Liste erstellt am 2013-04-01

Literatur

Afrika

Killick 1996

David Killick, *On Claims For "Advanced" Ironworking Technology in Precolonial Africa*. In: Peter R. Schmidt (Hrsg.), *The Culture and Technology of African Iron Production*. (Gainesville 1996), 247–266.

The central argument in both of these hypotheses is that African iron-smelting techniques differed significantly from those employed elsewhere in the Old World. This review has shown that this thesis is mistaken in the case of "direct steel production" in Africa and dubious at best in the claim for preheated blast. The case for an African direct steel process is negated by the fact that steel blooms have been reported from many other areas of the Old World and by historical and experimental evidence that the steel can be produced at will in most bloomery furnaces. The argument for preheated blast is severely weakened by evidence from experimental bloomery smelting in Europe that shows that comparable temperatures are attainable in furnaces that cannot possibly have employed preheated blast.
Even if both of these hypotheses are rejected, ample evidence remains of change in African bloomery iron smelting over the two and a half millennia of the African Iron Age. African ironworkers adapted the bloomery process to a wider variety of ores and invented a greater range of furnace designs than did bloomery ironworkers elsewhere in the Old World (Killick 1991b). There is therefore no lack of invention in African iron smelting; what requires explanation is the lack of growth in productivity of African iron technology over this span of time, during which the productivity of iron smelting in Europe grew by a factor of one thousand. Where specialist iron industries did emerge in later African history, as at Bassar, Togo (de Barros 1986), or on the Ndop Plain of Cameroon (Fowler 1990), increased productivity was obtained by changes in the social organization of production, not by technological innovations that greatly increased the amount of iron produced in a furnace in a given time. One of the tasks that lies ahead is to identify the reasons for the lack of growth in productivity in smelting technology. Were the barriers to increasing productivity social, or environmental, or both?
direct steel

Aktuell

Chittka 2013

Lars Chittka & Fei Peng, *Caffeine Boosts Bees' Memories*. science **339** (2013), 1157–1159.

Caffeine in floral nectar enhances the memory of bees for the flowers' scent by altering response properties of neurons in the bee brain.

Green 2013

Michael J. Green, *Missed It*. Annals of Internal Medicine **158** (2013), 357–361.

Kirchner 2013

James W. Kirchner & Ken L. Ferrier, *Mainly in the plain*. nature **495** (2013), 318–319.

The finding that global mass loss from landscapes is dominated by physical erosion and chemical weathering from flat terrain, rather than from mountains, challenges our understanding of how Earth's surface evolves.

Nonetheless, the authors' analysis does suggest that more geologists should climb down from the mountains that they love so much, to explore the erosion and weathering of the surrounding lowlands (Fig. 1). When they get there, however, they will find that many of these landscapes have been utterly transformed by human activities, which have greatly accelerated soil-erosion rates — to the point that they rival or exceed natural erosion rates in some of the steepest mountains on Earth, and threaten the long-term future of our food supply.

This is not a new problem: the crumbling relics of many vanished civilizations bear mute witness to the fate of those who squander their soil resources9. What is new, this time around, is that we know we are destroying our soil, and we know how to stop. The scientific basis for soil conservation has been understood for decades. What remains to be discovered, in many cultural landscapes, is the will to implement it.

Owens 2013

Brian Owens, *Slow Science*. nature **495** (2013), 300–303.

The world's longest-running experiments remind us that science is a marathon, not a sprint.

Although science is a long-term pursuit, research is often practised over short timescales: a discrete experiment or a self-contained project constrained by the length of a funding cycle. But some investigations cannot be rushed. To study human lifespans or the roiling of Earth's crust and the Sun's surface, for instance, requires decades and even centuries. Here, Nature takes a look at five of science's longestrunning projects, some of which have been amassing data continuously for centuries. Some generate hundreds of papers a year; one produces a single data point per decade. Experiments operating at this pace are challenged by shifting research priorities and technologies, and their existence is regularly threatened by funding droughts and changes in stewardship. But they are bound together by the foresight of the scientists who started them and the patience and dedication of those who carry the torch. If persistence predicts a long and healthy life — as one 90-year study of human longevity has suggested — then the scientists featured here could set some records themselves.

Paulsen 2013

Torbjørn Rage Paulsen, Louise Colville, Ilse Kranner, Matthew I. Daws, Göran Högstedt, Vigdis Vandvik & Ken Thompson, *Physical dormancy in seeds: a game of hide and seek?* New Phytologist **198** (2013), 496–503.

NewPhyt198-0496-Supplement1.doc

– Historically, 'physical dormancy', or 'hard seededness', where seeds are prevented from germinating by a water-impermeable seed coat, is viewed as a dormancy mechanism. However, upon water uptake, resumption of metabolism leads to the unavoidable release of volatile by-products, olfactory cues that are perceived by seed predators. Here, we examine the hypothesis that hard seeds are an anti-predator trait that evolved in response to powerful selection by small mammal seed predators.

– Seeds of two legume species with dimorphic seeds ('hard' and 'soft'), Robinia pseudoacacia and Vicia sativa, were offered to desert hamsters (Phodopus roborovskii) in a series of seed removal studies examining the differences in seed harvest between hard and soft seeds. Volatile compounds emitted by dry and imbibed soft seeds were identified by headspace gas chromatography–mass spectrometry (GC-MS).
– Fourteen main volatile compounds were identified, and hamsters readily detected both buried imbibed seeds and an artificial 'volatile cocktail' that mimicked the scent of imbibed seeds, but could not detect buried hard or dry soft seeds.
– We argue that physical dormancy has evolved to hide seeds from mammalian predators. This hypothesis also helps to explain some otherwise puzzling features of hard seeds and has implications for seed dispersal.
Keywords: dormancy, granivore, predation, seed, volatile compounds

Wright 2013

G. A. Wright et al., *Caffeine in Floral Nectar Enhances a Pollinator's Memory of Reward*. science **339** (2013), 1202–1204.
s339-1202-Supplement1.pdf
G. A. Wright, D. D. Baker, M. J. Palmer, D. Stabler, J. A. Mustard, E. F. Power, A. M. Borland & P. C. Stevenson
Plant defense compounds occur in floral nectar, but their ecological role is not well understood. We provide evidence that plant compounds pharmacologically alter pollinator behavior by enhancing their memory of reward. Honeybees rewarded with caffeine, which occurs naturally in nectar of Coffea and Citrus species, were three times as likely to remember a learned floral scent as were honeybees rewarded with sucrose alone. Caffeine potentiated responses of mushroom body neurons involved in olfactory learning and memory by acting as an adenosine receptor antagonist. Caffeine concentrations in nectar did not exceed the bees' bitter taste threshold, implying that pollinators impose selection for nectar that is pharmacologically active but not repellent. By using a drug to enhance memories of reward, plants secure pollinator fidelity and improve reproductive success.

Biologie

Axelsson 2013

Erik Axelsson et al., *The genomic signature of dog domestication reveals adaptation to a starch-rich diet*. nature **495** (2013), 360–364.
n495-0360-Supplement1.pdf, n495-0360-Supplement2.zip, n495-0360-Supplement3.zip
Erik Axelsson, Abhirami Ratnakumar, Maja-Louise Arendt, Khurram Maqbool, Matthew T. Webster, Michele Perloski, Olof Liberg, Jon M. Arnemo, Åke Hedhammar & Kerstin Lindblad-Toh
The domestication of dogs was an important episode in the development of human civilization. The precise timing and location of this event is debated1–5 and little is known about the genetic changes that accompanied the transformation of ancient wolves into domestic dogs. Here we conduct whole-genome resequencing of dogs and wolves to identify 3.8 million genetic variants used to identify 36 genomic regions that probably represent targets for selection during dog domestication. Nineteen of these regions contain genes important in brain function, eight of which belong to nervous system development pathways and potentially underlie behavioural changes central to dog domestication6. Ten genes with key roles in starch digestion and fat metabolism also show signals of selection. We identify

candidate mutations in key genes and provide functional support for an increased starch digestion in dogs relative to wolves. Our results indicate that novel adaptations allowing the early ancestors of modern dogs to thrive on a diet rich in starch, relative to the carnivorous diet of wolves, constituted a crucial step in the early domestication of dogs.

Barsh 2013

Gregory S. Barsh & Leif Andersson, *Detecting selection*. nature **495** (2013), 325–326.

Advances in population genetics and genome sequencing have made it possible to identify anonymous fragments of DNA that have undergone selection. This yields some evolutionary answers, and a panoply of puzzles.

Grossman 2013

Sharon R. Grossman et al., *Identifying Recent Adaptations in Large-Scale Genomic Data*. Cell **152** (2013), 703–713.

Cell152-0703-Supplement01.xlsx, Cell152-0703-Supplement02.xlsx, Cell152-0703-Supplement03.xlsx, Cell152-0703-Supplement04.xlsx, Cell152-0703-Supplement05.xlsx, Cell152-0703-Supplement06.xlsx, Cell152-0703-Supplement07.xlsx, Cell152-0703-Supplement08.xlsx, Cell152-0703-Supplement09.xlsx, Cell152-0703-Supplement10.pdf, Cell152-0703-Supplement12.pdf

Sharon R. Grossman, Kristian G. Andersen, Ilya Shlyakhter, Shervin Tabrizi, Sarah Winnicki, Angela Yen, Daniel J. Park, Dustin Griesemer, Elinor K. Karlsson, Sunny H. Wong, Moran Cabili, Richard A. Adegbola, Rameshwar N. K. Bamezai, Adrian V. S. Hill, Fredrik O. Vannberg, John L. Rinn, 1000 Genomes Project, Eric S. Lander, Stephen F. Schaffner & Pardis C. Sabeti

Although several hundred regions of the human genome harbor signals of positive natural selection, few of the relevant adaptive traits and variants have been elucidated. Using full-genome sequence variation from the 1000 Genomes (1000G) Project and the composite of multiple signals (CMS) test, we investigated 412 candidate signals and leveraged functional annotation, protein structure modeling, epigenetics, and association studies to identify and extensively annotate candidate causal variants. The resulting catalog provides a tractable list for experimental follow-up; it includes 35 high-scoring nonsynonymous variants, 59 variants associated with expression levels of a nearby coding gene or lincRNA, and numerous variants associated with susceptibility to infectious disease and other phenotypes. We experimentally characterized one candidate nonsynonymous variant in Toll-like receptor 5 (TLR5) and show that it leads to altered NF-kB signaling in response to bacterial flagellin.

Kamberov 2013

Yana G. Kamberov et al., *Modeling Recent Human Evolution in Mice by Expression of a Selected EDAR Variant*. Cell **152** (2013), 691–702.

Cell152-0691-Supplement1.pdf, Cell152-0691-Supplement2.pdf

Yana G. Kamberov, Sijia Wang, Jingze Tan, Pascale Gerbault, Abigail Wark, Longzhi Tan, Yajun Yang, Shilin Li, Kun Tang, Hua Chen, Adam Powell, Yuval Itan, Dorian Fuller, Jason Lohmueller, Junhao Mao, Asa Schachar, Madeline Paymer, Elizabeth Hostetter, Elizabeth Byrne, Melissa Burnett, Andrew P. McMahon, Mark G. Thomas, Daniel E. Lieberman, Li Jin, Clifford J. Tabin, Bruce A. Morgan & Pardis C. Sabeti

An adaptive variant of the human Ectodysplasin receptor, EDARV370A, is one of the strongest candidates of recent positive selection from genomewide scans.

We have modeled EDAR370A in mice and characterized its phenotype and evolutionary origins in humans. Our computational analysis suggests the allele arose in central China approximately 30,000 years ago. Although EDAR370A has been associated with increased scalp hair thickness and changed tooth morphology in humans, its direct biological significance and potential adaptive role remain unclear. We generated a knockin mouse model and find that, as in humans, hair thickness is increased in EDAR370A mice. We identify new biological targets affected by the mutation, including mammary and eccrine glands. Building on these results, we find that EDAR370A is associated with an increased number of active eccrine glands in the Han Chinese. This interdisciplinary approach yields unique insight into the generation of adaptive variation among modern humans.

Grabung

Pastoors 2008

A. Pastoors, G.-C. Weniger & J. F. Kegler, *The Middle–Upper Palaeolithic Transition at Yabroud II (Syria). A re-evaluation of the lithic material from the Rust excavation*. Paléorient **34** (2008), ii, 47–65.
The discussion about the Levantine transition from Middle to Upper Palaeolithic is still very intense. Different interpretations of the assemblage from Yabroud II (Syria) make this problem particularly apparent. This article presents the results of our reanalysis, which concentrated on the lithic artefacts from layers 10 to 5. Hence, the updated state of knowledge of Yabroud II allows a comparison to the sequence from Ksar Akil (Lebanon). Acting with all necessary caution that old excavations require, we see evidence for a complete transition from Tabun B-Type via Initial Upper Palaeolithic to Early Ahmarian industries at Yabroud II. Moreover, the cultural change at Yabroud II might be correlated to a climatic event.
Keywords: Middle-Upper Palaeolithic transition, Lithic production systems, Old collections, Levant

Solecki 1986

R. L. Solecki & R. S. Soleckl, *A Reappraisal of Rust's Cultural Stratigraphy of Yabroud Shelter I*. Paléorient **12** (1986), i, 53–59.
Rust's only profile drawing of Yabroud Shelter I represents his schematic, composite reconstruction of the entire shelter deposits. It is not a true section drawing, although, unfortunately, it has been used as such. Using information in Rust's text and data from our own excavations at the site, a new interpretation of Rust's cultural stratigraphy of Shelter I is presented.

Grundlagen

Lycett 2013

Stephen J. Lycett & Metin I. Eren, *Levallois economics: An examination of 'waste' production in experimentally produced Levallois reduction sequences*. Journal of Archaeological Science **40** (2013), 2384–2392.
Mathematical modelling has suggested that Levallois core morphology represents a reduction strategy driven by economic considerations; particularly the minimization of 'waste' while aiming to maximize cutting edge length of flakes obtained from cores of a given size. Such models are elegant in that they facilitate formal

modelling of economic considerations that potentially motivate patterns seen in prehistoric data. However, the abstract nature of such models means that they do not take full account of all the practical difficulties and material challenges involved in reproducing Levallois-style reductions in stone. In particular, such models have only examined nodule morphology in two-dimensions, and did not take account of the fact that in the case of classic (lineal) Levallois reduction, core surfaces must be reprepared between successive stages of flake removal. Hence, the potential economic implications of these factors are currently unknown, potentially undermining the significance of models that assume specific economic conditions. Here, we undertook to examine these factors using a series of experimentally produced Levallois reduction sequences. A total of 3957 flaking events were considered in our analyses, and we used six specific measures of economy to examine Levallois reduction across successive phases. Our analyses found that key assumptions of mathematical models suggesting that Levallois core morphology was driven by economic considerations (i.e. conservation of raw material when attempting to remove flakes with long cutting edges) can be upheld under the practical challenges of replicating Levallois-style reduction in stone. In supporting the notion that Levallois reduction has advantageous economic properties, our results emphasize the importance of considering why Levallois reduction did not emerge earlier in the archaeological record, and indeed, why even during the later Pleistocene the temporal and geographic distribution of Levallois technology varies. Our results also re-emphasize the value of formally modelling lithic reduction strategies in specific economic terms.

Keywords: Levallois | Core reduction | Economy of reduction | Waste | Experiment

Klima

McLauchlan 2013

Kendra K. McLauchlan, Joseph J.Williams, Joseph M. Craine & Elizabeth S. Jeffers, *Changes in global nitrogen cycling during the Holocene epoch*. nature **495** (2013), 352–355.

n495-0352-Supplement1.pdf

Human activities have doubled the pre-industrial supply of reactive nitrogen on Earth, and future rates of increase are expected to accelerate1. Yet little is known about the capacity of the biosphere to buffer increased nitrogen influx. Past changes in global ecosystems following deglaciation at the end of the Pleistocene epoch provide an opportunity to understand better how nitrogen cycling in the terrestrial biosphere responded to changes in carbon cycling. We analysed published records of stable nitrogen isotopic values (d15N) in sediments from 86 lakes on six continents. Here we show that the value of sedimentary d15N declined from 15,000 years before present to 7,0566597 years before present, a period of increasing atmospheric carbon dioxide concentrations and terrestrial carbon accumulation2. Comparison of the nitrogen isotope record with concomitant carbon accumulation on land and nitrous oxide in the atmosphere suggests millennia of declining nitrogen availability in terrestrial ecosystems during the Pleistocene– Holocene transition around 11,000 years before present. In contrast, we do not observe a consistent change in global sedimentary d15N values during the past 500 years, despite the potential effects of changing temperature and nitrogen influx from anthropogenic sources. We propose that the lack of a single response may indicate that modern increases in atmospheric carbon dioxide and net carbon sequestration in the biosphere have the potential to offset recent increased supplies of reactive nitrogen in some ecosystems.

Marcott 2013
Shaun A. Marcott, Jeremy D. Shakun, Peter U. Clark & Alan C. Mix, *A Reconstruction of Regional and Global Temperature for the Past 11,300 Years*. science **339** (2013), 1198–1201.
s339-1198-Supplement1.pdf, s339-1198-Supplement2.xlsx
Surface temperature reconstructions of the past 1500 years suggest that recent warming is unprecedented in that time. Here we provide a broader perspective by reconstructing regional and global temperature anomalies for the past 11,300 years from 73 globally distributed records. Early Holocene (10,000 to 5000 years ago) warmth is followed by ≈0.7°C cooling through the middle to late Holocene (<5000 years ago), culminating in the coolest temperatures of the Holocene during the Little Ice Age, about 200 years ago. This cooling is largely associated with ≈2°C change in the North Atlantic. Current global temperatures of the past decade have not yet exceeded peak interglacial values but are warmer than during ≈75 % of the Holocene temperature history. Intergovernmental Panel on Climate Change model projections for 2100 exceed the full distribution of Holocene temperature under all plausible greenhouse gas emission scenarios.

Kultur

Mendelssohn 1971
Kurt Mendelssohn, *A Scientist Looks at the Pyramids*. American Scientist **59** (1971), 210–220.
Engineering evidence connected with the building of the great pyramids suggests conclusions that go far beyond the problems of pyramid design.

Mendelssohn 1972
Kurt Mendelssohn, *Gedanken eines Naturwissenschaftlers zum Pyramidenbau*. Physik in unserer Zeit **3** (1972), 41–47.
Wenn der Physiker etwas Neues zum Pyramidenproblem beitragen kann, dann nicht weil er mehr sieht als der Ägyptologe, sondern weil er anderes sieht. Die Frage bleibt, warum vor 5000 Jahren die Ägypter die gesamte Arbeitskrafk ihres Volkes auf den Bau von Königsgräbern konzentriert haben. Die Pyramidenzeit umfaßte kaum mehr als ein Jahrhundert. Vor und nach dieser Zeit wurden Pharaonen weit billiger bestattet. Obwohl kein Zweifel uber den Zusammenhang zwischen Pyramidenbau und dem Totenkult der Könige bestehen kann, stellt sich die Annahme als ein Trugschluß heraus, daß der Pyramidenbau lediglich diesem Zweck diente. Die Pharaonen verfolgten noch einen anderen und wichtigeren Zweck als die Errichtung enormer Grabmäler.

Mendelssohn 1973
Kurt Mendelssohn, *A Building Disaster at the Meidum Pyramid*. Journal of Egyptian Archaeology **59** (1973), 60–71.
In 1837 J. S. Perring suggested that the heavily ruined state of the Meidum Pyramid was due to the action of stone robbers who used the structure as a quarry. This explanation was repeated by Petrie2 and Borchardt,3 and has since been generally accepted. After a visit to the site in 1965 I became convinced that the mass, nature, and disposition of the debris surrounding the building (pl. XXX, i) indicated a catastrophe in the final stage of its construction. Although this explanation was published in scientific magazines, it attracted considerable attention among Egyptologists and archaeologists. In the present paper the technological

evidence for the thecollapse and its influence on the construction of subsequent pyramids is therefore set out in more rigorous form.

Mendelssohn 1974
Kurt Mendelssohn, *The Riddle of the Pyramids*. (London 1974).

Time 1971
Science: Make-Work on the Nile. Time **1971**, V-10.
For many years, Egyptologists have puzzled over a major archaeological riddle. If each pharaoh built a pyramid for use as his own tomb and his eventual ascension to the sun, why are there more pyramids than there were pharaohs? British Physicist Kurt Mendelssohn believes that he has discovered the answer. Writing in American Scientist, he suggests that the pharaohs directed the construction of several pyramids at the same time to achieve maximum employment. Building the pyramids, in other words, may have been history's first great public-works project.

Methoden

Hesse 2013
Ralf Hesse, *Strict solar alignment of Bronze Age rock carvings in SE Sweden? Critical remarks on an archaeoastronomical case study*. Journal of Archaeological Science **40** (2013), 2321–2325.
A recently published paper proposing a "strict solar alignment" of figurative rock carvings in southern Sweden requires some critical and cautionary remarks. Using the paper "Strict solar alignment of Bronze Age rock carvings in SE Sweden" by N.-A. Mörner as a case study, various pitfalls and challenges in archaeoastronomical investigations are highlighted. Substantiating the idea of a relationship between the orientation of archaeological features such as rock carvings and astronomical events such as sunrise at winter solstice requires accurate and precise determination of (i) the orientation of the archaeological features and (ii) the azimuth of the astronomical event at the time of creation of the rock carvings, taking into account all influencing factors such as changes in Earth orbit parameters, surrounding topography and vegetation. Furthermore, possible motivations or intentions of Bronze Age rock carvers have to be considered. When trying to support a causal link between the orientation of archaeological features and astronomical events, it is indispensable to discuss and exclude possible alternative explanations, related to, for example, rock carving practice and visibility. Taking into account the above issues, there is no evidence for a solar alignment of the Järrestad rock carvings. The issues discussed using the Järrestad rock carvings as a case study are relevant to archaeoastronomical investigations in general.
Keywords: Archaeoastronomy | Accuracy | Precision | Rock carvings | Sweden | Bronze Age | LIDAR

Mörner 2012
Nils-Axel Mörner, *Strict solar alignment of Bronze Age rock carvings in SE Sweden*. Journal of Archaeological Science **39** (2012), 3301–3305.
see also: Hesse, J.Arch.Sci **40** (2013), 2321–2325.
JArchSci40-2321-Hesse.pdf
The Järrestad rock carving site in SE Sweden from the Bronze Age is examined as to the orientation of the individual carvings. A very strict orientation with respect to the main stages in the annual rhythm of the Sun is recorded; 60 feet, 61

shoes and a leading dancer all face the sunrise at Winter solstice, 20 ships face the sunset at Winter solstice, 12 feet point to the sunset at Summer solstice, and one serpent wiggles towards the sunrise at Summer solstice. Obviously, the Bronze Age people kept a strict control of the Sun's annual motions. The sunrise at Winter solstice seems to have been especially important.
Keywords: Solar alignment | Rock carvings | The Bronze Age | SE Sweden

Physik

Mendelssohn 1966
Kurt Mendelssohn, *The Quest for Absolute Zero*, *The meaning of low temperature physics*. World University Library (London 1966).