References

Afrika

CASTIGLIA 2022

Gabriele Castiglia, *An archaeology of conversion? Evidence from Adulis for early Christianity and religious transition in the Horn of Africa.* Antiquity **96** (2022), 1555–1573.

The port-city of Adulis in modern Eritrea was a key node on the Red Sea linking the Kingdom of Aksum to the Mediterranean, the Middle East and the Indian Ocean. Recent excavations at Adulis have reinvestigated two early Christian churches. New radiocarbon analysis dates both structures to the sixth and early seventh centuries AD, with multiple phases of architectural development reflecting changing use and liturgy. The author uses evidence for both continuity and change in architectural materials, construction styles and sacred practices to assess religious transition at Adulis, and across the Aksumite Kingdom more broadly. Moving beyond an archaeology of conversion, the article reinforces recent work on cosmopolitanism in the Horn of Africa.

Keywords: Horn of Africa | Aksumite Kingdom | Adulis | early Christianity | churches | Islam | cosmopolitanism

Aktuell

MSEMBURI 2023

William Msemburi, Ariel Karlinsky, Victoria Knutson, Serge Aleshin-Guendel, Somnath Chatterji & Jon Wakefield, *The WHO estimates of excess mortality associated with the COVID-19 pandemic.* nature **613** (2023), 130–137. DOI:10.1038/s41586-022-05522-2.

n613-0130-Supplement.pdf

The World Health Organization has a mandate to compile and disseminate statistics on mortality, and we have been tracking the progression of the COVID-19 pandemic since the beginning of 2020. Reported statistics on COVID-19 mortality are problematic for many countries owing to variations in testing access, differential diagnostic capacity and inconsistent certification of COVID-19 as cause of death. Beyond what is directly attributable to it, the pandemic has caused extensive collateral damage that has led to losses of lives and livelihoods. Here we report a comprehensive and consistent measurement of the impact of the COVID-19 pandemic by estimating excess deaths, by month, for 2020 and 2021. We predict the pandemic period all-cause deaths in locations lacking complete reported data using an overdispersed Poisson count framework that applies Bayesian inference techniques to quantify uncertainty. We estimate 14.83 million excess deaths globally, 2.74 times more deaths than the 5.42 million reported as due to COVID-19 for the period. There are wide variations in the excess death estimates across the six World Health Organization regions. We describe the data and methods used to generate these estimates and highlight the need for better reporting where gaps persist. We discuss various summary measures, and the hazards of ranking countries' epidemic responses.

Amerika

PRICE 2023

Michael Price, *Ancient points suggest Asian roots for early American tools.* science **379** (2023), 15.

Finds may support coastal route hypothesis for first settlers.

Ben Potter, an archaeologist at the University of Alaska, Fairbanks, remains unconvinced, arguing the artifacts from the pits are too jumbled to conclusively link them to any of the animal bone dates. "Their precise age remains unclear, in my opinion."

The points at Cooper's Ferry, they say, most closely resemble projectile points made by people who lived near modern-day Hokkaido, Japan, some 20,000 years ago. Genetic studies show these people were not ancestors of modern Native Americans, but Davis believes they may have passed technological traditions on to other Asian groups that did migrate through northeastern Siberia and into the Americas. "[Those travelers] didn't invent this stuff when they got to the Americas," he says. "When they left northeast Asia, they had a whole set of technological ideas in their minds."

David Meltzer, an archaeologist at Southern Methodist University, remains skeptical. He says the similarities between the two regions' stemmed points appear generic.

Energie

KIYABU 2018

Steven Kiyabu, Jeffrey S. Lowe, Alauddin Ahmed & Donald J. Siegel, *Computational Screening of Hydration Reactions for Thermal Energy Storage, New Materials and Design Rules.* Chemistry of Materials **30** (2018), 2006–2017.

The implementation of thermal energy storage (TES) can improve the efficiency of existing industrial processes, and enable new applications that require the uptake/release of heat on-demand. Among the myriad strategies for TES, thermochemical hydration/dehydration reactions are arguably the most promising due to their high energy densities, simplicity, cost effectiveness, and potential for reversibility at moderate temperatures. The present study uses first-principles calculations to identify TES materials that can out-perform known compounds. High-throughput density functional theory calculations were performed on metal halide hydrates and hydroxides mined from the Inorganic Crystal Structure Database. In total, 265 hydration reactions were characterized with respect to their thermodynamic properties, gravimetric and volumetric energy densities, and operating temperatures. Promising reactions were identified for three temperature ranges: low (<100 °C), medium (100-300 °C), and high (>300 °C). Several high-energy-density reactions were identified, including the dehydration of $CrF_3 \bullet 9H_2O$, a compound that appears to be unexplored for TES. Correlations linking TES performance with dozens of chemical features for hydrates and hydroxides were quantified using a Pearson correlation matrix. These analyses reveal propertyperformance relationships involving energy densities and the thermodynamics of hydration. In salt hydrates, the thermodynamics depend strongly on the water capacity of the hydrate. In hydroxides, thermodynamic properties are largely determined by the ionicity of the cation-hydroxide bond, which is in turn influenced by the cation's electronegativity and polarizing power. Based on these correlations, design rules for hydration-based TES systems are proposed.

Kiyabu 2022

Steven Kiyabu, Patrick Girard & Donald J. Siegel, *Discovery of Salt Hydrates for Thermal Energy Storage.* Journal of the American Chemical Society **144** (2022), 21617–21627.

Thermal energy storage (TES) has the potential to improve the eiciency of many applications but has not been widely deployed. The viability of a TES system depends upon the performance of its underlying storage material; improving the energy density of TES materials is an important step in accelerating the adoption of TES systems. For applications in thermochemical energy storage, salt hydrates are a promising class of materials due to their relatively high energy densities and their reversibility. Despite their promise, relatively few salt hydrates have been characterized, presenting the possibility that new hydrate compositions with superior properties may exist. Here, the energy densities, turning temperatures, and thermodynamic stabilities of 5292 hypothetical salt hydrates are predicted using highthroughput density functional theory calculations. The hydrates of several metal luorides, including CaF_2, VF_2, and CoF_3, are identiied as stable TES materials with class-leading energy densities and operating temperatures suitable for use in domestic heating and intermediate-temperature applications. The promising performance of these materials is demonstrated at the system level by parameterizing an operating model of a solar thermal TES system with data from the new hydrates. Finally, machine learning models for salt hydrate thermodynamics are developed and used to identify design guidelines for maximizing the energy density. In total, the new materials and design rules reported here are expected to nurture the implementation of TES systems.

Grabung

Darvill 2022

Timothy Darvill, *Mythical rings? Waun Mawn and Stonehenge Stage 1.* Antiquity **96** (2022), 1515–1529.

In a recent Antiquity article, Parker Pearson and colleagues (2021) presented results from excavations at Waun Mawn in south-west Wales, interpreting the site as a dismantled stone circle and source for some of the Bluestone pillars used in the Aubrey Holes at Stonehenge. Here, the author examines the evidence, showing that alternative interpretations are possible. Waun Mawn is argued to represent a series of smaller stone settings, typical of ceremonial sites in southwest Wales. Meanwhile the Aubrey Holes are shown to reflect a well-established regional sequence in which post circles are followed by pit circles. A Welsh 'source-circle' for Stonehenge cannot be excluded but, the author argues, the claim is unsupported by the current evidence.

Keywords: Wessex | Pembrokeshire | Stonehenge | Waun Mawn | pit/post circles | standing stones

Parker Pearson 2022

Mike Parker Pearson et al., *How Waun Mawn stone circle was designed and built, and when the Bluestones arrived at Stonehenge, A response to Darvill.* Antiquity **96** (2022), 1530–1537.

In response to Timothy Darvill's article, 'Mythical rings?' (this issue), which argues for an alternative interpretation of Waun Mawn circle and its relationship with Stonehenge, Parker Pearson and colleagues report new evidence from theWelsh site and elaborate on aspects of their original argument. The discovery

of a hearth at the centre of the circle, as well as further features around its circumference, reinforces the authors' original interpretation. The authors explore the evidence for the construction sequence, which was abandoned before the completion of the monument. Contesting Darvill's argument that the Aubrey Holes at Stonehenge originally held posts, the authors reassert their interpretation of this circle of cut features as Bluestone settings.

Keywords: UK | Waun Mawn | Stonehenge | stone circles

Mike Parker Pearson, Josh Pollard, Colin Richards, Kate Welham, Timothy Kinnaird, Aayush Srivastava, Chris Casswell, Dave Shaw, Ellen Simmons, Adam Stanford, Richard Bevins, Rob Ixer, Clive Ruggles, Jim Rylatt & Kevan Edinborough

Islam

Taylor 1830

Thomas Taylor, *Arguments of Celsus, Porphyry, and the emperor Julian, against the Christians, Also extracts from Diodorus Siculus, Josephus, and Tacitus, relating to the Jews, together with an appendix.* (London 1830).

Isotope

Li 2022

Haiming Li, Yufeng Sun, Ying Yang, Yifu Cui, Lele Ren, Hu Li, Guoke Chen, Petra Vaiglova, Guanghui Dong & Xinyi Liu, *Water and soil management strategies and the introduction of wheat and barley to northern China, An isotopic analysis of cultivation on the Loess Plateau.* Antiquity **96** (2022), 1478–1494.

Antiquity096-1478-Supplement.xlsx

Studies of 'food globalisation' have traced the dispersal of cereals across prehistoric Eurasia. The degree to which these crops were accompanied by knowledge of soil and water preparation is less well known, however. The authors use stable isotope and archaeobotanical analyses to trace long-term trends in cultivation practices on the Loess Plateau (6000 BC–AD 1900). The results indicate that ancient farmers cultivated grains originating in South-west Asia and used distinct strategies for different species. Barley was integrated into pre-existing practices, while wheat was grown using novel soil and water management strategies. These distinct approaches suggest that the spread of prehistoric crops and knowledge about them varied by local context.

Keywords: East Asia | Loess Plateau | stable isotope analysis | archaeobotany | crop management | manuring

Klima

Farmer 2023

Jesse R. Farmer et al., *The Bering Strait was flooded 10,000 years before the Last Glacial Maximum.* PNAS **120** (2023), e2206742119.

pnas120-e2206742119-Supplement.pdf

The cyclic growth and decay of continental ice sheets can be reconstructed from the history of global sea level. Sea level is relatively well constrained for the Last Glacial Maximum (LGM, 26,500 to 19,000 y ago, 26.5 to 19 ka) and the ensuing deglaciation. However, sea-level estimates for the period of ice-sheet growth before the LGM vary by > 60 m, an uncertainty comparable to the sea-level equivalent of the contemporary Antarctic Ice Sheet. Here, we constrain sea level prior to the LGM by reconstructing the flooding history of the shallow Bering Strait since 46 ka. Using a geochemical proxy of Pacific nutrient input to the Arctic Ocean, we find that the Bering Strait was flooded from the beginning of our records at 46 ka until 35.7(+3.3 -2.4) ka. To match this flooding history, our sea-level model requires an ice history in which over 50 % of the LGM's global peak ice volume grew after 46 ka. This finding implies that global ice volume and climate were not linearly coupled during the last ice age, with implications for the controls on each. Moreover, our results shorten the time window between the opening of the Bering Land Bridge and the arrival of humans in the Americas.

Jesse R. Farmer, Tamara Pico, Ona M. Underwood, Rebecca Cleveland Stout, Julie Granger, Thomas M. Cronin, François Fripiat, Alfredo Martínez-García, Gerald H. Haug & Daniel M. Sigman

Significance: The Bering Strait was a land bridge during the peak of the last ice age (the Last Glacial Maximum, LGM), when sea level was ≈130 m lower than today. This study reconstructs the history of sea level at the Bering Strait by tracing the inluence of Paciic waters in the Arctic Ocean. We ind that the Bering Strait was open from at least 46,000 until 35,700 y ago, thus dating the last formation of the land bridge to within 10,000 y of the LGM. This history requires that ice volume increased rapidly into the LGM. In addition, it appears that humans migrated to the Americas as soon as the formation of the land bridge allowed for their passage.

Politik

WEINMANN 2022

Markus Weinmann, Joseph S. Valacich, Christoph Schneider, Jeffrey L. Jenkins & Martin Hibbeln, *The Path of the Righteous, Using trace data to understand fraud decisions in real time.* MISQuart **46** (2022), 2317–2336.

Trace data—users' digital records when interacting with technology—can reveal their cognitive dynamics when making decisions on websites in real time. Here, we present a tracedata method, analyzing movements captured via a computer mouse, to assess potential fraud when filling out an online form. In contrast to existing fraud-detection Methods, which analyze information after submission, mousemovement traces can capture the cognitive deliberations as possible indicators of fraud as it is happening. We report two controlled studies using different tasks, where participants could freely commit fraud to benefit themselves financially. As they performed the tasks, we captured mousecursor movement data and found that participants who entered fraudulent responses moved their mouse significantly more slowly and with greater deviation. We show that the extent of fraud matters such that more extensive fraud increases movement deviation and decreases movement speed. These results demonstrate the efficacy of analyzing mousemovement traces to detect fraud during online transactions in real time, enabling organizations to confront fraud proactively as it is happening at internet scale. Our method of ana-

lyzing actual user behaviors in real time can complement other behavioral methods in the context of fraud and a variety of other contexts and settings.