salts within the droplets crystallize at relative humidities (RHs) below 50 %, leading to a near-instant loss of infectivity in 50 to 60 % of the virus. However, at 90 % RH, the droplet remains homogenous and aqueous, and the viral stability is sustained for the first 2 min, beyond which it decays to only 10 % remaining infectious after 10 min. The loss of infectivity at high RH is consistent with an elevation in the pH of the droplets, caused by volatilization of CO2 from bicarbonate buffer within the droplet. Four different variants of SARS-CoV-2 were compared and found to have a similar degree of airborne stability at both high and low RH.

Keywords: aerosol | SARS-CoV-2 | airborne transmission | microphysics | environmental conditions

Henry P. Oswin, Allen E. Haddrell, Mara Otero-Fernandez, Jamie F. S. Mann, Tristan A. Cogan, Thomas G. Hilditch, Jianghan Tian, Daniel A. Hardy, Darryl J. Hill, Adam Finn, Andrew D. Davidson & Jonathan P. Reid

Significance: The aerosol microenvironment is dynamic, exposing pathogens, such as severe acute respiratory syndrome coronavirus 2 virus, when exhaled in respiratory aerosol to extreme conditions of solute concentration, pH, and evaporative cooling. Yet surviving this environment is a key step in the transmission of such pathogens. Understanding the impact that airborne transport has on pathogens and the influence of environmental conditions on pathogen survival can inform the implementation of strategies to mitigate the spread of diseases such as coronavirus disease 2019. We report changes in the infectivity of the airborne virus over timescales from 5 s to 20 min and demonstrate the role of two microphysical processes in this infectivity loss, namely, particle crystallization and aerosol droplet pH change.

Altpaläolithikum

Stepka 2022

Zane Stepka, Ido Azuri, Liora Kolska Horwitz, Michael Chazan & Filipe Natalio, *Hidden signatures of early fire at Evron Quarry (1.0 to 0.8 Mya)*. PNAS **119** (2022), e2123439119.

pnas119-e2123439119-Supplement.pdf

Pyrotechnology is a key element of hominin evolution. The identification of fire in early hominin sites relies primarily on an initial visual assessment of artifacts' physical alterations, resulting in potential underestimation of the prevalence of fire in the archaeological record. Here, we used a suite of spectroscopic techniques to counter the absence of visual signatures for fire and demonstrate the presence of burnt fauna and lithics at the Lower Paleolithic (LP) open-air site of Evron Quarry (Israel), dated between 1.0 and 0.8 Mya and roughly contemporaneous to Gesher Benot Ya'aqov where early pyrotechnology has been documented. We propose reexamining finds from other LP sites lacking visual clues of pyrotechnology to yield a renewed perspective on the origin, evolution, and spatiotemporal dispersal of the relationship between early hominin behavior and fire use.

Keywords: Lower Paleolithic | pyrotechnology | spectroscopy | spatiotemporal patterns

Significance: This study reveals the presence of fire in a Lower Paleolithic (LP) site lacking visible signs of pyrotechnology and adds a new LP site to a handful of archaeological sites with evidence associating early hominin–produced artifacts and fire. This research Highlights the possibility of extracting "hidden" information on pyrotechnologyrelated activities from other sites.

Anthropologie

Bobe 2022

René Bobe & Bernard Wood, *Estimating origination times from the early hominin fossil record*. Evolutionary Anthropology **31** (2022), 92–102.

The age of the earliest recovered fossil evidence of a hominin taxon is all too often equated with that taxon's origination. However, the earliest known fossil record nearly always postdates, sometimes by a substantial period of time, the true origination of a taxon. Here we evaluate the first appearance records of the

earliest potential hominins (Sahelanthropus, Ardipithecus, Orrorin), as well as of the genera Australopithecus, Homo, and Paranthropus, to illustrate the considerable uncertainty regarding the actual timing of origin of these taxa. By placing confidence intervals on the first appearance records of early hominin taxa, we can better evaluate patterns of hominin diversity, turnover, and potential correlations with climatic and environmental changes.

Keywords: Australopithecus | first appearance data | hominin origins | Homo | Paranthropus

Davison 2022

Raziel Davison & Michael Gurven, *The importance of elders, Extending Hamilton's force of selection to include intergenerational transfers.* PNAS **119** (2022), e2200073119.

pnas119-e2200073119-Supplement.pdf

In classical evolutionary models, the force of natural selection diminishes with age toward zero by last reproduction. However, intergenerational resource transfers and other late-life contributions in social species may select for postreproductive longevity. We present a formal framework for estimating indirect fitness contributions via production transfers in a skills-intensive foraging niche, reflecting kinship and cooperation among group members. Among contemporary human hunter-gatherers and horticulturalists, indirect fitness contributions from transfers exceed direct reproductive contributions from before menopause until ages when surpluses end, around the modal age of adult death (≈70 y). Under reasonable assumptions, these benefits are the equivalent to having up to several more offspring after age 50. Despite early independence, minimal production surplus, and a shorter lifespan, chimpanzees could theoretically make indirect contributions if they adopted reliable food-sharing practices. Our results for chimpanzees hypothetically adopting hunter-gatherer subsistence suggest that a skillsintensive foraging ecology with late independence and late peak production could select for human-like life histories via positive feedback between longevity and late-life transfers. In contrast, life history changes preceding subsistence shifts would not favor further life extension or subsistence shifts. Our results formalize the theory that longevity can be favored under socioecological conditions characterized by parental and alloparental care funded through transfers of mid- to late-life production surpluses. We also extend our analysis beyond food transfers to illustrate the potential for indirect fitness contributions from pedagogy, or information transfers. While we focus mostly on humans, our approach is adaptable to any context or species where transfers can affect fitness.

Keywords: human evolution | force of selection | intergenerational transfers | life history theory | postreproductive lifespan

Significance: Prominent explanations for postreproductive longevity emphasize the myriad ways in which older adults help descendants in social species. However, standardmetrics expressing how natural selection acts with age show declines in tandem with reproduction, rendering postreproductive life vulnerable to harmful mutations. Here, we develop a framework for estimating three fitness metrics to characterize the "force of selection" in social species with pooled energy budgets. We show that intergenerational transfers of food and information in the complex, high-skill foraging niche typical of hunter-gatherers can select for longer lifespan via inclusive fitness benefits. Our ndings support the theory that postreproductive life in some mammals coevolved with multigenerational cooperation in a complex foraging niche and help explain selection against lateacting deleterious alleles.

Lobo 2022
José Lobo, Todd Whitelaw, Luís M. A. Bettencourt, Polly Wiessner, Michael E. Smith & Scott Ortman, *Scaling of Hunter-Gatherer Camp Size and Human Sociality*. Current Anthropology **63** (2022), 68–94.
One of the most common tendencies of human settlements is for larger settlements to display higher population densities. Work in urban science and archaeology suggests that this densification pattern reflects an emergent spatial equilibrium where individuals balance movement costs with social interaction benefits, leading to increases in aggregate productivity and social interdependence. The temporary camps created by hunters and gatherers exhibit a tendency to become less dense with their population size. The different manner in which hunter-gatherer groups express their sociality in residential space suggests that they typically lack the social structures and material technologies necessary for humans to live at greater spatial densities in permanent settlements. Here we examine why this difference occurs and consider conditions under which hunter-gatherer groups may transition to sedentism and densification. We investigate the relationship between population and area in hunter-gatherer camps using a data set representing a large cross-cultural sample derived from the ethnographic literature. We present a model based on the interplay between social interactions and scalar stress that describes the observed patterns among mobile hunter-gatherers. We find that the transition to a densification scheme does not necessary involve domestic food production, only surpluses and storable resources.

O'Grady 2022
Cathleen O'Grady, *Ancient Europeans farmed dairy—but couldn't digest milk*. science **377** (2022), 456.
Giant study of ancient pottery and DNA challenges common evolutionary explanation for lactase persistence

Bibel

van Bekkum 2017
Koert van Bekkum, *"How the Mighty Have Fallen", Sola Scriptura and the Historical Debate on David as a Southern Levantine Warlord*. In: Hans Burger, Arnold Huijgen & Eric Peels (Hrsg.), *Sola Scriptura, Biblical and Theological Perspectives on Scripture, Authority, and Hermeneutics*. Studies in Reformed Theology 32 (Leiden 2017), 159–183.
The recent debates regarding David as a warlord clearly resulted in a significant increase of the knowledge of the social and cultural transformation of the Southern Levant during Iron I and Iron IIA and of the geopolitical landscape in this period. At the same time, however, the range of opinions on the question how the historical figure of David fits into this picture has widened enormously. For Finkelstein, David was just a leader of a band, who manoeuvred between a north Israelite highlands polity and the dominating Philistine kingdom in the southern Shephelah. At the other side of the spectrum, Galil exploits the new available data in order to underline that the idea of a Davidic 'United Monarchy' with allies and vassals among the Philistine, Neo-Hittite and early Aramean rulers is still most likely. In between these two extremes, many other scenarios are available. Accordingly, it has become common to believe that David was indeed the founder of a dynasty in Jerusalem. Most scholars, however, are also hesitant to draw a concrete historical

picture, because they consider it being hard to do more than to mention only a few historical elements that should be used in a re-enactment of David's life, such as the fact that he was a mercenary and warlord expanding his power and territory through marriages and kinship networks.

Joosten 2022

Jan Joosten, *The Blood of the Eucharist*. unknown (2022), preprint, 1–14. .

The saying on the cup in Matt 26,27-28 par. conflicts with the prohibition on consuming blood which underlies much Jewish dietary law. Although symbolic, Jesus' words, "Drink from it, for this is my blood," would presumably have shocked a Jewish audience to the core. The saying can nevertheless be understood against the backdrop of its scriptural intertexts. More relevant than Exod 24,8, where Moses sprinkles the blood of the covenant on the Israelites, is Gen 9,4, the original prohibition on the consumption of blood imposed on Noah and his descendants after the flood. Significantly, this injunction is paired with a widereaching innovation, namely the permission to eat meat. The full significance of these provisions comes to light in the framework of the covenant of Sinai. The prohibition on blood and the permission to eat animal meat are at the heart of the Israelite "peace-offering", the table communion between Israel and their God. The meat is shared, the blood is for God only.

This elaborate ritual scheme, developed from Gen 1 to Lev 17, gives meaning to the saying on the cup. The invitation to "drink from it, for this is my blood," signals another momentous innovation: the last frontier between God and human beings is lifted. Drinking the blood is a metaphor of full communion with the deity.

Biologie

de Chiara 2022

Matteo de Chiara, Benjamin P. Barré, Jonas Warringer & Gianni Liti et al., *Domestication reprogrammed the budding yeast life cycle*. Nature Ecology & Evolution **6** (2022), 448–460.

NatEcoEvo06-0448-Supplement.pdf

Domestication of plants and animals is the foundation for feeding the world human population but can profoundly alter the biology of the domesticated species. Here we investigated the effect of domestication on one of our prime model organisms, the yeast Saccharomyces cerevisiae, at a species-wide level. We tracked the capacity for sexual and asexual reproduction and the chronological life span across a global collection of 1,011 genome-sequenced yeast isolates and found a remarkable dichotomy between domesticated and wild strains. Domestication had systematically enhanced fermentative and reduced respiratory asexual growth, altered the tolerance to many stresses and abolished or impaired the sexual life cycle. The chronological life span remained largely unaffected by domestication and was instead dictated by clade-specific evolution. We traced the genetic origins of the yeast domestication syndrome using genome-wide association analysis and genetic engineering and disclosed causative effects of aneuploidy, gene presence/absence variations, copy number variations and single-nucleotide polymorphisms. Overall, we propose domestication to be the most dramatic event in budding yeast evolution, raising questions about how much domestication has distorted our understanding of the natural biology of this key model species.

Matteo De Chiara, Benjamin P. Barré, Karl Persson, Agurtzane Irizar, Chiara Vischioni, Sakshi Khaiwal, Simon Stenberg, Onyetugo Chioma Amadi, Gašper Äun, Katja Doberšek, Cristian Taccioli, Joseph Schacherer, Uroš Petroviè, Jonas Warringer & Gianni Liti

Gibbons 2022

Ann Gibbons, *Ancient DNA reveals Black Death source*. science **376** (2022), 1254–1255.

Graves in Kyrgyzstan hold early victims of plague that swept medieval Europe.

Levy 2022

Stephanie B. Levy & William R. Leonard, *The evolutionary significance of human brown adipose tissue, Integrating the timescales of adaptation*. Evolutionary Anthropology **31** (2022), 75–91.

While human adaptability is regarded as a classical topic in anthropology, recent work provides new insight into metabolic adaptations to cold climates and the role of phenotypic plasticity in human evolution. A growing body of literature demonstrates that adults retain brown adipose tissue (BAT) which may play a role in non-shivering thermogenesis. In this narrative review, we apply the timescales of adaptation framework in order to explore the adaptive significance of human BAT. Human variation in BAT is shaped by multiple adaptive modes (i.e., allostasis, acclimatization, developmental adaptation, epigenetic inheritance, and genetic adaptation), and together the adaptive modes act as an integrated system. We hypothesize that plasticity in BAT facilitated the successful expansion of human populations into circumpolar regions, allowing for selection of genetic adaptations to cold climates to take place. Future research rooted in human energetics and biocultural perspectives is essential for understanding BAT's adaptive and health significance.

Keywords: circumpolar | cold stress | development | human energetics | metabolism | phenotypic plasticity

Pennisi 2022

Elizabeth Pennisi, *Foodmaking microbes bear marks of domestication*. science **377** (2022), 16.

Bacteria and fungi behind cheese, soy, and more share genomic traits with domesticated plants and animals.

Spyrou 2022

Maria A. Spyrou & Philip Slavin et al., *The source of the Black Death in fourteenth-century central Eurasia*. nature **606** (2022), 718–724.

n606-0718-Supplement.pdf

The origin of the medieval Black Death pandemic (ad 1346–1353) has been a topic of continuous investigation because of the pandemic's extensive demographic impact and long-lasting consequences1,2. Until now, the most debated archaeological evidence potentially associated with the pandemic's initiation derives from cemeteries located near Lake Issyk-Kul of modern-day Kyrgyzstan1,3–9. These sites are thought to have housed victims of a fourteenth-century epidemic as tombstone inscriptions directly dated to 1338–1339 state 'pestilence' as the cause of death for the buried individuals9. Here we report ancient DNA data from seven individuals exhumed from two of these cemeteries, Kara-Djigach and Burana. Our synthesis of archaeological, historical and ancient genomic data shows a clear involvement of the plague bacterium Yersinia pestis in this epidemic event. Two

reconstructed ancient Y. pestis genomes represent a single strain and are identified as the most recent common ancestor of a major diversification commonly associated with the pandemic's emergence, here dated to the first half of the fourteenth century. Comparisons with present-day diversity from Y. pestis reservoirs in the extended Tian Shan region support a local emergence of the recovered ancient strain. Through multiple lines of evidence, our data support an early fourteenth-century source of the second plague pandemic in central Eurasia.

Maria A. Spyrou, Lyazzat Musralina, Guido A. Gnecchi Ruscone, Arthur Kocher, Pier-Giorgio Borbone, Valeri I. Khartanovich, Alexandra Buzhilova, Leyla Djansugurova, Kirsten I. Bos, Denise Kühnert, Wolfgang Haak, Philip Slavin & Johannes Krause

Datierung

Fujioka 2022

Toshiyuki Fujioka, Alfonso Benito-Calvo, Rafael Mora, Lindsay McHenry, Jackson K. Njau & Ignacio de la Torre, *Direct cosmogenic nuclide isochron burial dating of early Acheulian stone tools at the T69 Complex (FLK West, Olduvai Bed II, Tanzania).* Journal of Human Evolution **165** (2022), 103155, 1–8.

JHumEvo165-a103155-Supplement1.pdf, JHumEvo165-a103155-Supplement2.zip, JHumEvo165-a103155-Supplement3.mp4

This Middle to Upper Bed II stratigraphic interval at Olduvai Gorge is a key period for our understanding of the disappearance of Homo habilis and the emergence of the Acheulian. The late Oldowan is probably last present at Olduvai at MNK Skull (de la Torre et al., 2021), and all published assemblages above Tuff IIB contain handaxes that support their attribution to the Acheulian (de la Torre and Mora, 2020). However, interassemblage variability in postTuff IIB is considerable and while biological and cultural connotations stemming from Leakey's (1971) distinction between the Developed Oldowan B and the Acheulian are now superseded (see review in de la Torre and Mora, 2014), the meaning of such technological variability is yet to be ascertained.

Keywords: Early Stone Age | Early Acheulian | Early Pleistocene | Cosmogenic nuclide dating

Granger 2022

Darryl E. Granger, Dominic Stratford, Laurent Bruxelles, Ryan J. Gibbon, Ronald J. Clarke & Kathleen Kuman, *Cosmogenic nuclide dating of Australopithecus at Sterkfontein, South Africa.* PNAS **119** (2022), e2123516119.

pnas119-e2123516119-Supplement.pdf

Sterkfontein is the most prolific single source of Australopithecus fossils, the vast majority of which were recovered from Member 4, a cave breccia now exposed by erosion and weathering at the landscape surface. A few other Australopithecus fossils, including the StW573 skeleton, come from subterranean deposits [T. C. Partridge et al., Science 300, 607–612 (2003); R. J. Clarke, K. Kuman, J. Hum. Evol. 134, 102634 (2019)]. Here, we report a cosmogenic nuclide isochron burial date of 3.41 ± 0.11 million years (My) within the lower middle part of Member 4, and simple burial dates of 3.49 ± 0.19 My in the upper middle part of Member 4 and 3.61 ± 0.09 My in Jacovec Cavern. Together with a previously published isochron burial date of $3.67 \pm$

0.16 My for StW 573 [D. E. Granger et al., Nature 522, 85–88 (2015)], these results place nearly the entire Australopithecus assemblage at Sterkfontein in the mid-Pliocene, contemporaneous with Australopithecus afarensis in East Africa. Our ages for the fossil-bearing breccia in Member 4 are considerably older than the previous ages of ca. 2.1 to 2.6 My interpreted from flowstones associated with the same deposit. We show that these previously dated flowstones are stratigraphically intrusive within Member 4 and that they therefore underestimate the true age of the fossils.

Keywords: Australopithecus | Sterkfontein | cosmogenic | burial | karst

Significance: Australopithecus fossils from the richest hominin-bearing deposit (Member 4) at Sterkfontein in South Africa are considerably older than previously argued by some and are contemporary with Australopithecus afarensis in East Africa. Our dates demonstrate the limitations of the widely accepted concept that Australopithecus africanus, which is well represented at Sterkfontein, descended from A. afarensis. The contemporaneity of the two species now suggests that a more complex family tree prevailed early in the human evolutionary process. The dates highlight the limitations of faunal age estimates previously relied upon for the South African sites. They further demonstrate the importance of detailed stratigraphic analysis in assessments of accurate dating of the karst cave sites in South Africa, which are stratigraphically highly complex.

Energie

Krall 2022

Lindsay M. Krall, Allison M. Macfarlane & Rodney C. Ewing, *Nuclear waste from small modular reactors*. PNAS **119** (2022), e2111833119.

pnas119-e2111833119-Supplement.pdf

Small modular reactors (SMRs; i.e., nuclear reactors that produce <300 MWelec each) have garnered attention because of claims of inherent safety features and reduced cost. However, remarkably few studies have analyzed the management and disposal of their nuclear waste streams. Here, we compare three distinct SMR designs to an 1,100-MWelec pressurized water reactor in terms of the energy-equivalent volume, (radio-)chemistry, decay heat, and fissile isotope composition of (notional) high-, intermediate-, and lowlevel waste streams. Results reveal that water-, molten salt–, and sodium-cooled SMR designs will increase the volume of nuclear waste in need of management and disposal by factors of 2 to 30. The excess waste volume is attributed to the use of neutron reflectors and/or of chemically reactive fuels and coolants in SMR designs. That said, volume is not the most important evaluation metric; rather, geologic repository performance is driven by the decay heat power and the (radio-)chemistry of spent nuclear fuel, for which SMRs provide no benefit. SMRs will not reduce the generation of geochemically mobile 129I, 99Tc, and 79Se fission products, which are important dose contributors for most repository designs. In addition, SMR spent fuel will contain relatively high concentrations of fissile nuclides, which will demand novel approaches to evaluating criticality during storage and disposal. Since waste stream properties are influenced by neutron leakage, a basic physical process that is enhanced in small reactor cores, SMRs will exacerbate the challenges of nuclear waste management and disposal.

Keywords: nuclear | small modular reactors | energy | waste | nuclear waste

Significance: Small modular reactors (SMRs), proposed as the future of nuclear energy, have purported cost and safety advantages over existing gigawatt-scale light water reactors (LWRs). However, few studies have assessed the implications of SMRs for the back end of the nuclear fuel cycle. The low-, intermediate-, and

high-level waste stream characterization presented here reveals that SMRs will produce more voluminous and chemically/ physically reactive waste than LWRs, which will impact options for themanagement and disposal of this waste. Although the analysis focuses on only three of dozens of proposed SMR designs, the intrinsically higher neutron leakage associated with SMRs suggests that most designs are inferior to LWRs with respect to the generation, management, and final disposal of key radionuclides in nuclear waste.

Grabung

Gleirscher 2021

Paul Gleirscher, *Die Himmelsscheibe von Nebra, Zum Stand der Deutung und Datierung eines schillernden Ritualgeräts.* Archäologische Informationen **44** (2021), 187–204.

The aim of this article is to present the discussion on the symbolism and chronology of the Nebra Sky Disk. It was found in 1999 by two looters on the Mittelberg near Nebra. Thus, the indications remain questionable. There is also no proof, that the disk has been part of a deposition of several objects. The image of the disk is a pictogram or cypher, but never an astronomical measuring instrument or contained a complex calendar. The Nebra Sky Disk originally shows the night sky with the moon in two different forms and some stars, amongst them the Pleiades, symbols of sowing and harvest (phase I). The two lateral golden arcs added in a further step (phase II or III) are interpreted as markers of the northern and southern tropics of the moon and not of the sun. The so-called sun-boat is interpreted as the blade of a 'big button sickle'. Thus, the symbolism of moon and sowing/harvest was strengthened. If so, this gives an indication for dating phase II or III of the Nebra Sky Disk to the Late Bronze Age. The two further manipulations don't concern the symbolism of the disk. First it was perforated with no bearing on the image (phase IV). With the ritual deposition one of the two 'horizon arcs' finally was removed or got lost (phase V). The Nebra Sky Diks may have been in use until the (Early) Iron Age.

Keywords: archaeology | sky disk | Nebra | sequence of the illustration | question of symbolism | question of dating | Bronze Age | Iron Age.

Der Beitrag widmet sich der Diskussion um die Deutung und Datierung der Himmelsscheibe von Nebra. Sie wurde 1999 am Mittelberg bei Nebra von Raubgräbern gefunden, so dass eine Reihe von Fragen offenbleibt. Ein mehrteiliger Hortfund ist nicht abzusichern. Beim Bild der Himmelsscheibe handelt es sich um ein Piktogramm bzw. eine Chiffre, keinesfalls um ein astronomisches Messinstrument oder einen komplexen Kalender. Die Himmelsscheibe von Nebra zeigt zunächst (Phase I) einen Nachthimmel mit Vollund Sichelmond und Sternen, darunter den Plejaden, gängige Symbole für Aussaat und Ernte. In zwei chronologisch austauschbaren Schritten (Phasen II und III) wurden nacheinander drei "Bögen" ergänzt, von denen die beiden seitlichen hier als Marker für den Lauf des Mondes und nicht der Sonne, jener am unteren Bildrand als Blatt einer "Großen Knopfsichel" und nicht als Sonnenbarke interpretiert werden. Dadurch wurde die Mond- bzw. Erntesymbolik verstärkt. Trifft das zu, ergibt sich daraus ein Datierungsansatz für Phase II oder III in die Spätbronzezeit. Die beiden weiteren Umarbeitungen betreffen nicht mehr die Symbolik der Scheibe. Sie wurde zunächst ohne Rücksicht auf das Bild rundum gelocht (Phase IV). Schließlich wurde im Zuge der rituellen Deponierung ein Bogenelement entfernt oder ging verloren (Phase V). Die Himmelsscheibe von Nebra kann bis in die (frühe) Eisenzeit in Gebrauch gewesen sein.

Keywords: Archäologie | Himmelsscheibe | Nebra | Bildabfolge | Deutungsfragen | Datierungsfragen | Bronzezeit | Eisenzeit.

Susnow 2022

Matthew Susnow, *Religious Innovation and Elite Ideology at Bronze Age Hazor*. Oxford Journal of Archaeology **41** (2022), 152–171.

Hazor was the largest Bronze Age site in the southern Levant, established as an urban centre with many temples. This study explores how Hazor's elites used religion as an ideological tool to promote their legitimacy, to reinforce social hierarchy, and to maintain control over the populace. Accordingly, a methodology employing the spatial analysis of temple assemblages will be used to show that the use patterns of many of Hazor's temples diverge from other contemporary temples in the region. These anomalies, it is argued, resulted from Hazor's elites actively controlling and manipulating the performance of ritual throughout the site. Hazor's elites also made use of highly recognizable forms of cultic space so as to engage the non-elite sectors of society while altering the manner in which those spaces were used and who had access to them. This religious innovation at Hazor was directly related to an elite ideology that strived to maintain control over non-elites, while also aiming to integrate the various socially stratified groups into a community joined together in a sacred landscape.

Judentum

Hellinger 2022

Moshe Hellinger, *The Criticism of Democracy in R. Shach's Teaching*. unknown (2022), preprint, 1–31. .

In Rabbi Shach's world, democracy is viewed as one of the worst diseases of the 20th century. He objects to democracy mainly insofar as the character of the state of Israel and of Israeli society is concerned. His apprehension that Israel would become a liberal democratic state, detached from its Jewish roots, makes him treat democracy as a dangerous adversary. Its rule of law and its values defy the Torah and Halakhah, by which a Jewish state must be governed. Furthermore, its major values are deplorable. Equality is a false value, as demonstrated by the Communist revolution. Democratic freedom leads to licentiousness and to the destruction of the Jewish people. Even the more technical and procedural aspect of democracy, namely the principle of the majority decision in free elections and in parliamentary and cabinet decisionmaking, serves as an instrument of manipulation, bribery, and intrigues and leads to political decision- making that is immoral and harmful.

In contradistinction to democracy, R. Shach postulates the eternal Torah with its high spiritual and moral values. Only the Torah promotes the full moral and spiritual development of human personality. As a Chosen People living in the light of Torah values, the Jewish people can offer an alternative to the shallowness that is inherent in democratic regimes.

Klima

Fleitmann 2022

Dominik Fleitmann, John Haldon & Raymond S. Bradley et al., *Droughts and societal change, The environmental context for the emergence of Islam in late Antique Arabia*. science **376** (2022), 1317–1321.

s376-1317-Supplement.pdf

In Arabia, the first half of the sixth century CE was marked by the demise of Himyar, the dominant power in Arabia until 525 CE. Important social and political changes followed, which promoted the disintegration of the major Arabian polities. Here, we present hydroclimate records from around Southern Arabia, including a new high-resolution stalagmite record from northern Oman. These records clearly indicate unprecedented droughts during the sixth century CE, with the most severe aridity persisting between ≈500 and 530 CE. We suggest that such droughts undermined the resilience of Himyar and thereby contributed to the societal changes from which Islam emerged.

Dominik Fleitmann, John Haldon, Raymond S. Bradley, Stephen J. Burns, Hai Cheng, R. Lawrence Edwards, Christoph C. Raible, Matthew Jacobson & Albert Matter

Kultur

Mackay 2022

Alex Mackay et al., *Environmental influences on human innovation and behavioural diversity in southern Africa 92–80 thousand years ago.* Nature Ecology & Evolution **6** (2022), 361–369.

NatEcoEvo06-0361-Supplement1.pdf, NatEcoEvo06-0361-Supplement2.xlsx

Africa's Middle Stone Age preserves sporadic evidence for novel behaviours among early modern humans, prompting a range of questions about the influence of social and environmental factors on patterns of human behavioural evolution. Here we document a suite of novel adaptations dating approximately 92–80 thousand years before the present at the archaeological site Varsche Rivier 003 (VR003), located in southern Africa's arid Succulent Karoo biome. Distinctive innovations include the production of ostrich eggshell artefacts, long-distance transportation of marine molluscs and systematic use of heat shatter in stone tool production, none of which occur in coeval assemblages at sites in more humid, well-studied regions immediately to the south. The appearance of these novelties at VR003 corresponds with a period of reduced regional wind strength and enhanced summer rainfall, and all of them disappear with increasing winter rainfall dominance after 80 thousand years before the present, following which a pattern of technological similarity emerges at sites throughout the broader region. The results indicate complex and environmentally contingent processes of innovation and cultural transmission in southern Africa during the Middle Stone Age.

Alex Mackay, Simon J. Armitage, Elizabeth M. Niespolo, Warren D. Sharp, Mareike C. Stahlschmidt, Alexander F. Blackwood, Kelsey C. Boyd, Brian M. Chase, Susan E. Lagle, Chester F. Kaplan, Marika A. Low, Naomi L. Martisius, Patricia J. McNeill, Ian Moffat, Corey A. O'Driscoll, Rachel Rudd, Jayson Orton & Teresa E. Steele

McMahon 2022

Augusta McMahon, *Composite Human-Animal Figures in Early Urban Northern Mesopotamia, Shamans or images of resistance?* Oxford Journal of Archaeology **41** (2022), 230–251.

Urban growth in northern Mesopotamia in the early fourth millennium BC was accompanied by an increase in clay container sealings, reflecting the intensified movement and management of resources and manufactured items. The diverse imagery impressed into these sealings includes a human-ibex grasping a pair of snakes, a bird-human, and other composite figures. The human-ibex in particular has been identified as a 'shaman', but this is not an appropriate term. The early

fourth millennium BC was a period of enormous social and economic upheaval generated by the growth of cities and institutions. Composite figures may have expressed resistance to increasingly structured lived experiences, acknowledging the paradoxes of urban living and affirming the continued presence of the unexplainable.

Kupfer

Berger 2022

Daniel Berger, Gerhard Brügmann, Ronny Friedrich, Joachim Lutz, Hans-Peter Meyer & Ernst Pernicka, *Shiny bronze in glassy matter: an inconspicuous piece of slag from the Bronze Age mining site of Mušiston (Tajikistan) and its significance for the development of tin metallurgy in Central Asia.* Archaeological and Anthropological Sciences **14** (2022), 150, 1–29.

This paper aims at contributing to a better understanding of the beginnings of tin and bronze metallurgy in Central Asia by investigating a hitherto unique piece of a bronze slag. The object was originally discovered as a stray find only 4 km away from the large copper-tin deposit of Mušiston in Tajikistan. It contains many prills of bronze and copper as well as small charcoal particles. Radiocarbon dating of the charcoal places the slag in a period between 1900 and 1400 BCE and thus in the Late Bronze Age of the region. This date coincides with radiocarbon dates of relics from underground galleries of the Mušiston deposit. Chemical and microscopic examination demonstrated the slag to be a relic of a co-smelting process, in which a natural assemblage of tin and copper minerals was smelted simultaneously. Both the chemical and the tin and copper isotope compositions clearly link the slag to the nearby polymetallic ores from Mušiston, of which an extensive dataset is presented. The artefact's lead isotope ratios and increased iron concentration in turn indicate intentional fluxing of the original ore charge with iron-dominated ores. These results are the first tangible evidence of a smelting process of tin ores in the entire region and therefore add a new dimension to the findings from previous mining archaeological investigations. At the same time, the results give significant information about the smelting process of secondary polymetallic ores from Mušiston and help in assessing the scientific data of Bronze Age bronze artefacts from Central Asia.

Keywords: Smelting slag | Co-smelting | Late Bronze Age | Central Asia | Mušiston | Tin and copper ores | Isotopic analysis | Process reconstruction | Bronze production

Metallzeiten

Ashkenazi 2022

Hai Ashkenazi & Danny Rosenberg, *Resistance and Authority at the Beginning of Urbanism, The case of Tel Bet Yerah broken maceheads.* Oxford Journal of Archaeology **41** (2022), 136–151.

A large number of broken limestone maceheads found at Early Bronze Tel Bet Yerah appears to be the result of intentional curation and fragmentation. Our analysis suggests that Early Bronze maceheads could function as weapons, but their efficiency and dependability were limited. Based on their properties, provenance,

breakage pattern, and dating, we suggest that the maceheads symbolized the distribution of power in the community and resistance to centralized authority during Early Bronze II. Their accumulation and fragmentation would then represent a reversal of heterarchical tendencies and possibly an attempt to assert centralized power at the beginning of Early Bronze III.

Methoden

de Cupere 2000

Bea de Cupere, An Lentacker, Wim van Neer, Marc Waelkens & Laurent Verslype, *Osteological Evidence for the Draught Exploitation of Cattle, First Applications of a New Methodology*. International Journal of Osteoarchaeology **10** (2000), 254–267.

Although the aetiology of bone pathologies in cattle is poorly documented, various deformations in the skeleton have been attributed to draught exploitation in the archaeozoological literature. This paper summarizes the results of an osteological study that was undertaken on the feet of modern draught oxen. This led to the definition of a series of draught-related anomalies. In an attempt to describe the pathologies in a more consistent and quantitative way, a scoring scale for each individual bone pathology was established. The developed method is applied to cattle remains from four Roman and one late medieval site. The distribution of the observed pathological indices (PIs) on the first phalanges is interpreted in terms of the age structure of the cattle populations, and the possible modes of cattle exploitation and meat consumption in various settlement types.

Keywords: palaeopathology | archaeozoology | cattle | traction | Roman

Kamjan 2022

Safoora Kamjan, Pınar Erdil, Esmee Hummel, Çiler Çilingiroğlu & Canan Çakırlar, *Traction in Neolithic Catalhöyük? Palaeopathological analysis of cattle and aurochs remains from the East and West Mounds*. Journal of Anthropological Archaeology **66** (2022), 101412, 1–13.

Cattle traction was a technological innovation that made a significant impact on production, individual and household wealth, and social organisation. Despite ongoing debates regarding the origins and extent of the harnessing of cattle power among early agropastoral societies, only a few studies have attempted at addressing this matter systematically. In Neolithic Çatalh|yük, several studies have explored the symbolism and domestication of aurochs and cattle, while the systematic investigation of Bos skeletal remains regarding the presence of cattle traction has been missing. This study focuses on Neolithic Çatalh|yük in Central Anatolia, renowned for its cattle symbolism, to explore the possibility of cattle traction in the 7th and 6th millennium BCE. We studied the palaeopathological traces on the lower limbs of Bos from Çatalh|yük East (Early, Middle, and Late) and West Mounds. Our results suggest that arthropathies are present on the Bos lower limbs (particularly anterior elements) in all phases of Neolithic Çatalh|yük. Pathological and sub-pathological changes are on average more severe among the small cattle of Çatalh|yük West than in the preceding periods at Çatalh|yük East, a result affected by a few rather deformed specimens in Çatalh|yük West. We did not observe any clear correlation between cattle survivorship, size, and pathology severity. Although an unequivocal association between pathologies and traction in prehistoric cattle remains challenging, we discuss plausible explanations for the

changing nature and intensity of cattle pathologies at Çatalh|yük throughout time. Furthermore, we discuss the implications of possible draught use of cattle for the socioeconomic shifts Çatalh|yük experienced in the 6th millennium BC.

Keywords: Domestic cattle | Catalhöyük | Secondary Products Revolution | Traction | Palaeopathology | Zooarchaeology

Mittelpaläolithikum

Hussain 2022

Shumon T. Hussain, Marcel Weiss & Trine Kellberg Nielsen, *Being-with other predators, Cultural negotiations of Neanderthal-carnivore relationships in Late Pleistocene Europe*. Journal of Anthropological Archaeology **66** (2022), 101409, 1–37.

Late Pleistocene hominins co-evolved with non-analogue assemblages of carnivores and carnivorous omnivores. Although previous work has carefully examined the ecological and adaptive significance of living in such carnivore-saturated environments, surprisingly little attention has been paid to the social and cultural consequences of being-with, and adapting to, other charismatic predators and keystone carnivores. Focusing on Neanderthal populations in Western Eurasia, this paper draws together mounting archaeological evidence that suggests that some Late Pleistocene hominins devised specific behavioral strategies to negotiate their place within the vibrant carnivore guilds of their time. We build on integrative multispecies theory and broader reconceptualizations of human-nature relations to argue that otherwise puzzling evidence for purported 'symbolic' behavior among Neanderthals can compellingly be re-synthesized with their ecology, settlement organization and lifeworld phenomenology. This re-framing of Neanderthal lifeways in the larger context of startling carnivore environments reveals that these hominins likely developed intimate, culturally mediated, and hence varied, bonds with raptor, hyena and bear others, rather than merely competing with them for resources, space and survival. This redressing of human-carnivore relations in the Middle Paleolithic yields important challenges for current narratives on evolving multispecies systems in the Late Pleistocene, complicating our understanding of Late Quaternary megafaunal extinctions and the roles of hominins in these processes.

Keywords: Human evolution | Middle Paleolithic | Neanderthals | Human-animal interaction | Multispecies archaeology | Animal studies | Palaeoenviromental humanities | Sympatry

Neolithikum

Antolín 2022

F. Antolín et al., *Neolithic occupations (c. 5200-3400 cal BC) at Isolino Virginia (Lake Varese, Italy) and the onset of the pile-dwelling phenomenon around the Alps*. Journal of Archaeological Science: Reports **42** (2022), 103375, 1–11.

Neolithic pile dwelling sites are known particularly well North of the Alps, with a boom starting from ca. 4300 cal BC. These sites are famous for the excellent preservation conditions of organic material (wooden tools, textiles, fruit remains and foodstuffs have been preserved in many of them), but their origin is still unclear. In Europe, only three reliably-dated settlements of this type are documented in

the Early Neolithic: La Marmotta ca. 5700–5300 cal BC (Lake Bracciano, Italy), Dispilio ca. 5400–3500 cal BC (Lake Orestias, Greece) and La Draga ca. 5300–4900 cal BC (Lake Banyoles, Spain). New interventions within the framework of the AgriChange project have made it possible to expand and improve the knowledge on the dynamics of occupation at Isolino Virginia ca. 5200–3400 cal BC (Lake Varese, Italy), the earliest known pile-dwelling site around the Alps. Our results suggest that this site could have been the spark of the pile-dwelling phenomenon in the area.

Keywords: Radiocarbon dating | Bayesian modelling | Western Europe | Early farmers | Pile-dwelling site

F. Antolín, H. Martínez-Grau, B. L. Steiner, F. Follmann, R. Soteras, S. Häberle, G. Prats, M. Schäfer, M. Mainberger, I. Hajdas & D. G. Banchieri

Physik

Robinson 2018

Andrew Robinson, *Einstein said that — didn't he?* nature **557** (2018), 30.

As the physicist's papers reach volume 15, Andrew Robinson sifts attributed quotes.

Politik

Boyce-Jacino 2022

Christina Boyce-Jacino, Ellen Peters, Alison P. Galvani & Gretchen B. Chapman, *Large numbers cause magnitude neglect, The case of government expenditures.* PNAS **119** (2022), e2203037119.

pnas119-e2203037119-Supplement.pdf

Four studies demonstrate that the public's understanding of government budgetary expenditures is hampered by difficulty in representing large numerical magnitudes. Despite orders of magnitude difference between millions and billions, study participants struggle with the budgetary magnitudes of government programs. When numerical values are rescaled as smaller magnitudes (in the thousands or lower), lay understanding improves, as indicated by greater sensitivity to numerical ratios and more accurate rank ordering of expenses. A robust benefit of numerical rescaling is demonstrated across a variety of experimental designs, including policy relevant choices and incentive-compatible accuracy measures. This improved sensitivity ultimately impacts funding choices and public perception of respective budgets, indicating the importance of numerical cognition for good citizenship.

Keywords: numerical cognition | policy | information presentation | numeracy

Significance: Comprehension of government expenditures requires understanding immense monetary amounts, yet numbers of such magnitude are difficult to understand. Our findings highlight the implications of basic numerical processing for participatory democracy. Basic principles of numerical cognition predict that a simple rescaling manipulation will increase nonexperts' ability to discriminate among different price tags for large government programs, a prediction that was supported in four experiments. By converting large numbers into smaller ones, regardless of their unit familiarity, people are better able to process numerical information and, subsequently, incorporate differences in budgetary magnitudes into their judgments and decisions.

Story or Book

Domínguez-Rodrigo 2022

Manuel Domínguez-Rodrigo, *Savannas, human evolution, and only in Africa*. Evolutionary Anthropology **31** (2022), 103–105.

Only in Africa. By N. Owen-Smith. (2021) Cambridge, UK: Cambridge University Press, ISBN 978-1-108-95966-7. $ 44.99. Paperback.

The book dispels the old idea that hominins emerged at the same time as savannas. These existed a long time before hominins appeared. Most of the Miocene evolution of apes in Africa took place within the context of seasonal forests and woodlands, some of the latter fairly open.

All this converges to show that savanna landscapes started their opening trend long before hominins emerged, during a long period of aridity after 10 Ma that saw the disappearance of Middle Miocene ape diversity in Africa, at the same time that monkeys diversified and adopted specialized diets. The issue now is not so much as whether hominins and savannas initiated their evolution together, since Miocene apes were generalist primates adopted to seasonal mosaic environments, but whether community evolution and inter-taxa competition may have been a stronger drive than climate for the adoption of the adaptive patterns that led to the earliest hominins.

Hofmann 2022

Daniela Hofmann, *Molekularbiologie und Archäologie*. Prähistorische Zeitschrift **97** (2022), 366–369.

Stefanie Samida, 2021, Molekularbiologie und Archäologie. Eine ungewöhnliche Beziehung (Wien, Berlin): Turia+Kant. 18,00 E. 141 pages, 3 figures SW. ISBN 978-3-85132-982-7

The starting point is akin to that of Snow's (1959) "two cultures", which outlines the potential for mutual incomprehension between the natural sciences and humanities.

It is clear where Samida's sympathies lie, and I agree with her that complex social phenomena like migration or kinship do not have easy explanations.

Robinson 2022

Andrew Robinson, *Alphabetized*. science **376** (2022), 1387.

The origins of the world's chief writing system come to life in an illuminating historiography.

Inventing the Alphabet. Johanna Drucker. University of Chicago Press, 2022. 384 pp.

Drucker herself tends to the more widely held scholarly view that Greeks living in Phoenicia invented their alphabet, inspired by the Phoenician script, and that from there, it spread to the mother country during the first half of the first millennium BCE. She also presents the limited but thought-provoking evidence from Sinai and Egypt that the Phoenicians may have been inspired to create the alphabet by others.