Liste erstellt am 2013-09-22

Literatur

Aktuell

Ball 2013

Philip Ball, *Quantum Quest*. nature **501** (2013), 154–156.

"The very best quantum-foundational effort," says Christopher Fuchs of the Perimeter Institute for Theoretical Physics in Waterloo, Canada, "will be the one that can write a story — literally a story, all in plain words — so compelling and so masterful in its imagery that the mathematics of quantum mechanics in all its exact technical detail will fall out as a matter of course".

Egyed 1963

L. Egyed, *The expanding earth?* nature **197** (1963), 1059–1060.

MacDougall 1963

John MacDougall, Richard Butler, Philipp Kronberg & Aage Sandqvist, *A comparison of terrestrial and universal expansion*. nature **199** (1963), 1080.

Prof. L. Egyed has recently summarized a number of hypotheses concerning the expansion of the Earth, and has suggested that the Earth's radius is expanding at a rate of 0.5–1.0 mm per year. There appears to be a remarkably close agreement between the rate of increase of the Earth's radius and that of the universe according to Hubble's law. Using the at present accepted value for Hubble's constant, H = 100 km/s/megaparsec, which is 1.65×10^{-4} mm per year per mile, and substituting the value of the Earth's radius in the Hubble equation, v = RH, we obtain a radial expansion for the Earth of 0.66 mm per year. While this agreement may be fortuitous it may suggest a fundamental concordance between expansion processes in the Earth's core and those responsible for the expansion of the universe.

Powell 2013

Devin Powell, *Physicists net fractal butterfly*. nature **501** (2013), 144–145.

Decades-old search closes in on recursive pattern that describes electron behaviour.

Anthropologie

Ferry 2013

Alissa L. Ferry, Susan J. Hespos & Sandra R. Waxman, *Nonhuman primate vocalizations support categorization in very young human infants*. PNAS **110** (2013), 15231–15235.

pnas110-15231-Supplement1.wav, pnas110-15231-Supplement2.wav

Language is a signature of our species and our primary conduit for conveying the contents of our minds. The power of language derives not only from the exquisite detail of the signal itself but also from its intricate link to human cognition. To acquire a language, infants must identify which signals are part of their language

and discover how these signals are linked to meaning. At birth, infants prefer listening to vocalizations of human and nonhuman primates; within 3 mo, this initially broad listening preference is tuned specifically to human vocalizations. Moreover, even at this early developmental point, human vocalizations evoke more than listening preferences alone: they engender in infants a heightened focus on the objects in their visual environment and promote the formation of object categories, a fundamental cognitive capacity. Here, we illuminate the developmental origin of this early link between human vocalizations and cognition. We document that this link emerges from a broad biological template that initially encompasses vocalizations of human and nonhuman primates (but not backward speech) and that within 6 mo this link to cognition is tuned specifically to human vocalizations. At 3 and 4 mo, nonhuman primate vocalizations promote object categorization, mirroring precisely the advantages conferred by human vocalizations, but by 6 mo, nonhuman primate vocalizations no longer exert this advantageous effect. This striking developmental shift illuminates a path of specialization that supports infants as they forge the foundational links between human language and the core cognitive processes that will serve as the foundations of meaning.
infancy | developmental tuning | language acquisition | conceptual development | language and thought

McGurk 1976

Harry McGurk & John MacDonald, *Hearing lips and seeing voices.* nature **264** (1976), 746–748.

Most verbal communication occurs in contexts where the listener can see the speaker as well as hear him. However, speech perception is normally regarded as a purely auditory process. The study reported here demonstrates a previously unrecognised influence of vision upon speech perception. It stems from an observation that, on being shown a film of a young woman's talking head, in which repeated utterances of the syllable [ba] had been dubbed on to lip movements for [ga], normal adults reported hearing [da]. With the reverse dubbing process, a majority reported hearing [bagba] or [gaba]. When these subjects listened to the soundtrack from the film, without visual input, or when they watched untreated film, they reported the syllables accurately as repetitions of [ba] or [ga]. Subsequent replications confirm the reliability of these findings; they have important implications for the understanding of speech perception.

Mani 2013

Anandi Mani, Sendhil Mullainathan, Eldar Shafir & Jiaying Zhao, *Poverty Impedes Cognitive Function.* science **341** (2013), 976–980.

s341-0976-Supplement.pdf

The poor often behave in less capable ways, which can further perpetuate poverty. We hypothesize that poverty directly impedes cognitive function and present two studies that test this hypothesis. First, we experimentally induced thoughts about finances and found that this reduces cognitive performance among poor but not in well-off participants. Second, we examined the cognitive function of farmers over the planting cycle. We found that the same farmer shows diminished cognitive performance before harvest, when poor, as compared with after harvest, when rich. This cannot be explained by differences in time available, nutrition, or work effort. Nor can it be explained with stress: Although farmers do show more stress before harvest, that does not account for diminished cognitive performance. Instead, it appears that poverty itself reduces cognitive capacity. We suggest that this is because poverty-related concerns consume mental resources, leaving less for other tasks. These data provide a previously unexamined perspective and help explain a

spectrum of behaviors among the poor. We discuss some implications for poverty policy.

Vohs 2013
: Kathleen D. Vohs, *The Poor's Poor Mental Power*. science **341** (2013), 969–970.
Poverty's mental toll might explain its connection to unhealthy impulsive behaviors.
The depletion of mental functioning with poverty comports with a framework called the limited-resource model of self-control. Self-control may be the greatest human strength because it is involved in the ability to make wise choices. Several studies have found that after using self-control (and thus reducing the resource), decision-making patterns shift toward favoring intuitive over reasoned options.

Bibel

Faust 2013
: Avraham Faust, *Decoration versus Simplicity: Pottery and Ethnic Negotiation in Early Israel*. In: Bracha Yaniv, Mirjam Rajner & Ilia Rodov (Hrsg.), *Ars Judaica, Volume 9*. (Oxford 2013), 7–7.
007-Figures.zip
Pottery in ancient Israel and Judah was simple and undecorated. This stands in sharp contrast to most other societies in the Iron Age I and II, in which some forms (sometimes many) of pottery were decorated.
It appears that this tradition became meaningful already during the Iron Age I, when the Israelites were negotiating their identity with the Egypto-Canaanite system, and later with the Philistines. As part of this ethnic negotiation, the Israelites asserted their identity in contrast to stronger and more complex societies, and consequently defined themselves as simple and egalitarian. One of the manifestations of this ethos was the meaning that was invested in the lack of decoration on pottery. This "simplicity" accompanied Israelite society throughout the biblical period, and even beyond.

Biologie

de Waal 2013
: Frans B. M. de Waal & Sergey Gavrilets, *Monogamy with a purpose*. PNAS **110** (2013), 15167–15168.
Because human monogamy is unlikely to have arisen in the context of mutually exclusive female ranges, it appears fundamentally different from, say, the well-known monogamy of gibbons or marmosets, which live in isolated pairs. Several scenarios try to explain the advantages of monogamy within a larger society, one of which harks back to Morris' (2) proposal that by sexually and reproductively equalizing the men within a community, pair-bonding fosters cooperation (13, 14). Even if the origins of monogamy in humans are unique, the two analyses discussed here offer a first hint of the conditions favoring the evolution of monogamy, which may help us understand how the human case compares with that of other animals, and which natural tendencies (e.g., bonding, caring) it recruited to arrive at a similar arrangement.

Datierung

Benz 2012

Marion Benz, Aytaç Coşkun, Irka Hajdas, Katleen Deckers, Simone Riehl, Kurt W. Alt, Bernhard Weninger & Vecihi Özkaya, *Methodological implications of new radiocarbon dates from the early holocene site of Körtik Tepe, southeast Anatolia*. Radiocarbon **54** (2012), 291–304.

One of the greatest challenges of contemporary archaeology is to synthesize the large amount of radiocarbon and archaeological data into a useful dialogue. For the late Epipaleolithic and the Early Neolithic of the Near East, many 14C ages have been published without precise stratigraphic documentation. Consequently, for archaeological age models we often must use some more elementary approaches, such as probabilistic summation of calibrated ages. The stratigraphy of Körtik Tepe allows us for the first time to study an extended series of 14C ages of the earliest Holocene. In particular, we are able to analyze the data according to stratigraphic position within a well-documented profile. However, because of a plateau in the 14C age calibration curve at the transition from the Younger Dryas to the Early Holocene, dates of this period can be interpreted only if an extended sequence of dates is available. Due to problems remaining in the calibration procedure, the best way to achieve an interpretation is to compare the results of different 14C calibration software. In the present paper, we use the results of the calibration programs OxCal and CalPal. This approach has important implications for future age modeling, in particular for the question of how to date the transition from the Epipaleolithic to the PPNA precisely and accurately.

Weninger 2009

Bernhard Weninger & Reinhard Jung, *Absolute Chronology of the End of the Aegean Bronze Age*. In: Sigrid Deger-Jalkotzy & Anna Elisabeth Bächle (Hrsg.), *LH IIIC Chronology and Synchronisms*, *III: LH IIIC Late and the Transition to the Early Iron Age*. Philosophisch-Historische Klasse, Denkschriften 384 (Wien 2009), 373–416.

Most important, we conclude there exists near-perfect agreement (with remaining errors on the scale of a few decades) between the traditional historical-archaeological dating of the Aegean Late Bronze Age – for all phases between LH III B Early and Submycenaean – and the tree-ring calibrated 14C-data as obtained from Kastanás. As a result of chronological finetuning of finds from the sites of Kastanás, IJssiros, Tiryns, Tell Kazel and Ugarit, and by transfer of dendrodates from Switzerland via Italy to the Aegean, we make a new proposal for the absolute chronology of the end of the Greek Late Bronze and the beginning of the Early Iron Age (Fig. 14).

We further conclude that the long-standing dating-discrepancies at Kastanás can be explained by a combination (stacking) of different effects, mainly: (i) measurements performed on 'old-wood' samples, (ii) major distortion of calibrated ages for short-lived (≈ 1–4 yr old animal bone) samples by application of an inadequate (10–20 yr) tree-ring calibration curve, and (iii) inadequate (over-smoothed) construction of tree-ring calibration curves (both INTCAL98 and all the more INTCAL04), based on an inadequately low tree-ring sample density. This explanation is demonstrated by pairwise comparisons of the archaeological data with the INTCAL04 curve, the archaeological data with INTCAL04 raw data, as well as the INTCAL04 curve with INTCAL04 raw data.

The inescapable corollary of this work is that the Radiocarbon Community must seriously consider undertaking a major research program, directed at establishing a Holocene 14C-age calibration based on a continuous sequence of annual samples. This annual 14C-age calibration would supply to archaeologists, on a world-wide scale, the widely requested chronological control over cultural events and processes, including the Aegean Late Bronze Age under study in the present paper, with achievable decadel dating precision.

Klima

Coulthard 2013

Tom J. Coulthard, Jorge A. Ramirez, Nick Barton, Mike Rogerson & Tim Brücher, *Were Rivers Flowing across the Sahara During the Last Interglacial? Implications for Human Migration through Africa.* PLoS ONE **8** (2013), e74834. DOI:10.1371/journal.pone.0074834.

Human migration north through Africa is contentious. This paper uses a novel palaeohydrological and hydraulic modelling approach to test the hypothesis that under wetter climates c.100,000 years ago major river systems ran north across the Sahara to the Mediterranean, creating viable migration routes. We confirm that three of these now buried palaeo river systems could have been active at the key time of human migration across the Sahara. Unexpectedly, it is the most western of these three rivers, the Irharhar river, that represents the most likely route for human migration. The Irharhar river flows directly south to north, uniquely linking the mountain areas experiencing monsoon climates at these times to temperate Mediterranean environments where food and resources would have been abundant. The findings have major implications for our understanding of how humans migrated north through Africa, for the first time providing a quantitative perspective on the probabilities that these routes were viable for human habitation at these times.

Painter 2013

Thomas H. Painter, Mark G. Flanner, Georg Kaser, Ben Marzeion, Richard A. VanCuren & Waleed Abdalati, *End of the Little Ice Age in the Alps forced by industrial black carbon.* PNAS **110** (2013), 15216–15221.

Glaciers in the European Alps began to retreat abruptly from their mid-19th century maximum, marking what appeared to be the end of the Little Ice Age. Alpine temperature and precipitation records suggest that glaciers should instead have continued to grow until circa 1910. Radiative forcing by increasing deposition of industrial black carbon to snow may represent the driver of the abrupt glacier retreats in the Alps that began in the mid-19th century. Ice cores indicate that black carbon concentrations increased abruptly in the mid-19th century and largely continued to increase into the 20th century, consistent with known increases in black carbon emissions from the industrialization of Western Europe. Inferred annual surface radiative forcings increased stepwise to 13–17 W • m-2 between 1850 and 1880, and to 9–22 W • m-2 in the early 1900s, with snowmelt season (April/May/June) forcings reaching greater than 35 W • m-2 by the early 1900s. These snowmelt season radiative forcings would have resulted in additional annual snow melting of as much as 0.9 m water equivalent across the melt season. Simulations of glacier mass balances with radiative forcingequivalent changes in atmospheric temperatures result in conservative estimates of accumulating negative mass balances of magnitude -15 m water equivalent by 1900 and -30 m water equivalent by 1930, magnitudes and timing consistent with the observed retreat. These

results suggest a possible physical explanation for the abrupt retreat of glaciers in the Alps in the mid-19th century that is consistent with existing temperature and precipitation records and reconstructions.
aerosol | cryosphere | albedo | climate

Straub 2013

Marietta Straub et al., *Changes in North Atlantic nitrogen fixation controlled by ocean circulation*. nature **501** (2013), 200–203.

n501-0200-Supplement.pdf

Marietta Straub, Daniel M. Sigman, Haojia Ren, Alfredo Martínez-García, A. Nele Meckler, Mathis P. Hain & Gerald H. Haug

In the ocean, the chemical forms of nitrogen that are readily available for biological use (known collectively as 'fixed' nitrogen) fuel the global phytoplankton productivity that exports carbon to the deep ocean1–3. Accordingly, variation in the oceanic fixed nitrogen reservoir has been proposed as a cause of glacial–interglacial changes in atmospheric carbon dioxide concentration2,3.Marine nitrogen fixation, which produces most of the ocean's fixed nitrogen, is thought to be affected by multiple factors, including ocean temperature4 and the availability of iron2,3,5 and phosphorus6. Here we reconstruct changes in North Atlantic nitrogen fixation over the past 160,000 years from the shell-bound nitrogen isotope ratio (15N/14N) of planktonic foraminifera in Caribbean Sea sediments. The observed changes cannot be explained by reconstructed changes in temperature, the supply of (iron-bearing) dust or water column denitrification. We identify a strong, roughly 23,000-year cycle in nitrogen fixation and suggest that it is a response to orbitally driven changes in equatorial Atlantic upwelling7, which imports 'excess' phosphorus (phosphorus in stoichiometric excess of fixed nitrogen) into the tropical North Atlantic surface5,6. In addition, we find that nitrogen fixation was reduced during glacial stages 6 and 4, when North Atlantic Deep Water had shoaled to become glacial North Atlantic intermediate water8, which isolated the Atlantic thermocline from excess phosphorus-rich middepth waters that today enter from the Southern Ocean. Although modern studies have yielded diverse views of the controls on nitrogen fixation1,2,4,5, our palaeobiogeochemical data suggest that excess phosphorus is the master variable in the North Atlantic Ocean and indicate that the variations in its supply over the most recent glacial cycle were dominated by the response of regional ocean circulation to the orbital cycles.

Wu 2013

Yingzhe Wu, Mukul Sharma, Malcolm A. LeCompte, Mark N. Demitroff & Joshua D. Landis, *Origin and provenance of spherules and magnetic grains at the Younger Dryas boundary*. PNAS **110** (2013), E3557–E3566.

One or more bolide impacts are hypothesized to have triggered the Younger Dryas cooling at ≈12.9 ka. In support of this hypothesis, varying peak abundances of magnetic grains with iridium and magnetic microspherules have been reported at the Younger Dryas boundary (YDB). We show that bulk sediment and/or magnetic grains/microspherules collected from the YDB sites in Arizona, Michigan, New Mexico, New Jersey, and Ohio have 187Os/188Os ratios ≥1.0, similar to average upper continental crust (= 1.3), indicating a terrestrial origin of osmium (Os) in these samples. In contrast, bulk sediments from YDB sites in Belgium and Pennsylvania exhibit 187Os/188Os ratios «1.0 and at face value suggest mixing with extraterrestrial Os with 187Os/188Os of ≈0.13. However, the Os concentration in bulk sample and magnetic grains from Belgium is 2.8 pg/g and 15 pg/g, respectively, much lower than that in average upper continental crust (=31 pg/g), indicating

no meteoritic contribution. The YDB site in Pennsylvania is remarkable in yielding 2- to 5-mm diameter spherules containing minerals such as suessite (Fe-Ni silicide) that form at temperatures in excess of 2000 °C. Gross texture, mineralogy, and age of the spherules appear consistent with their formation as ejecta from an impact 12.9 ka ago. The 187Os/188Os ratios of the spherules and their leachates are often low, but Os in these objects is likely terrestrially derived. The rare earth element patterns and Sr and Nd isotopes of the spherules indicate that their source lies in 1.5-Ga Quebecia terrain in the Grenville Province of northeastern North America.
cometary | glaciation

Kultur

d'Errico 1995

Francesco d'Errico, *A New Model and its Implications for the Origin of Writing, The La Marche Antler Revisited*. Cambridge Archaeological Journal **5** (1995), 163–206.

Current models for the origin of writing do not pay sufficient attention to the origin and early development of means adopted by modern humans to record, transmit and process information outside the human body. The present article attempts to fill this gap by elaborating a theoretical model able to classify and describe the variability of these systems. The model is applied to the study of the engraved antler from La Marche, one of the better-known Palaeolithic objects to have been interpreted as an early system of notation. Technical analysis of the marks, through application of a range of experimental criteria, suggests that the sets of marks carved on this object should be interpreted as an artificial memory system with a complex code based on the morphology and the spatial distribution of the engraved marks. These results have important implications for current theories on the origin of writing.

Mittelpaläolithikum

Bocherens 2013

Hervé Bocherens, Gennady Baryshnikov & Wim Van Neer, *Were bears or lions involved in salmon accumulation in the Middle Palaeolithic of the Caucasus? An isotopic investigation in Kudaro 3 cave*. Quaternary International (2013), preprint, 1–7. DOI:10.1016/j.quaint.2013.06.026.

Bone fragments of large anadromous salmon in the Middle Palaeolithic archaeological layers of Kudaro 3 cave (Caucasus) suggested fish consumption by archaic Hominins, such as Neandertals. However, large carnivores such as Asiatic cave bears (Ursus kudarensis) and cave lions (Panthera spelaea) were also found in the cave and could have been responsible for such an accumulation. The diet of these carnivores was evaluated using carbon, nitrogen and sulphur isotopes in faunal bone collagen. The results suggest that anadromous fish were neither part of the diet of either cave bear (vegetarian) or cave lion (predators of herbivores from arid areas) and therefore provide indirect support to the idea that Middle Palaeolithic Hominins, probably Neandertals, were able to consume fish when it was available.

Politik

Lo 2013

Adeline Lo & James H. Fowler, *The mathematics of murder*. nature **501** (2013), 170–171.

A mathematical model of gun ownership has been developed that clarifies the debate on gun control and tentatively suggests that firearms restrictions may reduce the homicide rate.

Wodarz and Komarova assume that there is a positive relationship between the number of gun owners and the number of potential gun-related attackers. This is reasonable: if there are no guns, there will be no attacks with guns. But the authors also assume that there is a negative relationship between the rate of gun ownership and the likelihood that a gun-wielding attacker actually uses his or her weapon. This is because non-criminals may own guns, too. If a potential victim possesses a gun, a potential attacker might think twice about attacking.

A few other factors are also included in the model, such as the risk of dying in a gun attack, and the availability and take-up of illegal arms in the face of varying levels of gun control. But the key insight is that there are essentially two perfect worlds, one in which no one owns a gun (meaning no one is able to attack) and one in which everyone owns a gun (meaning no one is willing to attack). In between, we get the worst of both worlds because some criminals have guns and they choose to use them. This means that the effect of gun availability is crucially dependent on where we sit between these two worlds.

Wodarz 2013

Dominik Wodarz & Natalia L. Komarova, *Dependence of the Firearm-Related Homicide Rate on Gun Availability, A Mathematical Analysis*. PLoS ONE **8** (2013), e71606. DOI:10.1371/journal.pone.0071606.

pone08-e71606-Supplement1.pdf, pone08-e71606-Supplement2.txt

In the USA, the relationship between the legal availability of guns and the firearm-related homicide rate has been debated. It has been argued that unrestricted gun availability promotes the occurrence of firearm-induced homicides. It has also been pointed out that gun possession can protect potential victims when attacked. This paper provides a first mathematical analysis of this tradeoff, with the goal to steer the debate towards arguing about assumptions, statistics, and scientific methods. The model is based on a set of clearly defined assumptions, which are supported by available statistical data, and is formulated axiomatically such that results do not depend on arbitrary mathematical expressions. According to this framework, two alternative scenarios can minimize the gun-related homicide rate: a ban of private firearms possession, or a policy allowing the general population to carry guns. Importantly, the model identifies the crucial parameters that determine which policy minimizes the death rate, and thus serves as a guide for the design of future epidemiological studies. The parameters that need to be measured include the fraction of offenders that illegally possess a gun, the degree of protection provided by gun ownership, and the fraction of the population who take up their right to own a gun and carry it when attacked. Limited data available in the literature were used to demonstrate how the model can be parameterized, and this preliminary analysis suggests that a ban of private firearm possession, or possibly a partial reduction in gun availability, might lower the rate of firearm-induced homicides. This, however, should not be seen as a policy recommendation, due to the limited data available to inform and parameterize the model. However, the model clearly defines what needs to be measured, and provides a basis for a scientific discussion about assumptions and data.