

References

Afrika

FAUVELLE 2013

François-Xavier Fauvelle, *Das Goldene Rhinozeros, Afrika im Mittelalter*. (München 2017). Originaltitel: *Le Rhinoceros d'or – Histoires du Moyen Âge africain*.

Aktuell

HERTTING 1993

G. Hertting, Th. Schäfer, L. O. Björn, Norman G. Bisset, Meinhart H. Zenk, Philip McIntosh & F. Parsche, *Responding to: First Identification of Drugs in Egyptian Mummies*. *Naturwissenschaften* **80** (1993), 243–246.

Since the mummies examined were dated from 1070 B.C. to 395 A.D. and all were positive for these drugs, it would seem that drug use/abuse was common and widespread among upper class Egyptians over a long period of time, as suggested by the authors. But how could such a practice have escaped documentation by the Egyptians themselves?

A notable omission in the work reported is appropriate control samples. Inclusion and examination of material from mummies of young children (unlikely to have accumulated the drugs in question, even if accessible) or, perhaps better, animals, from the same origins as the mummies which furnished the samples studied, would have helped to determine the validity, or otherwise, of the findings. It is not clear whether the authors used immunoassays and/or gas chromatography combined with mass spectrometry for each of three substances they purport to have detected and quantified. At high dilutions, immunoassays are known to have a tendency to yield false positive results, since at the lower end of the calibration curves there are fluctuations (“noise”) and the curves do not reach zero. Gas-liquid chromatography/ mass spectrometry is certainly sensitive enough to pick up the small amounts of nicotine present which might have originated from outside sources such as those indicated above, but what method was used to obtain the data presented is not mentioned. Also worth noting is that nicotine is water-soluble and, if present, would not be fully extracted by the procedure described.

SANBERG 2018

Paul R. Sanberg, *Finding reward in risk*. *science* **360** (2018), 570.

I was in my first full professorship, spending long hours in the lab and focused on publishing my research. I was doing everything I had been taught to do in a traditional academic setting, exactly the way I had been taught to do it. I loved my field and was proud of my work. I should have been happy to have come this far. I was the only one in my family to have earned a bachelor's degree, and a career as an academic researcher was far beyond what I had ever imagined when I was younger. Yet I had to acknowledge that I was a little bored with the routine that had been my life since graduate school.

Altpaläolithikum

FOLEY 2015

Robert A. Foley & Marta Mirazón Lahr, *Lithic Landscapes, Early Human Impact from Stone Tool Production on the Central Saharan Environment*. [PLoS ONE 10 \(2015\), e116482](#).

[DOI:10.1371/journal.pone.0116482](#).

Humans have had a major impact on the environment. This has been particularly intense in the last millennium but has been noticeable since the development of food production and the associated higher population densities in the last 10,000 years. The use of fire and overexploitation of large mammals has also been recognized as having an effect on the world's ecology, going back perhaps 100,000 years or more. Here we report on an earlier anthropogenic environmental change. The use of stone tools, which dates back over 2.5 million years, and the subsequent evolution of a technologically-dependent lineage required the exploitation of very large quantities of rock. However, measures of the impact of hominin stone exploitation are rare and inherently difficult. The Messak Settafet, a sandstone massif in the Central Sahara (Libya), is littered with Pleistocene stone tools on an unprecedented scale and is, in effect, a man-made landscape. Surveys showed that parts of the Messak Settafet have as much as 75 lithics per square metre and that this fractured debris is a dominant element of the environment. The type of stone tools—Acheulean and Middle Stone Age—indicates that extensive stone tool manufacture occurred over the last half million years or more. The lithic-strewn pavement created by this ancient stone tool manufacture possibly represents the earliest human environmental impact at a landscape scale and is an example of anthropogenic change. The nature of the lithics and inferred age may suggest that hominins other than modern humans were capable of unintentionally modifying their environment. The scale of debris also indicates the significance of stone as a critical resource for hominins and so provides insights into a novel evolutionary ecology.

Amerika

HURST 2002

W. Jeffrey Hurst, Stanley M. Tarka Jr, Terry G. Powis, Fred Valdez Jr & Thomas R. Hester, *Cacao usage by the earliest Maya civilization*. [nature 418 \(2002\), 289–290](#).

[n418-0289-Supplement.pdf](#)

Foaming chocolate prepared in spouted vessels made a delectable Preclassic drink.

We now know that the Maya had a long, continuous history of preparing and consuming liquid chocolate from the Preclassic period through to the Spanish Conquest.

Anthropologie

HOLLOWAY 2018

Ralph L. Holloway et al., *Endocast morphology of Homo naledi from the Dinaledi Chamber, South Africa*. [PNAS 115 \(2018\), 5738–5743](#).

[pnas115-05738-Supplement.pdf](#)

Ralph L. Holloway, Shawn D. Hurst, Heather M. Garvin, P. Thomas Schoenemann, William B. Vanti, Lee R. Berger & John Hawks

Hominin cranial remains from the Dinaledi Chamber, South Africa, represent multiple individuals of the species *Homo naledi*. This species exhibits a small endocranial volume comparable to *Australopithecus*, combined with several aspects of external cranial anatomy similar to larger-brained species of *Homo* such as *Homo habilis* and *Homo erectus*. Here, we describe the endocast anatomy of this recently discovered species. Despite the small size of the *H. naledi* endocasts, they share several aspects of structure in common with other species of *Homo*, not found in other hominins or great apes, notably in the organization of the inferior frontal and lateral orbital gyri. The presence of such structural innovations in a small-brained hominin may have relevance to behavioral evolution within the genus *Homo*.

Keywords: brain evolution | human evolution | South Africa | *Homo* | paleo-anthropology

Significance: The new species *Homo naledi* was discovered in 2013 in a remote cave chamber of the Rising Star cave system, South Africa. This species survived until between 226,000 and 335,000 y ago, placing it in continental Africa at the same time as the early ancestors of modern humans were arising. Yet, *H. naledi* was strikingly primitive in many aspects of its anatomy, including the small size of its brain. Here, we have provided a description of endocast anatomy of this primitive species. Despite its small brain size, *H. naledi* shared some aspects of human brain organization, suggesting that innovations in brain structure were ancestral within the genus *Homo*.

VAN DE LOOSDRECHT 2018

Marieke van de Loosdrecht et al., *Pleistocene North African genomes link Near Eastern and sub-Saharan African human populations*. [science](#) **360** (2018), 548–552.

[s360-0548-Supplement.pdf](#)

Marieke van de Loosdrecht, Abdeljalil Bouzouggar, Louise Humphrey, Cosimo Posth, Nick Barton, Ayinuer Aximu-Petri, Birgit Nickel, Sarah Nagel, El Hassan Talbi, Mohammed Abdeljalil El Hajraoui, Saaïd Amzazi, Jean-Jacques Hublin, Svante Pääbo, Stephan Schiffels, Matthias Meyer, Wolfgang Haak, Choongwon Jeong & Johannes Krause

North Africa is a key region for understanding human history, but the genetic history of its people is largely unknown. We present genomic data from seven 15,000-year-old modern humans, attributed to the Iberomaurusian culture, from Morocco. We find a genetic affinity with early Holocene Near Easterners, best represented by Levantine Natufians, suggesting a pre-agricultural connection between Africa and the Near East. We do not find evidence for gene flow from Paleolithic Europeans to Late Pleistocene North Africans. The Taforalt individuals derive one-third of their ancestry from sub-Saharan Africans, best approximated by a mixture of genetic components preserved in present-day West and East Africans. Thus, we provide direct evidence for genetic interactions between modern humans across Africa and Eurasia in the Pleistocene.

ZENG 2018

Tian Chen Zeng, Alan J. Aw & Marcus W. Feldman, *Cultural hitchhiking and competition between patrilineal kin groups explain the post-Neolithic Y-chromosome bottleneck*. [Nature Communications](#) **9** (2018), 2077, 1–12. DOI:10.1038/s41467-018-04375-6.

In human populations, changes in genetic variation are driven not only by genetic processes, but can also arise from cultural or social changes. An abrupt population bottleneck specific to human males has been inferred across several Old World (Africa, Europe, Asia) populations 5000–7000 BP. Here, bringing together anthropological theory, recent population genomic studies and mathematical models, we propose a sociocultural hypothesis, involving the formation of patrilineal kin groups and intergroup competition among these groups. Our analysis shows that this sociocultural hypothesis can explain the inference of a population bottleneck. We also show that our hypothesis is consistent with current findings from the archaeogenetics of Old World Eurasia, and is important for conceptions of cultural and social evolution in prehistory.

Keramik

KOZOWYK 2017

P. R. B. Kozowyk, J. A. Poulis & G. H. J. Langejans, *Laboratory strength testing of pinewood and birch bark adhesives, A first study of the material properties of pitch*. [Journal of Archaeological Science: Reports](#) **13** (2017), 49–59.

Adhesives are an important yet often overlooked aspect of human tool use. Previous experiments have shown that compound resin/gum adhesive production by anatomically modern humans was a cognitively demanding task that required advanced use of fire, forward planning and abstraction, among other traits. Yet the oldest known adhesives were produced by Neandertals, not anatomically modern humans. These tar or pitch adhesives are an entirely different material, produced from a distinct, albeit similarly complex process. However, the material properties of these adhesives and the influence of the production process on performance are still unclear. To this end we conducted a series of laboratory based lap shear and impact tests following modern adhesive testing standards at three different temperatures to measure the strength of pine and birch pitch adhesives. We tested eight different recipes that contain charcoal as an additive (mimicking contamination) or were reduced by boiling (seething) for different lengths of time. Lap shear tests were conducted on wood and flint adherends to determine shear strength on different materials, and we conducted high load-rate tests to understand how the same material behaves under impact forces. Our results indicate that both pine and birch pitch adhesives behave similarly at room temperature. Pine pitch is highly sensitive to the addition of charcoal and further heating. Up to a certain extent, charcoal additives increase performance, as does extra seething. However, too much charcoal and seething will reduce performance. Similarly, pine pitch is sensitive to ambient temperature changes and it is strongest at 0 °C and weakest at 38 °C. Adhesive failures occur in a similar manner on flint and wood suggesting the weakest part of a flint-adhesive-wood composite tool may have been the cohesive strength of the adhesive. Finally, pine pitch adhesives may be better suited to resisting high-load rate impacts than static shear forces. Our experiments show that pitch production and post-production manipulation are sensitive processes, and to obtain a workable and strong adhesive one requires a deep understanding of the material properties. Our results validate previous archaeological adhesive studies that suggest that the manufacture and use of adhesives was an advanced technological process.

Keywords: Adhesives | Pine pitch | Birch bark pitch | Palaeolithic | Hafting | Neandertal | Lap shear | Impact

ZHOU 2018

X. Zhou, X. Y. Li & K. Lu, *Enhanced thermal stability of nanograined metals below a critical grain size*. *science* **360** (2018), 526–530.
s360-0526-Supplement.pdf

The limitation of nanograined materials is their strong tendency to coarsen at elevated temperatures. As grain size decreases into the nanoscale, grain coarsening occurs at much lower temperatures, as low as ambient temperatures for some metals. We discovered that nanometer-sized grains in pure copper and nickel produced from plastic deformation at low temperatures exhibit notable thermal stability below a critical grain size. The instability temperature rises substantially at smaller grain sizes, and the nanograins remain stable even above the recrystallization temperatures of coarse grains. The inherent thermal stability of nanograins originates from an autonomous grain boundary evolution to low-energy states due to activation of partial dislocations in plastic deformation.

Klima

MCCONNELL 2018

Joseph R. McConnell et al., *Lead pollution recorded in Greenland ice indicates European emissions tracked plagues, wars, and imperial expansion during antiquity*. *PNAS* **115** (2018), 5726–5731.

pnas115-05726-Supplement1.pdf, pnas115-05726-Supplement2.xlsx

Joseph R. McConnell, Andrew I. Wilson, Andreas Stohl, Monica M. Arienzo, Nathan J. Chellman, Sabine Eckhardt, Elisabeth M. Thompson, A. Mark Pollard & Jørgen Peder Steffensen

Lead pollution in Arctic ice reflects midlatitude emissions from ancient lead–silver mining and smelting. The few reported measurements have been extrapolated to infer the performance of ancient economies, including comparisons of economic productivity and growth during the Roman Republican and Imperial periods. These studies were based on sparse sampling and inaccurate dating, limiting understanding of trends and specific linkages. Here we show, using a precisely dated record of estimated lead emissions between 1100 BCE and 800 CE derived from subannually resolved measurements in Greenland ice and detailed atmospheric transport modeling, that annual European lead emissions closely varied with historical events, including imperial expansion, wars, and major plagues. Emissions rose coeval with Phoenician expansion, accelerated during expanded Carthaginian and Roman mining primarily in the Iberian Peninsula, and reached a maximum under the Roman Empire. Emissions fluctuated synchronously with wars and political instability particularly during the Roman Republic, and plunged coincident with two major plagues in the second and third centuries, remaining low for >500 years. Bullion in silver coinage declined in parallel, reflecting the importance of lead–silver mining in ancient economies. Our results indicate sustained economic growth during the first two centuries of the Roman Empire, terminated by the second-century Antonine plague.

Keywords: ice core | lead pollution | plague | war | antiquity

Significance: An 1100 BCE to 800 CE record of estimated lead emissions based on continuous, subannually resolved, and precisely dated measurements of lead pollution in deep Greenland ice and atmospheric modeling shows that European emissions closely varied with historical events, including imperial expansion, wars, and major plagues. Emissions rose coeval with Phoenician expansion and accelerated during expanded Carthaginian and Roman lead–silver mining primarily in the Iberian Peninsula. Emissions fluctuated synchronously with wars and political

instability, particularly during the Roman Republic, reaching a sustained maximum during the Roman Empire before plunging in the second century coincident with the Antonine plague, and remaining low for >500 years. Bullion in silver coinage declined in parallel, reflecting the importance of lead–silver mining in ancient economies.

Kultur

GÖRLITZ 2016

Dominique Görlitz, *The Occurrence of Cocaine in Egyptian Mummies, New research provides strong evidence for a trans-Atlantic dispersal by humans*. *Diffusion Fundamentals* **26** (2016), ii, 1–11. [URN:nbn:de:bsz:15-qucosa-214380](https://nbn-resolving.org/urn:nbn:de:bsz:15-qucosa-214380).

Drift studies with seeds of selected crop plants, as well as chemical analyses of several cocaine species, support the hypothesis of a pre-Columbian human interaction between the Old and New World. The emphasis in this article has deliberately been put on the dispersal and cultivation history of the American coca plant (*Erythroxylum*). This is because of the recent discovery of cocaine in ancient Egyptian mummies. There is also the dispersal history of the plant and existing knowledge of the use of a shamanic plant, which have led to controversial discussions over several decades about potential trans-Atlantic contacts prior to Columbus rediscovery of America. The spread and domestication history of the coca plant delivers striking evidence for the theory of anthropogenic dispersal of this species across the Atlantic in ancient times. The unique phytochemical characteristics of this plant, its south hemispheric distribution pattern and its limited water dispersal ability of crop plants (cocaine as well as tobacco, fig. 5) support this theory. The reconstruction of those dispersal routes, and the identification of the proto-historical merchants involved in such contacts, poses a fascinating challenge for future research.

Keywords: cocaine and nicotine in Egyptian mummies | trans-Atlantic crop dispersal | Geo-Botany | Egyptology | proto-historical voyages | ancient diffusion and cultural interaction

Methoden

BALABANOVA 1992

S. Balabanova, F. Parsche & W. Pirsig, *First Identification of Drugs in Egyptian Mummies*. *Naturwissenschaften* **79** (1992), 358. [Naturw079-0358-Comment.pdf](#)

This is the first study which shows the presence of cocaine, hashish, and nicotine in Egyptian mummies, dating back to about 1000 B.C.

Mittelpaläolithikum

KOZOWYK 2017

P. R. B. Kozowyk, M. Soressi, D. Pomstra & G. H. J. Langejans, *Experimental methods for the Palaeolithic dry distillation of birch bark, Implications for the origin and development of Neandertal adhesive*

technology. [Scientific Reports 7 \(2017\), 8033](#). DOI:10.1038/s41598-017-08106-7.

SciRep07-08033-Supplement.pdf

The destructive distillation of birch bark to produce tar has recently featured in debates about the technological and cognitive abilities of Neandertals and modern humans. The abilities to precisely control fire temperatures and to manipulate adhesive properties are believed to require advanced mental traits. However, the significance given to adhesive technology in these debates has quickly outgrown our understanding of birch bark tar and its manufacture using aceramic techniques. In this paper, we detail three experimental methods of Palaeolithic tar production ranging from simple to complex. We recorded the fuel, time, materials, temperatures, and tar yield for each method and compared them with the tar known from the Palaeolithic. Our results indicate that it is possible to obtain useful amounts of tar by combining materials and technology already in use by Neandertals. A ceramic container is not required, and temperature control need not be as precise as previously thought. However, Neandertals must have been able to recognize certain material properties, such as adhesive tack and viscosity. In this way, they could develop the technology from producing small traces of tar on partially burned bark to techniques capable of manufacturing quantities of tar equal to those found in the Middle Palaeolithic archaeological record.

Physik

BECKER 2018

Adam Becker, *What is real? The unfinished quest for the meaning of quantum physics*. (London 2018).

Every physicist agrees quantum mechanics is among humanity's finest scientific achievements. But ask what it means, and the result will be a brawl. For a century, most physicists have followed Niels Bohr's Copenhagen interpretation and dismissed questions about the reality underlying quantum physics as meaningless. A mishmash of solipsism and poor reasoning, Copenhagen endured, as Bohr's students vigorously protected his legacy, and the physics community favoured practical experiments over philosophical arguments. As a result, questioning the status quo long meant professional ruin. And yet, from the 1920s to today, physicists like John Bell, David Bohm, and Hugh Everett persisted in seeking the true meaning of quantum mechanics. *What is Real?* is the gripping story of this battle of ideas and the courageous scientists who dared to stand up for truth.

Story or Book

PURCELL 2018

Conor Purcell, *Deconstructing time*. [science 360 \(2018\), 499](#).

A quantum physicist reveals why time is not as simple as it seems.

The Order of Time. Carlo Rovelli. Riverhead Books, 2018. 250 pp.

Where other writers struggle to get their complex ideas across, Rovelli introduces profound notions with ease, using simple but evocative language. "The absence of time does not mean . . . that everything is frozen and unmoving," he writes, for example, in chapter 6. "It means that the incessant happening that wearies the world is not ordered along a time line, is not measured by a gigantic ticktocking."