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References

Afrika

Tryon 2019

Christian A. Tryon, *The Middle/Later Stone Age transition and cultural dynamics of late Pleistocene East Africa*. Evolutionary Anthropology **28** (2019), 267–282.

The Middle to Later Stone Age (MSA/LSA) transition is a prominent feature of the African archeological record that began in some places ≈30,000–60,000 years ago, historically associated with the origin and/or dispersal of "modern" humans. Unlike the analogous Middle to Upper Paleolithic transition in Eurasia and associated Neanderthal extinction, the African MSA/LSA record remains poorly documented, with its potential role in explaining changes in the behavioral diversity and geographic range of Homo sapiens largely unexplored. I review archeological and biogeographic data from East Africa, show regionally diverse pathways to the MSA/LSA transition, and emphasize the need for analytical approaches that document potential ancestordescendent relationships visible in the archeological record, needed to assess independent invention, population interaction, dispersal, and other potential mechanisms for behavioral change. Diversity within East Africa underscores the need for regional, rather than continental-scale narratives of the later evolutionary history of H. sapiens.

Keywords: biogeography | chronology | demography | dispersal | lithic technology | obsidian

Aktuell

de Lange 2019

Ann-Marie G. de Lange & Lars T. Westlye et al., *Population-based neuroimaging reveals traces of childbirth in the maternal brain*. PNAS **116** (2019), 22341–22346.

pnas116-22341-Supplement.pdf

Maternal brain adaptations have been found across pregnancy and postpartum, but little is known about the long-term effects of parity on the maternal brain. Using neuroimaging and machine learning, we investigated structural brain characteristics in 12,021 middle-aged women from the UK Biobank, demonstrating that parous women showed less evidence of brain aging compared to their nulliparous peers. The relationship between childbirths and a "younger-looking" brain could not be explained by common genetic variation or relevant confounders. Although prospective longitudinal studies are needed, the results suggest that parity may involve neural changes that could influence women's brain aging later in life.

Keywords: pregnancy and childbirth | brain imaging | genetics | machine learning

Ann-Marie G. de Lange, Tobias Kaufmann, Dennis van der Meer, Luigi A. Maglanoc, Dag Alnæs, Torgeir Moberget, Gwenaëlle Douaud, Ole A. Andreassen & Lars T. Westlye

Significance: Pregnancy is one of the most dynamic periods in a woman's life, involving a remarkable potential for brain plasticity that promotes cognitive and emotional adjustments to the newborn. We provide evidence for a relationship

between number of childbirths and brain aging in 12,021 middle-aged women, suggesting that potential parity-related brain changes may endure beyond the postpartum period and influence the course of neurobiological aging.

Normile 2019

Dennis Normile, *Parched peatlands fuel Indonesia's blazes*. science **366** (2019), 18–19.

Policies to preserve and restore waterlogged forest help mitigate fires, scientists say.

Concentrated in the coastal plains of Sumatra, Borneo, and Papua, these peat forests provide a habitat for rare species such as orangutans, leopards, Sumatran tigers, tapirs, white-winged ducks, and freshwater turtles. But in the 1980s, concession holders started to dig drainage canals through peatlands to float out logs and dry out the peat to plant dryland crops, especially oil palm and acacia trees for pulp and paper. Fires they set to clear the land can burn out of control.

The agency blocks drainage canals, often with simple earthen or wooden dams designed in some cases to allow small boats to pass, says BRG head Nazir Foead. It also replants degraded areas with native vegetation and encourages local communities to use the lands in a sustainable way for fishing and planting crops adapted to wetlands, such as sago palm. By the end of 2018, the agency had initiated restoration projects in 366 villages in seven provinces, Foead says.

Pocheville 2019

Arnaud Pocheville, Sabine Nöbel, Guillaume Isabel & Etienne Danchin, *"Cultural flies: Conformist social learning in fruitflies predicts long-lasting mate-choice traditions", Response to Comment*. science **366** (2019), 194.

Thornquist and Crickmore claim that systematic experimental error may explain the results of Danchin and colleagues. Their claim rests on mistakes in their analyses, for which we provide corrections. We reassert that conformity in fruitflies predicts long-lasting mate-preference traditions.

Romero-Olivares 2019

Adriana L. Romero-Olivares, *Review with care*. science **366** (2019), 146.

"This paper requires significant editing, as it is not written in sound English and cannot be accepted in its current form." "This sentence does not make any sense." "The authors need a native Englishspeaking co-author to thoroughly revise the grammar of this manuscript." My heart sank when I received this feedback from a reviewer for the first paper I had ever submitted as a first author. The reviewer didn't say a thing about the underlying science—but isn't that what peer review is supposed to evaluate? Regardless, the reviewer recommended that our manuscript be rejected. This happened about 10 years ago. But as a nonnative English speaker who needs to publish in English, I still think about the experience today.

Thornquist 2019

Stephen C. Thornquist & Michael A. Crickmore, *Comment on "Cultural flies: Conformist social learning in fruitflies predicts long-lasting mate-choice traditions"*. science **366** (2019), 194.

The claims of Danchin et al. (Research Articles, 30 November 2018, p. 1025) regarding long-lasting mate preference based on conformity may result from systematic experimental error. Even if mate copying were a genuine phenomenon, it is unlikely to result in persisting culture in the wild.

Uhlorn 2019

Brittany L. Uhlorn, *Making peace with imperfection.* science **366** (2019), 274.

"I can eat 200 grams of sweet potato, 4 ounces of ground turkey, and 90 grams of lettuce for lunch," I thought to myself. "I have to run 2 miles after my workout to make up for that chocolate chip I ate yesterday, and I need to check my weight tomorrow to make sure I didn't gain anything overnight." "Brittany? Brittany! Any suggestions for troubleshooting your labmate's experiment?" My graduate school adviser was trying to get my attention during lab meeting—but there I was again, meticulously planning meals and obsessing over exercise, oblivious to the eating disorder I had developed to cope with the stress and anxiety that accompanied my quest for perfection.

Anthropologie

Hsieh 2019

PingHsun Hsieh & Evan E. Eichler et al., *Adaptive archaic introgression of copy number variants and the discovery of previously unknown human genes.* science **366** (2019), 324.

s366-0324-Supplement1.pdf, s366-0324-Supplement2.zip

Copy number variants (CNVs) are subject to stronger selective pressure than single-nucleotide variants, but their roles in archaic introgression and adaptation have not been systematically investigated. We show that stratified CNVs are significantly associated with signatures of positive selection in Melanesians and provide evidence for adaptive introgression of large CNVs at chromosomes 16p11.2 and 8p21.3 from Denisovans and Neanderthals, respectively. Using long-read sequence data, we reconstruct the structure and complex evolutionary history of these polymorphisms and show that both encode positively selected genes absent from most human populations. Our results collectively suggest that large CNVs originating in archaic hominins and introgressed into modern humans have played an important role in local population adaptation and represent an insufficiently studied source of large-scale genetic variation.

PingHsun Hsieh, Mitchell R. Vollger, Vy Dang, David Porubsky, Carl Baker, Stuart Cantsilieris, Kendra Hoekzema, Alexandra P. Lewis, Katherine M. Munson, Melanie Sorensen, Zev N. Kronenberg, Shwetha Murali, Bradley J. Nelson, Giorgia Chiatante, Flavia Angela Maria Maggiolini, Hélène Blanché, Jason G. Underwood, Francesca Antonacci, Jean-François Deleuze & Evan E. Eichler

Bibel

Finkelstein 1984

IsraelFinkelstein, *The Iron Age "Fortresses" of the Negev Highlands, Sedentarization of the Nomads.* Tel Aviv: Archaeology **11** (1984), 189–209.

Nomadic sedentarization in the Negev Highlands, which perhaps began as early as the 12th century B.C.E., reached its zenith toward the end of the lIth or early 10th centuries. But crucial developments were taking place at the same time in the central part of the country and the Beer Sheva basin. The new political entity that came into being at the same time in the north soon came into inevitable confrontation with the waxing desert peoples over control of the south. The Bible

describes Saul's struggle with the Amalekites (1 Sam. 14:48; 15) and relates how David "put garrisons throughout all Edom" (2 Sam. 8:14), referring perhaps to the Negev Highlands (see Meshel 1974:148). There was no need for the kings of Israel to vanquish the desert tribes militarily. The disruption of trade, one of their main sources of income, brought about the collapse of the infrastructure that had made their sedentarization possible.5 Following the destruction of Tel Masos, Stratum I I , the commercial centre of the south, which was identified by Kochavi (1980) as the city of Amalek mentioned in 1 Sam. 15:5, Israelite settlement in the Beer Sheva basin intensified. A dramatic reversal occurd in the Negev Highlands as a result of these events; since the economic basis for permanent settlement no longer existed, the desert population reverted to its previous mode of existence – pastoral nomadism – and the villages and farmsteads were abandoned.6 The emerging monarchy quickly acted in defence of its southern borders against the nomads; the fortified centres of Beer-sheba and Arad were established in the 10th century RC.E., while the fort at Kadeshbarnea became the focus of rule over Negev Highlands somewhat later. These forts probably became the foundation for the special relationship, based on a complex system of agreements, between the Kingdom of Israel, and later, Judah, and the desert tribes. Rule by political wisdom backed up by military strength might have obviated the need for any strongholds between the Beer sheva basin and Kadesh-barnea.7

Commerce in the south continued, of course, in the 10th century B.C.E. and thereafter, but the trade monopoly was taken over by the political powers to the north – initially the United Kingdom, then the Kingdom of Judah and, finally, from the 8th century onwards, the Assyrian empire. The denizens of the desert probably took part in this commerce but were unable to achieve the same economic and political advantages they had enjoyed previously. Only centuries later, during the Hellenistic period, did those conditions necessary for nomadic sedentarization reappear – this time one step further along – providing the foundation for the development of the Nabatean desert kingdom.

Finkelstein 1985

Israel Finkelstein, Shlomo Bunimovitz & Zvi Lederman, *Excavations at Shiloh 1981–1984, Preliminary Report*. Tel Aviv: Archaeology **12** (1985), 123–180.

According to the above data, it may be concluded that the nature of the settlement at Shiloh changed from stratum to stratum as reflected in the numerical fluctuations of domestic animals. During the Middle Bronze Age lIB-lIC, when the site seems to have been inhabited by a rather prosperous population, the percentage of cattle was relatively high. During the Late Bronze Age, however, the economy (or at least the socio-economic character of the site) appears to have changed. Perhaps a crisis of unknown nature caused a certain deterioration of the economic situation, which resulted in a decrease in the size of the cattle herds. Concurrently, a significant increase in the role of sheep and goats can be observed. According to the excavator, the size of the population in the hill country decreased during this period and the inhabitants may have reverted to nomadism or semi-nomadism (Finkelstein 1985). At Shiloh there does not seem to have been a permanent settlement at this time either. The archaeozoological data presented above may be one of the manifestations of this situation. It is well known that nomadic populations raise mainly caprovines rather than cattle,-whose nutritional and water requirements are more demanding than those of sheep and goats.

However, the bones retrieved in the Late Bronze Age strata at Shiloh came from what the excavator believes were offerings made by a nomadic population at a cultic place that existed at the site during this period (Chapter 5.2). The

preponderance of sheep and goat bones in these loci may represent a preference of the meat of these animals in the cult practices. Or perhaps both explanations are valid: the site became a cultic centre for the surrounding semi-nomadic population who brought offerings of sheep and goat meat simply because that was what most of their flocks were composed of.

In any case, in Iron Age I the site once again underwent an interesting socio-economic metamorphosis. The renewal of permanent settlement is reflected by the increased percentage of cattle remnants. The large number of silos found on the site (see Chapter 4.1.3) probably represent not only the ploughing capacity of these animals to supply grains for the inhabitants, but their own fodder supply for the dry seasons characteristic of the central hill country of Israel.

FINKELSTEIN 1988

Israel Finkelstein, *Arabian Trade and Socio-Political Conditions in the Negev in the Twelfth-Eleventh Centuries B.C.E.* Journal of Near Eastern Studies **47** (1988), 241–252.

By comparing the historical processes in the south in the eleventh century and during the Nabatean period, a model for the emergence and collapse of a desert-people political entity can be suggested. A political vacuum led to an intensive participation of the desert groups in the Arabian trade, even to its monopolization by the local nomads. This brought about a dramatic change in the economy and a gradual shift from pastoral nomadism to subsistence based more on trade and on seasonal agriculture as well. Some of the population settled down and an urban trade center emerged, with the obvious social outcome-social stratification. In this process, the desert people acquired many of the characteristics of northern material culture. Finally, a state or a chiefdom evolved. But this structure was very fragile, and a political change-the intervention of a northern force in the events in the south-reversed the process. The loss of the trade monopoly caused the collapse of the desert entity, the abandonment of the settlements, and a process of renomadization.

FINKELSTEIN 1989

Israel Finkelstein, *The Land Of Ephraim Survey 1980–1987, Preliminary Report.* Tel Aviv: Archaeology **16** (1989), 117–183.

The above indications would seem to point to the socio-economic background of the population which settled in the hill country during the Iron I. The settling of areas which are suited to horticulture (undoubtedly, in pre-Islamic periods there were vineyards too), implies the presence of a permanently settled population that could expect to reap the fruit of its labours only within a few years after planting (e.g. Boardman 1977:189). On the other hand, a cereal and pasturage economy does not require permanent settlement throughout the entire year. It appears, therefore, that the settlement pattern for the Iron I, especially its early phase, indicates that the population came from a pastoral, and not an urban or rural Background. However, it may be noted that the choice of the eastern regions may have been due also to the preference of topographically moderate areas which also enable a varied, almost autarchic economy. Whichever, the foregoing will have far-reaching implications for the argument concerning the origin of the "Israelite" population.

FINKELSTEIN 1990

Israel Finkelstein & Avi Perevolotsky, *Processes of Sedentarization and Nomadization in the History of Sinai and the Negev.* Bulletin of the American Schools of Oriental Research **279** (1990), 67–88.

The article suggests an historical-ecological model for human activity in Sinai and the Negev. Three main factors influenced human presence there: ecological niches that enabled dry farming alongside animal husbandry; proximity to centers of the settled lands, which allowed a symbiotic-dimorphic relationship with sedentary populations; and occasional trade opportunities that could change the economic balance in the desert. The desert people's subsistence usually was based on sheep/goat herding with occasional seasonal dry farming. The nomads traded surplus animal products to sedentary communities for agricultural goods. Usually they left only few archaeological remains. Occasionally, however, the desert witnessed some sedentarization, which was reversed when the geopolitical or economic situation changed. In two periods, sedentarization resulted from a deterioration of rural and urban society in the settled land, during which the nomads had to supply their own agricultural needs.

FINKELSTEIN 1992

A. Rejoinder, *Invisible Nomads*. Bulletin of the American Schools of Oriental Research **287** (1992), 87–88.

FINKELSTEIN 1998

Israel Finkelstein, *Bible Archaeology or Archaeology of Palestine in the Iron Age? A Rejoinder*. Levant **30** (1998), 167–174.

The archaeology of the United Monarchy has recently become a focus of a fierce dispute. The debate has far-reaching consequences for archaeological, historical and biblical studies. In a recent article, Mazar (1997) criticized my views on this topic and supported the prevailing theory. In this rejoinder, I demonstrate that the Low Chronology for the material remains of the eleventh-ninth centuries E.G.E., whether right or wrong, is based on archaeological considerations. The prevailing scheme is based on uncritical reading of the biblical text and on irrelevant sentiments regarding the grandeur of the early Israelite state.

The dispute over the archaeology of the United Monarchy is a clash between two approaches to Iron Age archaeology. The first attempts to deal independently with the archaeological data. The second takes the Bible as the framework and adjusts the archaeological record to pseudo-historical sources. From the point of view of the integrity of our discipline, the latter is a disturbing phenomenon regardless of who is right and who is wrong chronologically.

The dispute will probably be decided by a combination of short- and long-term field and laboratory research. The short term includes the results of the excavation of Stratum VIA at Megiddo and the possibility that a monument such as the Shishak stele from Megiddo or the Moabite stone will be found in situ with a clear assemblage of finds. The long term includes the accumulation of 14C results and quantitative analysis of pottery assemblages.

FINKELSTEIN 2003

Israel Finkelstein & Eli Piasetzky, *Recent radiocarbon results and King Solomon*. Antiquity **77** (2003), 771-779.

Radiocarbon dating and stratigraphy here offer a new chronological structure for the Iron Age in the Levant. The credit for the construction of massive public monuments in the northern part of Israel is here wrested from David and Solomon and attributed to the later Omride dynasty. The early Israelite monarchs actually ruled over a small kingdom in the highlands around Jerusalem rather than a great empire.

Keywords: Biblical history | Solomon | historical archaeology | radiocarbon

Finkelstein 2003

Israel Finkelstein & Eli Piasetzky, *Wrong and Right, High and low ^{14}C dates from Tel Rehov and Iron Age chronology.* Tel Aviv: Archaeology **30** (2003), 283–295.

Bruins, van der Plicht and Mazar (2003a) recently presented a new set of 14C measurements from Tel RelJov and interpret them as supporting at least part of the conventional chronology system for the Iron Age strata in the Levant. The present article takes issue with the provenance of the samples and with Bruins, van der Plicht and Mazar s methodology, historical arguments and interpretation of the measurements using the calibration curve. The article shows that the new readings from Tel RelJov far from support the conventional chronology. First, there is an alternative interpretation for the readings from Tel RelJov V,which falls in the very late 10th century BCE. Second, Tel RelJov IV is the contemporary of Megiddo VA (VA-IVB) and hence the latter, with its ashlar palaces, must be dated to the first half of the 9th century BCE. This means that the new Tel RelJov measurements support the most important component of the Low Chronology system.

Finkelstein 2006

Israel Finkelstein, Baruch Halpern, Gunnar Lehmann & Herman Michael Niemann, *The Megiddo Hinterland Project.* In: Israel Finkelstein, David Ussishkin & Baruch Halpern (Hrsg.), *Megiddo IV, The 1998–2002 Seasons.* Monograph series, Tel Aviv, Nadler Institute of Archaeology 24 (Tel Aviv 2006), 705–776.

From the four transition periods briefly discussed above, two cases—the EB I/II and the EB II/III transitions—show a remarkable harmony between the results from the dig of the main site and the data collected from the surrounding countryside. The two other cases draw a different picture. In the Late Bronze/Iron I transition, the picture at Megiddo only partially reflects the situation in the valley. And in the Iron II/Persian period transition, the results of the rural sector tell a very different story from that of the excavation of the main mound.

Römer 2006

Thomas Römer, *Das doppelte Ende des Josuabuches, Einige Anmerkungen zur aktuellen Diskussion um "deuteronomistisches Geschichtswerk" und "Hexateuch".* Zeitschrift für die Alttestamentliche Wissenschaft **118** (2006), 523–548.

The double ending of the book of Joshua in Jos 23f. cannot be explained by the assumption of a twofold Dtr. redaction. Jos 23 is the Dtr conclusion of the period of the conquest, in which two Dtr authors are to be distinguished. The original text (23.1–3.9.11.14–16a) sets forth the complete expulsion of the enemies, and threatens exile for any failure to obey Yahweh's commands. By this the books of Deut and Jos are bound tightly together, but the period of the Judges is not yet in view. The later Dtr. layer introduces the idea that Yahweh would not bring the expulsion of the enemies to completion and so prepares for the continuation of the history in the Judges period. Jos 24, on the other hand, is a post-Dtr text which is a unity apart from v. 19–21 and arises from the attempt to produce a Hexateuch in place of a Pentateuch during the Persian period.

Das doppelte Ende des Josuabuches in Jos 23f. kann nicht mit der Annahme zweier dtr Schichten erklärt werden. Jos 23 ist der dtr Abschluß der Landnahmezeit, in welchem zwei dtr Hände zu unterscheiden sind: der ursprüngliche Text

(23,1–3.9.11.14–16a) insistiert auf der vollständigen Vertreibung der Feinde, droht aber bereits das Exil bei Nichtbefolgung von Yhwhs Forderungen an. Dadurch werden die Bücher Dtn und Jos eng aneinander gebunden, die Richterzeit kommt noch nicht in den Blick. Die zweite dtr Schicht trägt die Idee ein, dass Yhwh die Vertreibung der Feinde nicht vollständig zu Ende bringt, und bereitet damit die Fortsetzung der dtr Geschichte in der Richterzeit vor. Jos 24 hingegen ist nachdtr. Dieser, von v. 19–21 abgesehen, einheitliche Text erklärt sich als ein Versuch während der Perserzeit einen Hexateuch anstelle eines Pentateuchs zu publizieren.

Biologie

Kunin 2019

William E. Kunin, *Robust evidence of insect declines*. nature **574** (2019), 641–642.

Data are mounting that document widespread insect losses. A long-term research project now provides the strongest evidence of this so far, and demonstrates the value of standardized monitoring programmes.

Rosenberg 2019

Kenneth V. Rosenberg, Adriaan M. Dokter, Peter J. Blancher, John R. Sauer, Adam C. Smith, Paul A. Smith, Jessica C. Sta, *Decline of the North American avifauna*. science **366** (2019), 120–124.

s366-0120-Supplement.pdf

Species extinctions have defined the global biodiversity crisis, but extinction begins with loss in abundance of individuals that can result in compositional and functional changes of ecosystems. Using multiple and independent monitoring networks, we report population losses across much of the North American avifauna over 48 years, including once-common species and from most biomes. Integration of range-wide population trajectories and size estimates indicates a net loss approaching 3 billion birds, or 29 % of 1970 abundance. A continent-wide weather radar network also reveals a similarly steep decline in biomass passage of migrating birds over a recent 10-year period. This loss of bird abundance signals an urgent need to address threats to avert future avifaunal collapse and associated loss of ecosystem integrity, function, and services.

Kenneth V. Rosenberg, Adriaan M. Dokter, Peter J. Blancher, John R. Sauer, Adam C. Smith, Paul A. Smith, Jessica C. Stanton, Arvind Panjabi, Laura Helft, Michael Parr & Peter P. Marra

Seibold 2019

Sebastian Seibold & Wolfgang W. Weisser et al., *Arthropod decline in grasslands and forests is associated with landscape-level drivers*. nature **574** (2019), 671–674.

n574-0671-Supplement.pdf

Recent reports of local extinctions of arthropod species1, and of massive declines in arthropod biomass2, point to land-use intensification as a major driver of decreasing biodiversity. However, to our knowledge, there are no multisite time series of arthropod occurrences across gradients of land-use intensity with which to confirm causal relationships. Moreover, it remains unclear which land-use types and arthropod groups are affected, and whether the observed declines in biomass and diversity are linked to one another. Here we analyse data from more than 1

million individual arthropods (about 2,700 species), from standardized inventories taken between 2008 and 2017 at 150 grassland and 140 forest sites in 3 regions of Germany. Overall gamma diversity in grasslands and forests decreased over time, indicating loss of species across sites and regions. In annually sampled grasslands, biomass, abundance and number of species declined by 67 %, 78 % and 34 %, respectively. The decline was consistent across trophic levels and mainly affected rare species; its magnitude was independent of local land-use intensity. However, sites embedded in landscapes with a higher cover of agricultural land showed a stronger temporal decline. In 30 forest sites with annual inventories, biomass and species number—but not abundance—decreased by 41 % and 36 %, respectively. This was supported by analyses of all forest sites sampled in three-year intervals. The decline affected rare and abundant species, and trends differed across trophic levels. Our results show that there are widespread declines in arthropod biomass, abundance and the number of species across trophic levels. Arthropod declines in forests demonstrate that loss is not restricted to open habitats. Our results suggest that major drivers of arthropod decline act at larger spatial scales, and are (at least for grasslands) associated with agriculture at the landscape level. This implies that policies need to address the landscape scale to mitigate the negative effects of land-use practices.

Sebastian Seibold, Martin M. Gossner, Nadja K. Simons, Nico Blüthgen, Jörg Müller, Didem Ambarlý, Christian Ammer, Jürgen Bauhus, Markus Fischer, Jan C. Habel, Karl Eduard Linsenmair, Thomas Nauss, Caterina Penone, Daniel Prati, Peter Schall, Ernst-Detlef Schulze, Juliane Vogt, Stephan Wöllauer & Wolfgang W. Weisser

Energie

Mielke 2019

Howard W. Mielke, Christopher R. Gonzales, Mark A. S. Laidlaw & Sara Perl Egendorf et al., *The concurrent decline of soil lead and children's blood lead in New Orleans*. PNAS **116** (2019), 22058–22064.

pnas116-22058-Supplement1.pdf, pnas116-22058-Supplement2.xlsx

Lead (Pb) is extremely toxic and a major cause of chronic diseases worldwide. Pb is associated with health disparities, particularly within low-income populations. In biological systems, Pb mimics calcium and, among other effects, interrupts cell signaling. Furthermore, Pb exposure results in epigenetic changes that affect multi-generational gene expression. Exposure to Pb has decreased through primary prevention, including removal of Pb solder from canned food, regulating lead-based paint, and especially eliminating Pb additives in gasoline. While researchers observe a continuous decline in children's blood lead (BPb), reservoirs of exposure persist in topsoil, which stores the legacy dust from leaded gasoline and other sources. Our surveys of metropolitan New Orleans reveal that median topsoil Pb in communities (n = 274) decreased 44 % from 99 mg/kg to 54 mg/kg (P value of 2.09E-8), with a median depletion rate of ≈2.4 mg/kg y over 15 y. From 2000 through 2005 to 2011 through 2016, children's BPb declined from 3.6 ug/dL to 1.2 ug/dL or 64 %(P value of 2.02E-85), a decrease of ≈0.2 ug/dL y during a median of 12 y. Here, we explore the decline of children's BPb by examining a metabolism of cities framework of inputs, transformations, storages, and outputs. Our findings indicate that decreasing Pb in topsoil is an important factor in the continuous decline of children's BPb. Similar reductions are expected in other major US cities. The most contaminated urban communities, usually inhabited by vulnerable populations, require further reductions of topsoil Pb to fulfill primary prevention for the nation's children.

Keywords: urban soil | children's blood lead | exposure map

Howard W. Mielke, Christopher R. Gonzales, Eric T. Powell, Mark A. S. Laidlaw, Kenneth J. Berry, Paul W. Mielke Jr. & Sara Perl Egendorf

Significance: The inextricable link between topsoil lead (Pb) and children's blood lead (BPb) has not been widely accepted. Pb is associated with multiple health adversities. Urban residents are at risk from exposure to legacy Pb dust in topsoil resulting from smelting, industrial discharges, leaded gasoline emissions, leaded paint, and incineration. In New Orleans, topsoil median Pb decreased in ≈15 y from99 mg/kg to 54mg/kg, or ≈2.4 mg/kg y. In ≈12 y, children's median BPb declined from 3.6 ug/dL to 1.3 ug/dL, or ≈0.2 ug/dL y. We argue that depletion of topsoil Pb is an important factor in the continuous decline of children's BPb. Similar processes are expected in all US cities. Primary prevention requires curtailing Pb in all sources, including topsoil.

Najjaran 2019

Ahmad Najjaran, James Freeman, Alba Ramos & Christos N. Markides, *Experimental investigation of an ammonia-water-hydrogen diffusion absorption refrigerator*. Applied Energy **256** (2019), 113899, 1–12.

Highlights:

- A newly-proposed DAR unit for solar applications is tested in laboratory conditions.
- The unit is larger than conventional DARs with a nominal cooling power of 100 W.
- Larger condenser and absorber surface areas are used to promote heat rejection.
- The cooling power is measured directly by an air-coupling configuration.
- The experimental data are used to validate a popular DAR design model.

Diffusion absorption refrigeration (DAR) is a small-scale cooling technology that can be driven purely by thermal energy without the need for electrical or mechanical inputs. In this work, a detailed experimental evaluation was undertaken of a newly-proposed DAR unit with a nominal cooling capacity of 100 W, aimed at solar-driven cooling applications in warm climates. Electrical cartridge heaters were used to provide the thermal input which was varied in the range 150–700 W, resulting in heat source temperatures of 175–215°C measured at the generator. The cooling output during steady-state operation was determined from the power consumed by an electric heater used to maintain constant air temperature in an insulated box constructed around the evaporator. Tests were performed with the DAR system configured with the default manufacturer's settings (22 bar charge pressure and 30 % ammonia concentration). The measured cooling output (to air) across the range of generator heat inputs was 24–108 W, while the coefficient of performance (COP) range was 0.11–0.26. The maximum COP was obtained at a generator heat input of 300 W. Results were compared to performance predictions from a steady-state thermodynamic model of the DAR cycle, showing a reasonable level of agreement at the nominal design point of the system, but noteworthy deviations at part-load/off-design conditions. Temperature measurements from the experimental apparatus were used to evaluate assumptions used in the estimation of the model state point parameters and examine their influence on the predicted system performance.

Keywords: Diffusion absorption refrigeration | Absorption cooling | Ammonia-water | Coefficient of performance | Part-load operation

Islam

Bobzin 2000
Hartmut Bobzin, *Der Koran*, *Eine Einführung*. (München ²2000).

Cook 2002
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Anna M. Gade, *Recitation*. In: Andrew Rippin (Hrsg.), *The Blackwell Companion to the Qur'an*. (New York 2006), 481–493.

Neuwirth 2007
Angelika Neuwirth, *Studien zur Komposition der mekkanischen Suren*. (Berlin ²2007), 1–54.

Klima

Toniello 2019
Ginevra Toniello, Dana Lepofsky, Gavia Lertzman-Lepofsky, Anne K. Salomon & Kirsten Rowell, *11,500 y of human–clam relationships provide longterm context for intertidal management in the Salish Sea, British Columbia*. PNAS **116** (2019), 22106–22114.
pnas116-22106-Supplement1.pdf, pnas116-22106-Supplement2.csv
Historical ecology can provide insights into the long-term and complex relationships between humans and culturally important species and ecosystems, thereby extending baselines for modern management. We bring together paleoecological, archaeological, and modern clam records to explore the relationship between humans and butter clams (Saxidomus gigantea) throughout the Holocene in the northern Salish Sea of British Columbia, Canada. We compare butter clam size and growth patterns from different temporal, environmental, and cultural contexts spanning 11,500 y to present. Butter clam size and growth were restricted in early postglacial times but increased over the next few millennia. During the early-Late Holocene, humans took increasing advantage of robust clam populations and after 3.5 ka, began constructing clam gardens (intertidal rock-walled terraces). Environmental and cultural variables, including coarse substrate, stabilized sea surface temperature, and the presence of a clam garden wall, increased clam growth throughout the Holocene. Measurements of clams collected in active clam gardens and deposited in middens suggest that clam gardens as well as other mariculture activities enhanced clam production despite increased harvesting pressure. Since European contact, decline of traditional management practices and increases in industrial activities are associated with reduced clam size and growth similar to those of the early postglacial clams. Deepertime baselines that more accurately represent clam population variability and allow us to assess magnitudes of change throughout time as well as the complex interactions among humans and clams are useful for modern marine resource management.
Keywords: historical ecology | clam gardens | traditional resource management | Northwest Coast | paleoecology
Significance: Climate change, habitat loss, and overharvesting are threatening coastal ecosystems worldwide. A less widely recognized threat is the decline in

Indigenous mariculture practices. These practices, such as building of clam gardens, structured coastal ecosystems for millennia. Teasing out the dynamic and intertwined relationships between humans and culturally valued species, such as clams, requires long-term paleoecological and archaeological records. These records are requisite for creating meaningful management targets and for applying traditional mariculture practices, such as the tending of clam gardens, to increase the productivity and sustainability of our foods today. Documenting these interactions between humans and coastal ecosystems, such as we have done here, also counteracts the erasure of the long-term connections of Indigenous peoples to their lands and seas.

Wolff 2019

Eric W. Wolff, *Fresh evidence in the glacial-cycle debate*. nature **574** (2019), 636–637.

An analysis of air up to 2 million years old, trapped in Antarctic ice, shows that a major shift in the periodicity of glacial cycles was probably not caused by a long-term decline in atmospheric levels of carbon dioxide.

In both periods, the maximum CO2 concentrations are similar to those of interglacials from the past 500,000 years, peaking at 279 parts per million (p.p.m.). But the minimum value of 214 p.p.m. is much higher than the lows of around 180 p.p.m. that occurred during recent glacial maxima (the periods that corresponded to the maximum extent of ice).

The authors conclude that the relationship between CO2 levels and Antarctic temperature was similar before and after the MPT. The fact that the pre-MPT ice does not contain very low ratios of deuterium to hydrogen that would be characteristic of extremely cold Antarctic temperatures, nor low CO2 levels characteristic of recent glacial maxima, is probably just a consequence of the shorter period of the glacial cycles. Such low values are generally not found in the first 40,000 years of post-MPT glacial cycles either.

Yan 2019

Yuzhen Yan, Michael L. Bender & John A. Higgins et al., *Two-million-year-old snapshots of atmospheric gases from Antarctic ice*. nature **574** (2019), 663–666.

Over the past eight hundred thousand years, glacial–interglacial cycles oscillated with a period of one hundred thousand years ('100k world'1). Ice core and ocean sediment data have shown that atmospheric carbon dioxide, Antarctic temperature, deep ocean temperature, and global ice volume correlated strongly with each other in the 100k world2–6. Between about 2.8 and 1.2 million years ago, glacial cycles were smaller in magnitude and shorter in duration ('40k world'7). Proxy data from deep-sea sediments suggest that the variability of atmospheric carbon dioxide in the 40k world was also lower than in the 100k world8–10, but we do not have direct observations of atmospheric greenhouse gases from this period. Here we report the recovery of stratigraphically discontinuous ice more than two million years old from the Allan Hills Blue Ice Area, East Antarctica. Concentrations of carbon dioxide and methane in ice core samples older than two million years have been altered by respiration, but some younger samples are pristine. The recovered ice cores extend direct observations of atmospheric carbon dioxide, methane, and Antarctic temperature (based on the deuterium/hydrogen isotope ratio äDice, a proxy for regional temperature) into the 40k world. All climate properties before eight hundred thousand years ago fall within the envelope of observations from continuous deep Antarctic ice cores that characterize the 100k world. However, the lowest measured carbon dioxide and methane concentrations and Antarctic

temperature in the 40k world are well above glacial values from the past eight hundred thousand years. Our results confirm that the amplitudes of glacial–interglacial variations in atmospheric greenhouse gases and Antarctic climate were reduced in the 40k world, and that the transition from the 40k to the 100k world was accompanied by a decline in minimum carbon dioxide concentrations during glacial maxima.

Yuzhen Yan, Michael L. Bender, Edward J. Brook, Heather M. Clifford, Preston C. Kemeny, Andrei V. Kurbatov, Sean Mackay, Paul A. Mayewski, Jessica Ng, Jeffrey P. Severinghaus & John A. Higgins

Kultur

Gibbons 2019

Ann Gibbons, *Bronze Age inequality and family life revealed in powerful study*. science **366** (2019), 168.

Combined methods show women married far from home.

The burials of poor, unrelated people on the same plot suggested inequality thrived within these households. Such complex social structure in these rather modest farmsteads surprised Stockhammer, who says the archaeological record in Europe first shows servants or enslaved people living under the same roof as higher-ranking people 1500 years later, in classical Greece.

Metallzeiten

Finkelstein 1993

Israel Finkelstein & Ram Gophna, *Settlement, Demographic, and Economic Patterns in the Highlands of Palestine in the Chalcolithic and Early Bronze Periods and the Beginning of Urbanism*. Bulletin of the American Schools of Oriental Research **289** (1993), 1–22.

The central hill country of Palestine, from the Jezreel Valley in the north to the Beer-sheba Valley in the south, has been almost fully surveyed in the last two decades. The article summarizes the archaeological data on the sites and settlement patterns in the region in three phases of the fourth and third millennia B.C.E.-the Chalcolithic, the Early Bronze I, and the Early Bronze II-III-and compares them to the settlement patterns in the lowlands of the country. The highlands, which form the best-suited part of Palestine for horticulture-based economy, experienced a dramatic settlement and demographic growth in EB I. This wave of settlement was contemporaneous to the establishment of Egyptian trading communities in the southern coastal plain. The demographic expansion to the hill country was apparently stimulated by the growing demand for Palestinian horticulture products in Egypt. The intensification of agricultural specialization in the highlands and in other parts of the country played an important role in the urbanization process in the southern Levant, which also commenced at the end of EB I.

Mittelalter

Hoeniger 1884

Robert Hoeniger, *Kölner Schreinsurkunden des zwölften Jahrhunderts, Erster Band*. Publikationen der Gesellschaft für Rheinische Geschichtskunde 1-1 (Bonn 1884).

Hoeniger 1893
Robert Hoeniger, *Kölner Schreinsurkunden des zwölften Jahrhunderts, Zweiter Band, Erste Hälfte.* Publikationen der Gesellschaft für Rheinische Geschichtskunde 1-2.1 (Bonn 1893).

Hoeniger 1894
Robert Hoeniger, *Kölner Schreinsurkunden des zwölften Jahrhunderts, Zweiter Band, Zweite Hälfte.* Publikationen der Gesellschaft für Rheinische Geschichtskunde 1-2.2 (Bonn 1894).

Mittelpaläolithikum

Niekus 2019
Marcel J. L. Th. Niekus et al., *Middle Paleolithic complex technology and a Neandertal tar-backed tool from the Dutch North Sea.* PNAS **116** (2019), 22081–22087.
pnas116-22081-Supplement.pdf
We report the discovery of a 50,000-y-old birch tar-hafted flint tool found off the present-day coastline of The Netherlands. The production of adhesives and multicomponent tools is considered complex technology and has a prominent place in discussions about the evolution of human behavior. This find provides evidence on the technological capabilities of Neandertals and illuminates the currently debated conditions under which these technologies could be maintained. 14C-accelerator mass spectrometry dating and the geological provenance of the artifact firmly associates it with a host of Middle Paleolithic stone tools and a Neandertal fossil. The find was analyzed using pyrolysis – gas chromatography – mass spectrometry, X-ray micro-computed tomography, and optical light microscopy. The object is a piece of birch tar, encompassing one-third of a flint flake. This find is from northwestern Europe and complements a small set of well-dated and chemically identified adhesives from Middle Paleolithic/Middle Stone Age contexts. Together with data from experiments and other Middle Paleolithic adhesives, it demonstrates that Neandertals mastered complex adhesive production strategies and composite tool use at the northern edge of their range. Thus, a large population size is not a necessary condition for complex behavior and technology. The mitigation of ecological risk, as demonstrated by the challenging conditions during Marine Isotope Stage 4 and 3, provides a better explanation for the transmission and maintenance of technological complexity.
Keywords: Late Pleistocene | adhesive | birch bark tar | hafting | risk mitigation
Marcel J. L. Th. Niekus, Paul R. B. Kozowyk, Geeske H. J. Langejans, Dominique Ngan-Tillard, Henk van Keulen, Johannes van der Plicht, Kim M. Cohen, Willy van Wingerden, Bertil van Os, Bjørn I. Smit, Luc W. S. W. Amkreutz, Lykke Johansen, Annemieke Verbaas & Gerrit L. Dusseldorp
Significance: We report the discovery of a 50,000-y-old Neandertal tar-hafted flint tool found off the present-day Dutch coastline. The production of birch tar adhesives was a major technological development, demonstrating complex Neandertal technology and advanced cognitive ability. The rarity of Middle Paleolithic adhesive finds makes each new discovery crucial for improving our understanding of Neandertal lifeways. We demonstrate that birch tar was a routine part of the Neandertal technological repertoire. In addition, the complex know-how required for adhesive production in northwestern Europe during Marine Isotope Stage 4 and 3 was maintained in small groups leading highly mobile lives. This suggests a

degree of task specialization and supports the hypothesis that ecological risk drives the development of complex technology.

Zilhão 2019

João Zilhão, *Tar adhesives, Neandertals, and the tyranny of the discontinuous mind*. PNAS **116** (2019), 21966–21968.

Tar can be accidentally produced when burning birch bark over an open fire; small amounts will accumulate against the inclined surface of a stone above. An innovative Neandertal could have been led to deliberately recreate the conditions under which (s)he originally observed the phenomenon and, eventually, start making tar at will. Going from observation to production with this "condensation method" might well have represented the technology's starting point. However, that method would have been insufficient to regularly produce the necessary amounts, and it is also inconsistent with the chemical and textural properties of the archeological tars. As Niekus et al. argue, these properties imply use of the more sophisticated "pit and vessel" and "raised structure" methods, which imply the command of a set of chaînes opératoires and, crucially, being capable of controlling for how long the fire burns so as to stop it before pyrolysis occurs and the tar combusts. Thus, the spatial and temporal span over which these tar adhesives was produced reflects the acquisition, mastering, and cultural, intergenerational transmission of a complex production technology.

Story or Book

Wight 2019

Andrew J. Wight, *The precautionary tale of golden rice*. science **366** (2019), 192.

A journalist reveals the complicated history of a crop created to help millions.

Golden Rice: The Imperiled Birth of a GMO Superfood. Ed Regis. Johns Hopkins University Press, 2019. 256 pp.

After millions of dollars and years of effort, the United States, Canada, Australia, and New Zealand have all recently approved golden rice as safe for consumption. Now, the end goal is in sight: Golden rice is in front of regulators in the Philippines and in Bangladesh, where it is expected to be approved by the end of 2019.