

References

Aktuell

BETSCH 2015

Cornelia Betsch, Lars Korn & Cindy Holtmann, *Don't try to convert the antivaccinators, instead target the fence-sitters*. [PNAS 112 \(2015\), E6725–E6726](#).

The data show that countering antivaccination attitudes is difficult. Rather than attempting to convert a small number of antivaccinators, it seems more promising to target the larger group of fence-sitters because they may be more responsive to interventions.

BOSLOUGH 2015

Mark Boslough et al., *Incomplete Bayesian model rejects contradictory radiocarbon data for being contradictory*. [PNAS 112 \(2015\), E6722](#).

Mark Boslough, Kathleen Nicoll, Tyrone L. Daulton, Andrew C. Scott, Philippe Claeys, Jacquelyn L. Gill, Jennifer R. Marlon & Patrick J. Bartlein

It is because they reject dates that contradict their model that Kennett et al. arrive at a conclusion that contradicts ours.

BUTLER 2015

Declan Butler, *Why Europeans turn to jihad*. [nature 528 \(2015\), 20–21](#).

Terrorism is tough to study, but researchers have gleaned insights from the current generation of Islamist extremists.

The characteristics that extremists seem to share are resentment directed at society and a narcissistic need for recognition that leaves them open to a narrative of violent glory, said Roy.

HOLLIDAY 2015

Vance T. Holliday, *Problematic dating of claimed Younger Dryas boundary impact proxies*. [PNAS 112 \(2015\), E6721](#).

The data presented above and elsewhere provide evidence for multiple horizons with “impact proxies” at times other than the YDB, and raise doubts about the utility of the statistical manipulations to address the dating of the YDB, which can be no better than the data on which they are based.

HORNE 2015

Zachary Horne, Derek Powell, John E. Hummel & Keith J. Holyoak, *Highlighting risks of diseases shifts vaccine attitudes, Reply to Betsch et al.* [PNAS 112 \(2015\), E6727](#).

KENNETT 2015

James P. Kennett et al., *Synchronicity of widespread Bayesian-modeled ages supports Younger Dryas impact hypothesis, Reply to Holliday and Boslough et al.* [PNAS 112 \(2015\), E6723–E6724](#).

James P. Kennett, Douglas J. Kennett, Brendan J. Culleton, J. Emili Aura Tortosa, Ted E. Bunch, Jon M. Erlandson, John R. Johnson, Jesús F. Jordá Pardo, Malcome A. LeCompte, William C. Mahaney, Kenneth Barnett Tankersley, James H. Wittke, Wendy S. Wolbach & Allen West

LAURANCE 2015

William F. Laurance, Sean Sloan, Lingfei Weng & Jeffrey A. Sayer, *Estimating the Environmental Costs of Africa's Massive "Development Corridors"*. *Current Biology* (2015), preprint, 1–8. DOI:10.1016/j.cub.2015.10.046.

In sub-Saharan Africa, dozens of major "development corridors" have been proposed or are being created to increase agricultural production [1–4], mineral exports [5–7], and economic integration. The corridors involve large-scale expansion of infrastructure such as roads, railroads, pipelines, and port facilities and will open up extensive areas of land to new environmental pressures [1, 4, 8]. We assessed the potential environmental impacts of 33 planned or existing corridors that, if completed, would total over 53,000 km in length and crisscross much of the African continent. We mapped each corridor and estimated human occupancy (using the distribution of persistent night-lights) and environmental values (endangered and endemic vertebrates, plant diversity, critical habitats, carbon storage, and climate-regulation services) inside a 50-km-wide band overlaid onto each corridor. We also assessed the potential for each corridor to facilitate increases in agricultural production. The corridors varied considerably in their environmental values, and many were only sparsely populated. Because of marginal soils or climates, some corridors appear to have only modest agricultural potential. Collectively, the corridors would bisect over 400 existing protected areas and could degrade a further 1,800 by promoting habitat disruption near or inside the reserves. We conclude that many of the development corridors will promote serious and largely irreversible environmental changes and should proceed only if rigorous mitigation and protection measures can be employed. Some planned corridors with high environmental values and limited agricultural benefits should possibly be cancelled altogether.

LEHMANN 2015

Johannes Lehmann & Markus Kleber, *The contentious nature of soil organic matter*. *nature* **528** (2015), 60–68.

The exchange of nutrients, energy and carbon between soil organic matter, the soil environment, aquatic systems and the atmosphere is important for agricultural productivity, water quality and climate. Long-standing theory suggests that soil organic matter is composed of inherently stable and chemically unique compounds. Here we argue that the available evidence does not support the formation of large-molecular-size and persistent 'humic substances' in soils. Instead, soil organic matter is a continuum of progressively decomposing organic compounds. We discuss implications of this view of the nature of soil organic matter for aquatic health, soil carbon-climate interactions and land management.

LI 2015

Wen-Wei Li, Han-Qing Yu & Bruce E. Rittmann, *Reuse water pollutants*. *nature* **528** (2015), 29–31.

Extracting carbon, nitrogen and phosphorus from wastewater could generate resources and save energy, say Wen-Wei Li, Han-Qing Yu and Bruce E. Rittmann.

Precipitated by adding calcium, iron or aluminum salts, 90 % of the phosphorus ends up buried in landfill because the precipitates cannot be taken up by plants and are often contaminated with toxic metals.

REARDON 2015

Sara Reardon, *Brain study seeks roots of suicide*. [nature 528 \(2015\), 19](#).

A clinical trial will look at the neurological structure and function of people who have attempted suicide.

There is evidence that genetics influences a person's suicide risk. For instance, biological relatives of adopted children who kill themselves are several times more likely to take their own lives than the general population. Those who study suicidal people say that they treat them with special care—and that the overall benefits of such studies outweigh any risks. “In most clinical trials, people at high risk of suicide are excluded, so we don't know how to treat them,” Jollant says. “We need to assess this population, not just say “‘exclude them from trials’”.

Amerika Biologie

KISTLER 2015

Logan Kistler, Lee A. Newsom, Timothy M. Ryan, Andrew C. Clarke, Bruce D. Smith & George H. Perry, *Gourds and squashes (Cucurbita spp.) adapted to megafaunal extinction and ecological anachronism through domestication*. [PNAS 112 \(2015\), 15107–15112](#).

pnas112-15107-Supplement1.rtf, pnas112-15107-Supplement2.rtf, pnas112-15107-Supplement3.rtf, pnas112-15107-Supplement4.rtf

The genus *Cucurbita* (squashes, pumpkins, gourds) contains numerous domesticated lineages with ancient New World origins. It was broadly distributed in the past but has declined to the point that several of the crops' progenitor species are scarce or unknown in the wild. We hypothesize that Holocene ecological shifts and megafaunal extinctions severely impacted wild *Cucurbita*, whereas their domestic counterparts adapted to changing conditions via symbiosis with human cultivators. First, we used high-throughput sequencing to analyze complete plastid genomes of 91 total *Cucurbita* samples, comprising ancient ($n = 19$), modern wild ($n = 30$), and modern domestic ($n = 42$) taxa. This analysis demonstrates independent domestication in eastern North America, evidence of a previously unknown pathway to domestication in northeastern Mexico, and broad archaeological distributions of taxa currently unknown in the wild. Further, sequence similarity between distant wild populations suggests recent fragmentation. Collectively, these results point to wild-type declines coinciding with widespread domestication. Second, we hypothesize that the disappearance of large herbivores struck a critical ecological blow against wild *Cucurbita*, and we take initial steps to consider this hypothesis through cross-mammal analyses of bitter taste receptor gene repertoires. Directly, megafauna consumed *Cucurbita* fruits and dispersed their seeds; wild *Cucurbita* were likely left without mutualistic dispersal partners in the Holocene because they are unpalatable to smaller surviving mammals with more bitter taste receptor genes. Indirectly, megafauna maintained mosaic-like landscapes ideal for *Cucurbita*, and vegetative changes following the megafaunal extinctions likely crowded out their disturbed-ground niche. Thus, anthropogenic landscapes provided favorable growth habitats and willing dispersal partners in the wake of ecological upheaval.

Keywords: evolutionary ecology | sensory ecology | TAS2R genes | ancient DNA | archaeogenomics

Significance: Squashes, pumpkins, and gourds belonging to the genus *Cucurbita* were domesticated on several occasions throughout the Americas, beginning around 10,000 years ago. The wild forms of these species are unpalatably bitter to humans and other extant mammals, but their seeds are present in mastodon dung deposits, demonstrating that they may have been dispersed by large-bodied herbivores undeterred by their bitterness. However, *Cucurbita* may have been poorly adapted to a landscape lacking these large dispersal partners. Our study proposes a link between the disappearance of megafaunal mammals from the landscape, the decline of wild *Cucurbita* populations, and, ultimately, the evolution of domesticated *Cucurbita* alongside human cultivators.

Bibel

ATHAS 2009

George Athas, *In Search of the Seventy 'Weeks' Of Daniel 9*. [Journal of Hebrew Scriptures 9 \(2009\), 2](#).

In conclusion, this new understanding of the seventy 'weeks' is able to make sense of both the literary features of the book of Daniel, as well as provide fairly precise dates for the calculation of the seventy 'weeks'. While it may leave us feeling that the author of Daniel has performed some mathematical and historical gymnastics, it elucidates one of the key concerns of the book of Daniel, which is to provide a theological comment on the foreign rule of the Jewish people. The author evidently felt that the repatriation of Jews under foreign overlords was not theologically satisfying, for it fell short of a true restoration which entailed the end of foreign rule over the Jews. Repatriation to the land, therefore, was not enough. However, the author was also not a revolutionary zealot, but one who believed that the overthrow of foreign rule could only be achieved by an act of God. In other words, the author possessed a truly apocalyptic mindset. As such, the author seems to have been averse to taking up arms and advocated instead faithfulness to Jewish customs despite the personal cost this might entail (cf. Dan 3; 6). Indeed, in Daniel 9, Onias III, the anointed High Priest, seems to be the salient example of such a stance. The author of Daniel preferred quiet resistance until the time when, inevitably, God would act decisively for the faithful among his people.

BLOCH-SMITH 2015

Elizabeth Bloch-Smith, *Massebot Standing for Yhwh, The Fall of a Yhwistic Cult Symbol*. In: JOHN J. COLLINS, T. M. LEMOS & SAUL M. OLYAN (Hrsg.), *Worship, Women, and War, Essays in Honor of Susan Niditch*. ([Providence 2015](#)), 99–115.

Both northern and southern texts accepted select Yhwistic stones without reservation. Stories of Jacob, Rachel, Moses, Joshua, Saul, and Absalom, plus the prophets Hosea and Isaiah, explicitly endorsed sacred stones. Micah, Kings, and the law codes prohibited massebot of foreign gods and so by implication perhaps accepted massebot of Yhwh, though Micah and the Holiness Code's view of a massebah as an image and object of worship suggests they condemned Yhwistic and non-Yhwistic stones alike.

Each of these proposals presumes an unverified as well as a direct association between the archaeological remains and the Bible. Such use of archaeological evidence is irresponsible. Very rarely are archaeological remains sufficiently precisely dated to argue a direct correspondence between the physical remains and a particular king or event. All the aforementioned scenarios are possible, but they lack the substantiating evidence that would raise the interpretation from merely possible

to plausible or probable. Based on the available evidence, a temple with a massebah, incense altars, and an altar was built during the late ninth or early eighth century in a Judahite fort near the southern border at Arad. If my alternative archaeological reconstruction is correct, the temple only functioned in Str. X, beginning as early as the later ninth century and continuing into approximately the mid-eighth century. Worship in this temple focused on a massebah that might have stood for either Yhwh or Baal. Who terminated this temple, when, and why are all unknown. Stratum IX builders incorporated the redesigned and rebuilt altar and incense burners, now mere construction stones, into a new structure, perhaps repurposed to fulfill the garrison's physical rather than religious needs. The massebah, as uncovered by the excavators, lay unceremoniously fallen in the niche area, buried under Str. IX constructional fill. This reconstruction allows for religious motives for terminating the temple, though they remain undocumented and archaeologically unsubstantiated. Whatever the motives, dating of the temple precludes termination in the context of Hezekiah or Josiah's alleged reforms.

The Arad massebah testifies to eighth-century royal support or tolerance for standing stones as marking the location of the deity's residence, or, more likely, given that the temple niche marked the location, as an aniconic image of the god. Over time, an object devoid of sanctity, a place marker, may have acquired divine status, comparable to Nehushtan. Sanctioned stones are amply attested in biblical texts.

KLETTNER 2010

Raz Kletter & Irit Ziffer, *Incense-Burning Rituals, From Philistine Fire Pans at Yavneh to the Improper Fire of Korah*. [Israel Exploration Journal](#) **60** (2010), 166–187.

Dozens of pottery fire pans composed of a bowl-like part and a handle were found in the Philistine repository pit at Yavneh, Israel. They date from the ninth-eighth centuries BCE and are published here for the first time. These vessels, derived from second-millennium BCE Aegean forms, have never before been identified in the Southern Levant. On the basis of the location of marks of burning, their relation to other finds and the pictorial evidence, we contend that the Yavneh fire pans were used in a cultic context for burning incense. Their discovery re opens the complex issues of the 'shovel' in the Old Testament and the use of incense in the Iron Age.

LISS 2005

Hanna Liss, Annette Böckler & Bruno Landthaler, *Tanach, Lehrbuch der jüdischen Bibel*. Schriften der Hochschule für jüdische Studien 8 (Heidelberg 2005).

MERKLEIN 1993

HELMUT MERKLEIN, KARLHEINZ MÜLLER & GÜNTER STEMBERGER (Hrsg.), *Bibel in jüdischer und christlicher Tradition, Festschrift für Johann Maier zum 60. Geburtstag*. Bonner Biblische Beiträge 88 (Frankfurt 1993).

Biologie

ASGHAR 2010

Shaheen Asghar, Andres Magnusson, Azad Khan, Keramat Ali & Akhtar Hussain, *In Bangladesh, Overweight Individuals Have Fewer*

Symptoms of Depression Than Nonoverweight Individuals. [Obesity 18 \(2010\), 1143–1145.](#)

The aim of this study was to examine whether the association between overweight and depression usually found in western societies would also be found in locations where overweight is not stigmatized. A total of 1,271 individuals from rural Bangladesh were randomly selected; the response rate was 76 %. Depressive symptoms were measured with the Montgomery-Asberg Depression Rating Scale (MADRS). The sum MADRS scores were 13.4 (s.d. = 5.8) and 18.5 (8.1) for overweight vs. nonoverweight (t = 6.6; P < 0.000) men, respectively, and 19.7 (7.8) and 23.2 (7.9) for overweight vs. nonoverweight women, respectively (t = 4.2; P < 0.000). Thus the MADRS score was lower in overweight individuals. After adjusting for sex and age, BMI significantly predicted the MADRS score (b = -0.3; t = 10.2; P < 0.000). These findings suggest that overweight may be related to fewer depressive symptoms in non-western cultures.

Energie

JACOBSON 2015

Mark Z. Jacobson, Mark A. Delucchi, Mary A. Cameron & Bethany A. Frew, *Low-cost solution to the grid reliability problem with 100 % penetration of intermittent wind, water, and solar for all purposes.* [PNAS 112 \(2015\), 15060–15065.](#)

This study addresses the greatest concern facing the large-scale integration of wind, water, and solar (WWS) into a power grid: the high cost of avoiding load loss caused by WWS variability and uncertainty. It uses a new grid integration-model and finds low-cost, no-load-loss, nonunique solutions to this problem on electrification of all US energy sectors (electricity, transportation, heating/cooling, and industry) while accounting for wind and solar time series data from a 3D global weather model that simulates extreme events and competition among wind turbines for available kinetic energy. Solutions are obtained by prioritizing storage for heat (in soil and water); cold (in ice and water); and electricity (in phase-change materials, pumped hydro, hydropower, and hydrogen), and using demand response. No natural gas, biofuels, nuclear power, or stationary batteries are needed. The resulting 2050–2055 US electricity social cost for a full system is much less than for fossil fuels. These results hold for many conditions, suggesting that low-cost, reliable 100 % WWS systems should work many places worldwide.

Keywords: energy security | climate change | grid stability | renewable energy | energy cost

Significance: The large-scale conversion to 100 % wind, water, and solar (WWS) power for all purposes (electricity, transportation, heating/cooling, and industry) is currently inhibited by a fear of grid instability and high cost due to the variability and uncertainty of wind and solar. This paper couples numerical simulation of time- and space-dependent weather with simulation of time-dependent power demand, storage, and demand response to provide low-cost solutions to the grid reliability problem with 100 % penetration of WWS across all energy sectors in the continental United States between 2050 and 2055. Solutions are obtained without higher-cost stationary battery storage by prioritizing storage of heat in soil and water; cold in water and ice; and electricity in phase-change materials, pumped hydro, hydropower, and hydrogen.

Judentum

HOLTZ 1984

BARRY W. HOLTZ (Hrsg.), *Back to the Sources, Reading the classic Jewish texts*. (New York 1984).

Klima

BAILLIE 1998

Mike G. L. Baillie, *Evidence for Climatic Deterioration in the 12th and 17th Centuries BC*. In: BERNHARD HÄNSEL (Hrsg.), *Mensch und Umwelt in der Bronzezeit Europas – Man and Environment in European Bronze Age, Abschlußtagung: Die Bronzezeit, das erste goldene Zeitalter Europas, Berlin, 17.–19. März 1997*. (Kiel 1998), 49–55.

The question is whether the abrupt, acid-related, presumably volcano-related, environmental downturns were sufficient in themselves to cause significant change in human societies. Or is it the case, as the data hints in Figures 4 and 5, that these occur in pre-existing periods of reduced temperature. If this latter point can be substantiated by future analysis, it may well turn out that the real significance of the 1628 BC and 1159 BC events is that they were superimposed on already deteriorating conditions. It again seems logical that agricultural populations subjected to stress can adapt to that stress up to a point. If a stressed agricultural population which has been adapting is suddenly confronted with an additional abrupt environmental downturn it is easy to imagine a system collapse.

RITZ 2015

Catherine Ritz, Tamsin L. Edwards, Gaël Durand, Antony J. Payne, Vincent Peyaud & Richard C. A. Hindmarsh, *Potential sea-level rise from Antarctic ice-sheet instability constrained by observations*. *nature* **528** (2015), 115–118.

n528-0115-Supplement1.pdf, n528-0115-Supplement2.xls, n528-0115-Supplement3.zip, n528-0115-Supplement4.mp4

Large parts of the Antarctic ice sheet lying on bedrock below sea level may be vulnerable to marine-ice-sheet instability (MISI)¹, a self-sustaining retreat of the grounding line triggered by oceanic or atmospheric changes. There is growing evidence^{2–4} that MISI may be underway throughout the Amundsen Sea embayment (ASE), which contains ice equivalent to more than a metre of global sea-level rise. If triggered in other regions^{5–8}, the centennial to millennial contribution could be several metres. Physically plausible projections are challenging⁹: numerical models with sufficient spatial resolution to simulate grounding-line processes have been too computationally expensive^{2,3,10} to generate large ensembles for uncertainty assessment, and lower-resolution model projections¹¹ rely on parameterizations that are only loosely constrained by present day changes. Here we project that the Antarctic ice sheet will contribute up to 30 cm sea-level equivalent by 2100 and 72 cm by 2200 (95 % quantiles) where the ASE dominates. Our processbased, statistical approach gives skewed and complex probability distributions (single mode, 10 cm, at 2100; two modes, 49 cm and 6 cm, at 2200). The dependence of sliding on basal friction is a key unknown: nonlinear relationships favour higher contributions. Results are conditional on assessments of MISI risk on

the basis of projected triggers under the climate scenario A1B (ref. 9), although sensitivity to these is limited by theoretical and topographical constraints on the rate and extent of ice loss. We find that contributions are restricted by a combination of these constraints, calibration with success in simulating observed ASE losses, and low assessed risk in some basins. Our assessment suggests that upper-bound estimates from low-resolution models and physical arguments⁹ (up to a metre by 2100 and around one and a half by 2200) are implausible under current understanding of physical mechanisms and potential triggers.

Kultur

FIDDYMENT 2015

Sarah Fiddymment et al., *Animal origin of 13th-century uterine vellum revealed using noninvasive peptide fingerprinting*. [PNAS 112 \(2015\), 15066–15071](#).

Sarah Fiddymment, Bruce Holsinger, Chiara Ruzzier, Alexander Devine, Annelise Binois, Umberto Albarella, Roman Fischer, Emma Nichols, Antoinette Curtis, Edward Cheese, Matthew D. Teasdale, Caroline Checkley-Scott, Stephen J. Milner, Kathryn M. Rudy, Eric J. Johnson, Jiří Vnouček, Mary Garrison, Simon McGrory, Daniel G. Bradley & Matthew J. Collins

Tissue-thin parchment made it possible to produce the first pocket Bibles: Thousands were made in the 13th century. The source of this parchment, often called “uterine vellum,” has been a long-standing controversy in codicology. Use of the Latin term abortivum in many sources has led some scholars to suggest that the skin of fetal calves or sheep was used. Others have argued that it would not be possible to sustain herds if so many pocket Bibles were produced from fetal skins, arguing instead for unexpected alternatives, such as rabbit. Here, we report a simple and objective technique using standard conservation treatments to identify the animal origin of parchment. The noninvasive method is a variant on zooarchaeology by mass spectrometry (ZooMS) peptide mass fingerprinting but extracts protein from the parchment surface by using an electrostatic charge generated by gentle rubbing of a PVC eraser on the membrane surface. Using this method, we analyzed 72 pocket Bibles originating in France, England, and Italy and 293 additional parchment samples that bracket this period. We found no evidence for the use of unexpected animals; however, we did identify the use of more than one mammal species in a single manuscript, consistent with the local availability of hides. These results suggest that ultrafine vellum does not necessarily derive from the use of abortive or newborn animals with ultrathin hides, but could equally well reflect a production process that allowed the skins of maturing animals of several species to be rendered into vellum of equal quality and fineness.

Keywords: pocket Bible | parchment | vellum | collagen | mass spectrometry

Significance: This study reports the first use, to our knowledge, of triboelectric extraction of protein from parchment. The method is noninvasive and requires no specialist equipment or storage. Samples can be collected without the need to transport the artifacts; instead, researchers can sample when and where possible and analyze when required. The level of access we have achieved highlights the importance of this technique. For this study, we have extracted proteins from 513 parchment samples, used to resolve the long-standing question of the origin of “uterine vellum.” We find no evidence of unexpected species, such as rabbit or squirrel. We suggest that uterine vellum was often an achievement of technological production using available resources, and would not have demanded unsustainable agricultural practices.

Kupfer

CHERNYKH 1998

Evgenij N. Chernykh, *Ancient mining and metallurgy in Eastern Europe, Ecological problems*. In: BERNHARD HÄNSEL (Hrsg.), *Mensch und Umwelt in der Bronzezeit Europas – Man and Environment in European Bronze Age, Abschlußtagung: Die Bronzezeit, das erste goldene Zeitalter Europas, Berlin, 17.–19. März 1997*. (Kiel 1998), 129–133.

According to the practice of the 18th and 19th centuries for smelting and refinement of a ton of copper (of merchandise quality), it was necessary to burn for charcoal from 300 to 500 cubic metres of the best wood – the pine or the birch (Chernykh 1994). This calculation does not include the charcoal necessary for the metalworking (for example, alloying or making finished goods). The wood needed for mining as such (timbering, staircases and so on), and for constructing various devices, which needed the best timbers, is not included either.

Calculations exist which demonstrate, that in the territory of South Urals one hectare of forested area could produce up to 250–270 cubic metres of satisfactory wood for burning it into charcoal (under condition of continuous tree-felling). Consequently, smelting and chemical refining of a ton of copper demanded in fact 1,5–2 hectares of good-quality forest for tree-felling. The process of re-establishment of conditional forest lasts up to 60 years for a birch and up to 80 years for a pine. But very often the reforestation did not take place at all: conditional forests were replaced by unconditional ones, which could not be used for producing charcoal.

ROVIRA 1999

Salvador Rovira, *Una propuesta metodológica para el estudio de la metalurgia prehistórica, El caso de Gornyy en la región de Kargaly (Orenburg, Rusia)*. *Trabajos de Prehistoria* 56 (1999), ii, 85–113.

A Methodological Proposal to Study the Prehistorical Metallurgy: The Case of Gornyy in the Kargaly Region (Orenburg, Russia)

Archaeological field-work realised at the site of Gornyy (occupied from 1700 to 1400 BC) has furnished an important collection of materials related to metallurgical activities (ores, slags, by-products and copper objects). These have been analyzed by a variety of instrumental techniques (scanning electron microscopy, X-ray fluorescence spectroscopy and metallography). The results show that metallurgy was a primitive one that worked oxidised copper ores by a non-slugging smelting process. Cast objects were finished by cold hammering and, on some occasions, annealing.

A replication of the prehistoric technology has been achieved by means of on-site smelting experiments. Thus, economic variables such as the efficiency of copper recovery and charcoal consumption have been evaluated and, using them, theoretical models of copper production and its behavioural impact have been constructed.

Keywords: Metallurgy | Slags | Ores | Copper Bronze Age | Srubnaya Culture | Russia | Smelting experiments

Kupfer Energie

CHERNYKH 1994

Eugène N. Chernykh, *L'ancienne production minière et métallurgique*

et les catastrophes écologiques anthropogènes, Introduction au problème. [Trabajos de Prehistoria 51 \(1994\), ii, 55–68.](#)

Mathematik Kultur

KOLODNY 2015

Oren Kolodny, Nicole Creanza & Marcus W. Feldman, *Evolution in leaps: The punctuated accumulation and loss of cultural innovations.* [PNAS 112 \(2015\), E6762–E6769.](#)

Archaeological accounts of cultural change reveal a fundamental conflict: Some suggest that change is gradual, accelerating over time, whereas others indicate that it is punctuated, with long periods of stasis interspersed by sudden gains or losses of multiple traits. Existing models of cultural evolution, inspired by models of genetic evolution, lend support to the former and do not generate trajectories that include large-scale punctuated change. We propose a simple model that can give rise to both exponential and punctuated patterns of gain and loss of cultural traits. In it, cultural innovation comprises several realistic interdependent processes that occur at different rates. The model also takes into account two properties intrinsic to cultural evolution: the differential distribution of traits among social groups and the impact of environmental change. In our model, a population may be subdivided into groups with different cultural repertoires leading to increased susceptibility to cultural loss, whereas environmental change may lead to rapid loss of traits that are not useful in a new environment. Taken together, our results suggest the usefulness of a concept of an effective cultural population size.

Keywords: toolkit | cultural accumulation | creativity | social stratification | fluctuating environment

Significance: The archaeological record suggests that cultural traits, as manifested in the tool repertoire, can accumulate exponentially, that technology can appear in bursts after long periods of stasis, and that dramatic cultural losses can occur. We introduce a model that accounts for this range of observations by considering a multifaceted creative process of innovation, accounting for the possibility that certain traits facilitate the invention of related traits. Further, we determine that differential distribution of tool-related knowledge, typically ignored in models, can dramatically affect the dynamics of cultural evolution, suggesting the concept of an effective cultural population size. Finally, we demonstrate that a fluctuating environment can lead to large scale cultural losses and select for generalist tools that are useful in multiple conditions.

Story or Book

PARDEE 2006

Dennis Pardee, *The Tel Dan Inscription.* [Journal of Near Eastern Studies 65 \(2006\), 289–291.](#)

The Tel Dan Inscription: A Reappraisal and a New Interpretation. By George Athas. *Journal for the Study of the Old Testament, Supplement Series 360*, Copenhagen International Seminar 12. Sheffield: Sheffield Academic Press, 2003. Pp. xii + 331 + 29 figs. \$ 165.

Athas demonstrates clearly that Hebrew *bêt dāviḏ* has a meaning very close to ‘dynasty’ (p. 303: “[...] an aristocratic family as patrons of Jerusalem and the surrounding peoples”), and the only impediment to seeing that meaning in the Tel Dan inscription is the absence of a word divider. Since Athas’s solution to that

problem is not itself without problems, one may legitimately ask if it really is a solution.

It is certain that similar queries will be made of the other points made by the author, but, all in all, his edifice appears to me to be quite strong. As I have in my query raised an issue that does not in fact change the author's basic view of what the inscription is talking about, so others may nibble at the edges without really weakening the foundation. At the most, the major conclusions reached here will stand more or less unscathed; at the least, they will have pushed the investigation forward in a major way that will allow another student of the inscription to make another major step forward.

SASSON 2005

Victor Sasson, *The Tell Dan Aramaic Inscription, The Problems of a new Minimized Reading*. *Journal of Semitic Studies* **50** (2005), 23–34.

Originally a doctoral thesis, *The Tel Dan Inscription: A Reappraisal and a New Interpretation* by George Athas aims to be a definitive study of the Old Aramaic inscription from Tell Dan. Its author has adopted the methods of the deconstructionists (= Minimizers). The Hebrew Bible is said to be 'an unknown quantity at best and a pure fabrication at worst'; the term bytdwd in the inscription is not in reference to the House of David (= Judah) but to Jerusalem as 'a small principality' or 'a small feudal estate'. According to the author the waw consecutive does not exist here, nor elsewhere in Aramaic. The reviewer argues that both the Hebrew Bible and the Tell Dan text are thereby downsized and devalued. Despite a detailed, minute palaeographical and epigraphical analysis which occupies 156 pages, as a published book aimed at professional epigraphers and established biblical scholars, it is generally disappointing, neither definitive, nor authoritative.