Liste erstellt am 2014-10-24

References

Afrika

Ozainne 2014

Sylvain Ozainne, Laurent Lespez, Aline Garnier, Aziz Ballouche, Katharina Neumann, Olivier Pays & Eric Huysecom, *A question of timing, Spatio-temporal structure and mechanisms of early agriculture expansion in West Africa.* Journal of Archaeological Science **50** (2014), 359–368.

JAS050-0359-Supplement1.xlsx, JAS050-0359-Supplement2.xlsx, JAS050-0359-Supplement3.docx

Although understanding the emergence of agriculture in West Africa has recently benefited from major advances, the reasons for its fast diffusion south of the Sahara remain to be explained.We propose here a reconstruction of African agriculture expansion built from a spatialization of available archaeological data and associated radiocarbon dates. With this approach, we can show that the initial spread of food production occurred with some specific rhythms. From this structure, we discuss the potential underlying processes. Our work suggests that the spread of agriculture inWest Africa cannot be explained by a simple response to an abrupt environmental change at the beginning of the Late Holocene, but rather by a combined climate-culture mechanism. In addition, cord-wrapped roulette-impressed pottery appears to be a good indicator of the expansion of agro-pastoralist populations in Sub-Saharan regions. Our results are also consistent with the assumption of a monophyletic origin of domestic pearl millet in south-western Sahara and strengthen the idea that the first cultivators were Saharan pastoralists.

Keywords: West Africa | Agriculture | Diffusion | Pearl millet | Roulette-decorated pottery | Climate-culture interactions

Aktuell

Cryan 2014

Paul. & al., *Behavior of bats at wind turbines.* PNAS **111** (2014), 15126–15131.

Paul. M. Cryan, P. Marcos Gorresen, Cris D. Hein, Michael R. Schirmacher, Robert H. Diehl, Manuela M. Huso, David T. S. Hayman, Paul D. Fricker, Frank J. Bonaccorso, Douglas H. Johnson, Kevin Heist & David C. Dalton

Wind turbines are causing unprecedented numbers of bat fatalities. Many fatalities involve tree-roosting bats, but reasons for this higher susceptibility remain unknown. To better understand behaviors associated with risk, we monitored bats at three experimentally manipulated wind turbines in Indiana, United States, from July 29 to October 1, 2012, using thermal cameras and other methods. We observed bats on 993 occasions and saw many behaviors, including close approaches, flight loops and dives, hovering, and chases. Most bats altered course toward turbines during observation. Based on these new observations, we tested the hypotheses that wind speed and blade rotation speed influenced the way that bats interacted with turbines.We found that bats were detected more frequently at lowerwind speeds and typically approached turbines on the leeward (downwind)

side. The proportion of leeward approaches increased with wind speed when blades were prevented from turning, yet decreased when blades could turn. Bats were observed more frequently at turbines on moonlit nights. Taken together, these observations suggest that bats may orient toward turbines by sensing air currents and using vision, and that air turbulence caused by fastmoving blades creates conditions that are less attractive to bats passing in close proximity. Tree bats may respond to streams of air flowing downwind from trees at night while searching for roosts, conspecifics, and nocturnal insect prey that could accumulate in such flows. Fatalities of tree bats at turbines may be the consequence of behaviors that evolved to provide selective advantages when elicited by tall trees, but are now maladaptive when elicited by wind turbines.

energy development | sensory perception | video surveillance | wildlife | wind energy

Krapohl 2014

Eva Krapohl & al., *The high heritability of educational achievement reflects many genetically influenced traits, not just intelligence.* PNAS **111** (2014), 15273–15278.

Eva Krapohl, Kaili Rimfeld, Nicholas G. Shakeshaft, Maciej Trzaskowski, Andrew McMillan, Jean-Baptiste Pingault, Kathryn Asbury, Nicole Harlaar, Yulia Kovas, Philip S. Dale & Robert Plomin

Because educational achievement at the end of compulsory schooling represents a major tipping point in life, understanding its causes and correlates is important for individual children, their families, and society. Here we identify the general ingredients of educational achievement using a multivariate design that goes beyond intelligence to consider a wide range of predictors, such as self-efficacy, personality, and behavior problems, to assess their independent and joint contributions to educational achievement. We use a genetically sensitive design to address the question ofwhy educational achievement is so highly heritable. We focus on the results of a United Kingdom-wide examination, the General Certificate of Secondary Education (GCSE), which is administered at the end of compulsory education at age 16. GCSE scores were obtained for 13,306 twins at age 16, whom we also assessed contemporaneously on 83 scales that were condensed to nine broad psychological domains, including intelligence, self-efficacy, personality, well-being, and behavior problems. The mean of GCSE core subjects (English, mathematics, science) is more heritable (62 %) than the nine predictor domains (35–58 %). Each of the domains correlates significantly with GCSE results, and these correlations are largely mediated genetically. The main finding is that, although intelligence accounts for more of the heritability of GCSE than any other single domain, the other domains collectively account for about as much GCSE heritability as intelligence. Together with intelligence, these domains account for75 %of the heritability of GCSE. We conclude that the high heritability of educational achievement reflects many genetically influenced traits, not just intelligence.

academic achievement | twin studies | behavioral genetics | general cognitive ability | personalized learning

Altpaläolithikum

Adler 2014

D. S. Adler & al., *Early Levallois technology and the Lower to Middle Paleolithic transition in the Southern Caucasus.* science **345** (2014), 1609–1613.

s345-1609-Supplement1.xlsx, s345-1609-Supplement2.xlsx, s345-1609-Supplement3.pdf

D. S. Adler, K. N. Wilkinson, S. Blockley, D. F. Mark, R. Pinhasi, B. A. Schmidt-Magee, S. Nahapetyan, C. Mallol, F. Berna, P. J. Glauberman, Y. Raczynski-Henk, N. Wales, E. Frahm, O. Jöris, A. MacLeod, V. C. Smith, V. L. Cullen & B. Gasparian

The Lower to Middle Paleolithic transition (≈400,000 to 200,000 years ago) is marked by technical, behavioral, and anatomical changes among hominin populations throughout Africa and Eurasia. The replacement of bifacial stone tools, such as handaxes, by tools made on flakes detached from Levallois cores documents the most important conceptual shift in stone tool production strategies since the advent of bifacial technology more than one million years earlier and has been argued to result from the expansion of archaic Homo sapiens out of Africa. Our data from Nor Geghi 1, Armenia, record the earliest synchronic use of bifacial and Levallois technology outside Africa and are consistent with the hypothesis that this transition occurred independently within geographically dispersed, technologically precocious hominin populations with a shared technological ancestry.

Anthropologie

Greene 2014

Joshua D. Greene, *From fear recognition to kidney donation*. PNAS **111** (2014), 14966–14967.

The finding that extraordinary altruists are better at recognizing fear suggests a deep connection between the cognitive underpinnings of antisocial and prosocial behavior. The hypothesized connection between extreme altruism and psychopathy suggests an alternative interpretation that, if correct, would make these results a bit less exciting. According to this alternative account, the altruists' cognitive and neural characteristics are not, in fact, so different from those of the control group.

It is important to note that the observed differences between altruists and controls are matters of degree and not stark categorical differences. Many of the control subjects have larger amygdalae than many of the altruists and likewise for the other characteristics measured.

We still do not know why extraordinary altruists tend to have these traits or how these traits are related to more familiar forms of generosity. However, thanks to the path-breaking work of Marsh et al., we are poised to find out.

Hussain 2013

Shumon T. Hussain, *Homo empathicus – Versuch einer Evolutionären Anthropologie der Empathie, Implikationen für die anthropologische Bestimmung des modernen Menschen und das Verschwinden letzter Neandertaler*. Universitätsforschungen zur prähistorischen Archäologie 239 (Bonn 2013).

Marsh 2014

Abigail A. Marsh, Sarah A. Stoycos, Kristin M. Brethel-Haurwitz, Paul Robinson, John W. VanMeter & Elise M. Cardinale, *Neural and cognitive characteristics of extraordinary altruists*. PNAS **111** (2014), 15036–15041.

Altruistic behavior improves the welfare of another individual while reducing the altruist's welfare. Humans' tendency to engage in altruistic behaviors is unevenly

distributed across the population, and individual variation in altruistic tendencies may be genetically mediated. Although neural endophenotypes of heightened or extreme antisocial behavior tendencies have been identified in, for example, studies of psychopaths, little is known about the neural mechanisms that support heightened or extreme prosocial or altruistic tendencies. In this study, we used structural and functional magnetic resonance imaging to assess a population of extraordinary altruists: altruistic kidney donors who volunteered to donate a kidney to a stranger. Such donations meet the most stringent definitions of altruism in that they represent an intentional behavior that incurs significant costs to the donor to benefit an anonymous, nonkin other. Functional imaging and behavioral tasks included face-emotion processing paradigms that reliably distinguish psychopathic individuals from controls. Here we show that extraordinary altruists can be distinguished from controls by their enhanced volume in right amygdala and enhanced responsiveness of this structure to fearful facial expressions, an effect that predicts superior perceptual sensitivity to these expressions. These results mirror the reduced amygdala volume and reduced responsiveness to fearful facial expressions observed in psychopathic individuals. Our results support the possibility of a neural basis for extraordinary altruism. We anticipate that these findings will expand the scope of research on biological mechanisms that promote altruistic behaviors to include neural mechanisms that support affective and social responsiveness.

psychopathy | organ donation | prosocial behavior

Robinson 2014

Elise B. Robinson & al., *Autism spectrum disorder severity reflects the average contribution of de novo and familial influences*. PNAS **111** (2014), 15161–15165.

Elise B. Robinson, Kaitlin E. Samocha, Jack A. Kosmicki, Lauren McGrath, Benjamin M. Neale, Roy H. Perlis & Mark J. Daly

Autism spectrum disorders (ASDs) are a highly heterogeneous group of conditions—phenotypically and genetically—although the link between phenotypic variation and differences in genetic architecture is unclear. This study aimed to determine whether differences in cognitive impairment and symptom severity reflect variation in the degree to which ASD cases reflect de novo or familial influences. Using data from more than 2,000 simplex cases of ASD, we examined the relationship between intelligence quotient (IQ), behavior and language assessments, and rate of de novo loss of function (LOF) mutations and family history of broadly defined psychiatric disease (depressive disorders, bipolar disorder, and schizophrenia; history of psychiatric hospitalization). Proband IQ was negatively associated with de novo LOF rate ($P = 0.03$) and positively associated with family history of psychiatric disease ($P = 0.003$). Female cases had a higher frequency of sporadic genetic events across the severity distribution ($P = 0.01$). High rates of LOF mutation and low frequencies of family history of psychiatric illness were seen in individuals who were unable to complete a traditional IQ test, a group with the greatest degree of language and behavioral impairment. These analyses provide strong evidence that familial risk for neuropsychiatric disease becomes more relevant to ASD etiology as cases become higher functioning. The findings of this study reinforce that there are many routes to the diagnostic category of autism and could lead to genetic studies with more specific insights into individual cases.

neuropsychiatric genetics | epidemiology | heterogeneity | phenotype

Sinha 2014

Pawan Sinha & al., *Autism as a disorder of prediction*. PNAS **111** (2014), 15220–15225.

Pawan Sinha, Margaret M. Kjelgaard, Tapan K. Gandhi, Kleovoulos Tsourides, Annie L. Cardinaux, Dimitrios Pantazis, Sidney P. Diamond & Richard M. Held

A rich collection of empirical findings accumulated over the past three decades attests to the diversity of traits that constitute the autism phenotypes. It is unclear whether subsets of these traits share any underlying causality. This lack of a cohesive conceptualization of the disorder has complicated the search for broadly effective therapies, diagnostic markers, and neural/genetic correlates. In this paper, we describe how theoretical considerations and a review of empirical data lead to the hypothesis that some salient aspects of the autism phenotype may be manifestations of an underlying impairment in predictive abilities. With compromised prediction skills, an individual with autism inhabits a seemingly "magical" world wherein events occur unexpectedly and without cause. Immersion in such a capricious environment can prove overwhelming and compromise one's ability to effectively interact with it. If validated, this hypothesis has the potential of providing unifying insights into multiple aspects of autism, with attendant benefits for improving diagnosis and therapy.

probabilistic processing | endophenotype | Markov models | theory | heterogeneity

Biologie

Nesbitt 2001

Mark Nesbitt, *Wheat evolution, Integrating archaeological and biological evidence*. In: P. D. S. Caligari & P. E. Brandham (Hrsg.), *Wheat Taxonomy: the legacy of John Percival, Festschrift Percival: The Percival Symposium, Reading, 12–13 July 1999*. Linnean Special Issue 3 (London 2001), 37–59.

Understanding of wheat evolution has benefited from improvements in identification techniques for archaeological wheat remains, and from the development of genetic characterisation of current-day wheats, most recently using DNA variability. Archaeological and botanical evidence agree well in locating the domestication of einkorn (Triticum monococcum) and emmer (Triticum dicoccum) in the fertile crescent of the Near East at about 7500 years BC (uncalibrated). DNA characterisation offers excellent potential for narrowing the area of origin, and tracing the spread of crops to Europe. The origin of spelt (T. spelta) is more complex. Biological and archaeological evidence agree that spelt first results from the hybridisation of a cultivated tetraploid wheat and Aegilops tauschii near the Caspian Sea or in Transcaucasia. However archaeobotanical evidence for spelt in this region or on its putative routes to Europe is still scanty and is based on doubtful identifications. The sudden appearance of spelt in Early Bronze Age central Europe may be the result of a local hybridisation of free-threshing hexaploid wheat (T. aestivum) and emmer wheat. The time and place of the origins of European spelt await resolution.

Keywords: Triticum – archaeology – domestication – archaeobotany

Udikovic-Kolic 2014

Nikolina Udikovic-Kolic, Fabienne Wichmann, Nichole A. Broderick & Jo Handelsman, *Bloom of resident antibiotic-resistant bacteria in soil following manure fertilization*. PNAS **111** (2014), 15202–15207.

The increasing prevalence of antibiotic-resistant bacteria is a global threat to public health. Agricultural use of antibiotics is believed to contribute to the spread of antibiotic resistance, but the mechanisms by which many agricultural practices influence resistance remain obscure. Although manure from dairy farms is a common soil amendment in crop production, its impact on the soil microbiome and resistome is not known. To gain insight into this impact, we cultured bacteria from soil before and at 10 time points after application of manure from cows that had not received antibiotic treatment. Soil treated with manure contained a higher abundance of β-lactam-resistant bacteria than soil treated with inorganic fertilizer. Functional metagenomics identified β-lactam-resistance genes in treated and untreated soil, and indicated that the higher frequency of resistant bacteria in manure-amended soil was attributable to enrichment of resident soil bacteria that harbor β-lactamases. Quantitative PCR indicated that manure treatment enriched the blaCEP-04 gene, which is highly similar (96 %) to a gene found previously in a Pseudomonas sp. Analysis of 16S rRNA genes indicated that the abundance of Pseudomonas spp. increased in manure-amended soil. Populations of other soil bacteria that commonly harbor β-lactamases, including Janthinobacterium sp. and Psychrobacter pulmonis, also increased in response to manure treatment. These results indicate that manure amendment induced a bloom of certain antibiotic-resistant bacteria in soil that was independent of antibiotic exposure of the cows from which the manure was derived. Our data illustrate the unintended consequences that can result from agricultural practices, and demonstrate the need for empirical analysis of the agroecosystem.

dairy cow manure | β-lactam antibiotics

Energie

Wang 2014

Kangli Wang & al., *Lithium–antimony–lead liquid metal battery for grid-level energy storage*. nature **514** (2014), 348–350.

Kangli Wang, Kai Jiang, Brice Chung, Takanari Ouchi, Paul J. Burke, Dane A. Boysen, David J. Bradwell, Hojong Kim, Ulrich Muecke & Donald R. Sadoway

The ability to store energy on the electric gridwould greatly improve its efficiency and reliability while enabling the integration of intermittent renewable energy technologies (such as wind and solar) into baseload supply1–4. Batteries have long been considered strong candidate solutions owing to their small spatial footprint, mechanical simplicity andflexibility in siting.However, the barrier to widespread adoption of batteries is their high cost. Here we describe a lithium–antimony–lead liquid metal battery that potentially meets the performance specifications for stationary energy storage applications. This Li||Sb–Pb battery comprises a liquid lithiumnegative electrode, a molten salt electrolyte, and a liquid antimony–lead alloy positive electrode, which self-segregate by density into three distinct layers owing to the immiscibility of the contiguous salt and metal phases. The all-liquid construction confers the advantages of higher current density, longer cycle life and simpler manufacturing of large-scale storage systems (because no membranes or separators are involved) relative to those of conventionalbatteries5,6.At charge–discharge current densities of 275 milliamperes per square centimetre, the cells cycled at 450 degrees Celsius with 98 per cent Coulombic efficiency and 73 per cent round-trip energy efficiency. To provide evidence of their high power capability, the cells were discharged and charged at current densities as high as 1,000 milliamperes per square centimetre. Measured capacity loss after operation for 1,800 hours (more than 450 charge–discharge cycles at 100 per cent depth of discharge) projects retention of over 85 per cent of initial capacity after

ten years of daily cycling. Our results demonstrate that alloying a high-melting-point, high-voltagemetal (antimony) with a low-melting-point, low-cost metal (lead) advantageously decreases the operating temperature while maintaining a high cell voltage. Apart from the fact that this finding puts us on a desirable cost trajectory, this approach maywell be more broadly applicable to other battery chemistries.

Grabung

Edwards 2007

Y. H. Edwards & L. Martin, *Fauna from the Natufian and PPNA Cave Site of Iraq ed-Dubb in Highland Jordan*. Paléorient **33** (2007), i, 143–174.

Occupation of the Iraq ed-Dubb cave site spans the Late Natufian and PPNA periods, providing a rare opportunity to carry out an intra-site exploration of human behaviour across a period when there were significant changes in climate and hunter-gatherers were experimenting with the innovative techniques of plant management which would lead to a new way of life as farmers. This paper focuses on zooarchaeological and taphonomic analyses of faunal remains. The data are examined for evidence of subsistence change between the Late Natufian and PPNA through assessment of species diversity , methods of procurement and issues relating to refuse disposal and degree of sedentism. The results indicate that human occupants of Iraq ed-Dubb were living within the capacity of their environment both in the Late Natufian and PPNA , with little significant change in the range of species hunted and trapped or in strategies for their capture. A small increase in emphasis on gazelle and an intensification of artiodactyl carcass-processing might suggest that the emphasis of the hunting/trapping regime was beginning to change during the PPNA. The apparently well-provisioned economy of this small highland site in the Late Natufian contrasts with the over-stretched subsistence regimes of sites to the west of the river Jordan. Spatial analysis of bone waste distribution has revealed , inter alia, that attitudes towards discarded rubbish appear not to have changed between the Early Natufian and PPNA and imply that discard patterns are related to dwelling-based living , but without the social order conferred by life in a village.

Keywords: Natufian, PPNA, Zooarchaeology, Jordan, refuse disposai

Kuijt 1998

Ian Kuijt & Hamzeh Mahasneh, *Dhra': An Early Neolithic Village in the Southern Jordan Valley*. Journal of Field Archaeology **25** (1998), 153–161.

Dhra' is an Early Neolithic village site located on the east side of the Dead Sea, and roughly contemporaneous with the Pre-Pottery Neolithic A period occupations at Jericho and Netiv Hagdud. Situated on an alluvial terrace near the springs of Ain Waida', Dhra' was a relatively large pre-agricultural community covering an area of approximately 80 m x 50 m, with a high concentration of oval or circular stone and mud structures. Excavations along the side of a 9 m long bulldozer trench revealed evidence of a later Early Bronze Age occupation overlying two and a half meters of Pre-Pottery Neolithic A period cultural material. Recovered within these Neolithic deposits were the remains of several large semi-subterranean oval structures, radiocarbon dated to approximately 10,000 years ago. Uncovered in another area of the site were the remains of a well-preserved oval stone structure, with a stone bench, radiocarbon dated to approximately 9,600 years ago. The

chipped stone industry is characterized by the presence of Khiam points, retouched blades, sickle blades, borers, and large bifacial tools. Groundstone tools include numerous pestles and hand stones. Suprisingly, very few microlithic tools were present with no Hagdud truncations or lunates recovered in excavation.

Lechevallier 1989

M. Lechevallier, D. Philibert, A. Ronen & A. Samzun, *Une occupation khiamienne et sultanienne à Hatoula (Israël)?* Paléorient **15** (1989), i, 1–10.

The site of Hatoula, in western Judea, has been occupied at the recent Natufian. This level is followed by a Khiamian level characterized by an industry with microliths (lunates) and el-Khiam points. In another part of the site, the level following the Natufian can be attributed either to the PPNA (Sultanian) or to a recent Khiamian phase. The features of these occupations are discussed, as well as the meaning implied by the terms "khiamian" and "sultanian".

Grundlagen

Albarella 2007

Umberto Albarella, Keith Dobney, Anton Ervynck & Peter Rowley-Conwy (Hrsg.), *Pigs and Humans, 10,000 Years of Interaction.* (Oxford 2007).

Childe 1929

V. Gordon Childe, *The Most Ancient East, The oriental prelude to European prehistory.* (New York 1929).

Isotope

Lamb 2014

Angela L. Lamb, Jane E. Evans, Richard Buckley & Jo Appleby, *Multi-isotope analysis demonstrates significant lifestyle changes in King Richard III.* Journal of Archaeological Science **50** (2014), 559–565.

JAS050-0559-Supplement.docx

The discovery of the mortal remains of King Richard III provide an opportunity to learn more about his lifestyle, including his origins and movements and his dietary history; particularly focussing on the changes that Kingship brought. We analysed bioapatite and collagen from sections of two teeth which formed during Richard's childhood and early adolescence, and from two bones: the femur (which averages long-term conditions), and the rib (which remodels faster and represents the last few years of life). We applied multi element isotope techniques to reconstruct a full life history. The isotopes initially concur with Richard's known origins in Northamptonshire but suggest that he had moved out of eastern England by age seven, and resided further west, possibly theWelsh Marches. In terms of his diet, there is a significant shift in the nitrogen, but not carbon isotope values, towards the end of his life, which we suggest could be explained by an increase in consumption of luxury items such as game birds and freshwater fish. His oxygen isotope values also rise towards the end of his life and as we know he did not relocate during this time, we suggest the changes could be brought about by increased wine consumption. This is the first suggestion of wine affecting the oxygen isotope

composition of an individual and thus has wider implications for isotope-based palaeodietary and migration reconstructions.

Keywords: Richard III | Isotopes | Diet | Bioapatite | Collagen | Wine

Jungpaläolithikum

Stiner 2000

Mary C. Stiner, Natalie D. Munro & Todd A. Surovell, *The Tortoise and the Hare, Small-Game Use, the Broad-Spectrum Revolution, and Paleolithic Demography*. Current Anthropology **41** (2000), 39–79.

This study illustrates the potential of small-game data for identifying and dating Paleolithic demographic pulses such as those associated with modern human origins and the later evolution of food-producing economies. Archaeofaunal series from Israel and Italy serve as our examples. Three important implications of this study are that (1) early Middle Paleolithic populations were exceptionally small and highly dispersed, (2) the first major population growth pulse in the eastern Mediterranean probably occurred before the end of the Middle Paleolithic, and (3) subsequent demographic pulses in the Upper and Epi-Paleolithic greatly reshaped the conditions of selection that operated on human subsistence ecology, technology, and society. The findings of this study are consistent with the main premise of Flannery's broad-spectrum-revolution hypothesis. However, ranking small prey in terms of work of capture (in the absence of special harvesting tools) proved far more effective in this investigation of human diet breadth than have the taxonomic-diversity analyses published previously.

Stiner 2002

Mary C. Stiner & Natalie D. Munro, *Approaches to Prehistoric Diet Breadth, Demography, and Prey Ranking Systems in Time and Space*. Journal of Archaeological Method and Theory **9** (2002), 181–214.

Zooarchaeological data on small game use hold much potential for identifying and dating Paleolithic demographic pulses in time and space, such as those associated with modern human origins and the evolution of food-producing economies. Although small animals were important to human diets throughout the Middle, Upper, and Epi-Paleolithic periods in the Mediterranean Basin, the types of small prey emphasized by foragers shifted dramatically over the last 200,000 years. Slow-growing, slow-moving tortoises, and marine mollusks dominate the Middle Paleolithic record of small game exploitation. Later, agile, fast-maturing animals became increasingly important in human diets, first birds in the early Upper Paleolithic, and soon thereafter hares and rabbits. While the findings of this study are consistent with the main premise of Flannery's Broad Spectrum Revolution (BSR) hypothesis (Flannery, K. V. (1969). In Ucko, P. J., and Dimbleby, G. W. (eds.), The Domestication and Exploitation of Plants and Animals, Aldine Publishing Company, Chicago, pp. 73–100), it is now clear that human diet breadth began to expand much earlier than the Pleistocene/Holocene transition. Ranking small prey in terms of work of capture (in the absence of special harvesting tools) proves far more effective in this investigation of human diet breadth than taxonomy-based diversity analyses published previously. Our analyses expose a major shift in human predator–prey dynamics involving small game animals by 50–40 KYA in the Mediterranean Basin, with earliest population growth pulses occurring in the Levant. In a separate application to the Natufian period (13–10 KYA), just prior to the rise of Neolithic societies in the Levant, great intensification is apparent from small game use. This effect is most pronounced at the onset of this short culture

period, and is followed by an episode of local depopulation during the Younger Dryas, without further changes in the nature of Natufian hunting adaptations. An essential feature of the diachronic and synchronic approaches outlined here is controlling the potentially conflating effects of spatial (biogeographic) and temporal variation in the faunal data sets.

Keywords: zooarchaeology; diet breadth; demography; Mediterranean Basin; hunter-gatherers; Middle Paleolithic; Upper Paleolithic; Epi-Paleolithic; Natufian.

Stutz 2009

Aaron Jonas Stutz, Natalie D. Munro & Guy Bar-Oz, *Increasing the resolution of the Broad Spectrum Revolution in the Southern Levantine Epipaleolithic (19–12 ka)*. Journal of Human Evolution **56** (2009), 294–306.

We analyze terminal Pleistocene archaeofaunal diversity trends in the Southern Levant by examining eight Epipaleolithic (ca. 19–12 ka) assemblages from the Western Galilee/Mt. Carmel, Israel subregion. We test predictions from a Broad Spectrum Revolution model of the population dynamics of human foragers and their prey. The study emphasizes control over geographic variability and archaeological recovery and recording methods, as we analyze a time series that samples the Epipaleolithic more fully than have previous studies. This provides a new opportunity to examine human population and economic change in the long-term transition to sedentism and agriculture.

We use the Mantel test to evaluate the significance of temporal trends in body-size-based big game diversity, as well as in diversity of small game prey types. Results demonstrate a highly significant decline through time in the relative abundance of medium and large big game, measured relative to small big game. This suggests that the apparent "gazelle specialization" by Late Epipaleolithic (Natufian) hunters reflects longer-term anthropogenic overexploitation of the largest prey types in the spectrum. While large and medium big game abundance declined, our results show small game increased in economic importance over time.

Considered with associated climate change data, the results provide substantial support for the hypothesis that local human populations expanded rapidly in size after the Last Glacial Maximum (LGM). We suggest that following the post-LGM population pulse, human foragers adopted a shifting series of intensification strategies mediated by changes in residential mobility.

Keywords: Human population dynamics | Big game depression | Mantel test

Kultur

Pearce 2014

Eiluned Pearce, *Modelling mechanisms of social network maintenance in hunter-gatherers*. Journal of Archaeological Science **50** (2014), 403–413.

Due to decreasing resource densities, higher latitude hunter-gatherers need to maintain their social networks over greater geographic distances than their equatorial counterparts. This suggests that as latitude increases, the frequency of face-to-face interaction decreases for 'weak tie' relationships in the outer mating pool (≈500-strong) and tribal (≈1500-strong) layers of a hunter-gatherer social network. A key question, then, is how a hunter-gatherer tribe sustains coherence as a single identifiable unit given that members are distributed across a large geographic area. The first step in answering this question is to establish whether the expectation that network maintenance raises a challenge for hunter-gatherers is

correct, or whether sustaining inter-group contact is in fact trivial. Here I present a null model that represents mobile groups as randomly and independently moving gas particles. The aim of this model is to examine whether face-to-face contact can be maintained with every member of an individual's tribe at all latitudes even under the baseline assumption of random movement. Contrary to baseline expectations, the number of encounters between groups predicted by the gas model cannot support tribal cohesion and is significantly negatively associated with absolute latitude. In addition, above ≈40° latitude random mobility no longer produces a sufficient number of encounters between groups to maintain contact across the 500-strong mating pool. These model predictions suggest that the outermost layers of hunter-gatherers' social networks may require additional mechanisms of support in the form of strategies that either enhance encounter rates, such as coordinated mobility patterns, or lessen the need for face-to-face interaction, such as the use of symbolic artefacts to represent social affiliations. Given the predicted decline in encounters away from the equator, such additional supports might be most strongly expressed at high latitudes.

Keywords: Gas model | Social relationship | Biomes | Latitude

Kupfer

Molofsky 2014

Lisa J. Molofsky & al., *A novel approach to lead isotope provenance studies of tin and bronze, Applications to South African, Botswanan and Romanian artifacts.* Journal of Archaeological Science **50** (2014), 440–450.

Lisa J. Molofsky, David Killick, Mihai N. Ducea, Monica Macovei, John T. Chesley, Joaquin Ruiz, Alyson Thibodeau & Gheorghe C. Popescu

Lead isotopic ratios of cassiterite, the dominant ore of tin, evolve after crystallization through decay of uranium (U) and thorium (Th) to lead (Pb), due to the relatively elevated U/Pb ratios of this mineral. We show that the Pb isotopic ratios of smelted tin at Rooiberg, South Africa, form an isochron with a model age that matches the known geological age (≈2 Ga) of the host granite for the Rooiberg cassiterite deposits. Since the Pb isotopic ratios of many prehistoric tin and bronze artifacts throughout southern Africa also fall on this isochron, we deduce that they were made with tin from either the Rooiberg deposits or similar age deposits that exist nearby. In addition, we show that bronze artifacts from Romania define an isochron corresponding to a Variscan age (≈0.3 Ga), suggesting a central or western European tin deposit as its source, since no Variscan tin is known from the neighboring Carpathian Mountains. Implications of this approach for provenance studies of tin and bronzes around the world are examined given various major tin deposits and their age distribution.

Keywords: Provenance | Tin | Bronze | Lead isotopes | Isochron | South Africa | Botswana | Romania

Park 2014

Jang-Sik Park & Vasant Shinde, *Characterization and comparison of the copper-base metallurgy of the Harappan sites at Farmana in Haryana and Kuntasi in Gujarat, India.* Journal of Archaeological Science **50** (2014), 126–138.

Copper-base metallic artifacts excavated from two Indus settlements at Farmana in Haryana and Kuntasi in Gujarat, India, were examined for their microstructure

and chemical composition. The two sites were approximately contemporaneous and belong to the mature Harappan phase of the Indus Civilization, spanning the second half of the 3rd millennium BC. The microstructural data revealed that almost every object examined was substantially worked during fabrication. The composition data showed that arsenic served as the single alloying element in about 60 % of the Farmana artifacts, with the rest of them made of either unalloyed copper or brass. Tin was not added deliberately in any of the Farmana artifacts. In the Kuntasi assemblage, however, tin as well as arsenic played a key role and most artifacts were alloyed with either arsenic or tin or both. Nevertheless, the two Harappan sites seem to have established a similar technology based on forging as the key fabrication method and circulation of product intermediaries as the primary means for metal acquisition. This article will present a detailed account of the mentioned results to characterize the technological status achieved by the two Indus communities. The results will then be compared with those of other Indus sites to gain insight into factors representing the general Indus bronze tradition.

Keywords: India | Harappan sites | Copper-base metallurgy | Microstructure | Chemical composition

Mesolithikum

Asouti 2012

Eleni Asouti & Dorian Q. Fuller, *From foraging to farming in the southern Levant, The development of Epipalaeolithic and Pre-pottery Neolithic plant management strategies*. Vegetation History and Archaeobotany **21** (2012), 149–162.

This paper reviews the archaeobotanical record of the transition from foraging to farming in the southern Levant. The concise presentation of the published botanical evidence follows a critical assessment of: (a) the nature of Epipalaeolithic plant management strategies, (b) the place of the southern Levant in the polycentric development of Near Eastern plant cultivation and domestication, and (c) region-specific pathways for the emergence of domesticated crop "packages". Some inferences are drawn and suggestions are made concerning the potential contribution of archaeobotanical research to questions of broader archaeological significance about socio-economic change in the southern Levant during the Pre-pottery Neolithic.

Keywords: Origins of agriculture | Southern Levant | Natufian | Neolithic | Cultivation | Plant domestication

Munro 2003

Natalie D. Munro, *Small game, the Younger Dryas, and the transition to agriculture in the southern Levant*. Mitteilungen der Gesellschaft für Urgeschichte **12** (2003), 47–71.

The Younger Dryas, an intense cooling and drying event of global proportions, has been attributed a major causal role in the adoption of agricultural economies in the southern Levant. Here, the impact of the Younger Dryas on human adaptations is evaluated using a small game index that measures the efficiency of human foraging as a proxy for site occupation intensity. The study examines faunal assemblages spanning the agricultural transition and dating to the Early and Late Natufian and Pre-Pottery Neolithic periods (ca. 14,500 to 11,000 Cal. BP). The small game index and other supporting evidence document major fluctuations in human site occupation intensity across this critical phase. Site occupation reached

an unprecedented high during the Early Natufian, but quickly reverted to pre-Natufian levels with the onset of the Younger Dryas in the Late Natufian phase. By decreasing site occupation intensity and increasing mobility, the Late Natufians implemented effective demographic strategies to cope with changing resource distributions. In contrast, there is no evidence for intensified resource use or food stress in the Late Natufian, at least in comparison to the Early Natufian phase. Although, it is tempting to assign the Younger Dryas a causal role in the adoption of agricultural economies, support for this hypothesis (in the form of food stress and resource intensification) does not currently exist.

Tchernov 1997

E. Tchernov, *Are Late Pleistocene Environmental Factors, Faunal Changes and Cultural Transformations Causally Connected? The case of the Southern Levant*. Paléorient **23** (1997), ii, 209–228.

At the eve of the Epipaleolithic an irreversible transformation took place in the southern Levant from small nomadic bands of an ephemeral nature and high residential mobility into a sedentary social organization, while acquiring new properties such as labor division, intergroup identification and wide usage of storage facilities. The abrupt replacement of many small Geometric Kebaran seasonal sites with a few relatively large long-term Natufian habitations emerged without traces of intermediate stages. This phenomenon is perhaps the most astonishing example of an increase in the level of complexity of social organization manifested throughout human history. It is argued that the main socio-economic transformations in human evolution were basically detached from the impact of the environment, at least since the Upper Paleolithic, and may be explained by the same basic innate self-organization properties that extend from DNA molecules to biosocialization. No causal and temporal matching between the local cultural changes and the global climatic events can be inferred, in particular during the abrupt shift to sedentisn in the early Natufian, and the transformation to incipient domestication during the PPNB. The cohesiveness of the southern Levantine paleo-communities lasted uninterruptedly from early Natufian to late PPNB, during which the Southwest Asian arid belt supported a rich diversity of Palearctic species, relicts of which still occupy the mountainous region of this areas. It is argued that the southern Levantine climatic oscillations cannot be directly correlated with the ecological and physiological behavior of organisms; certainly not with that of late humans.

Keywords: Southern Levant, Epipaleolithic, Kebaran, Natufian, Neolithic, Sedentism, Domestication, Self-organization, Increase in biological complexity

Methoden

Defrasne 2014

Claudia Defrasne, *Digital image enhancement for recording rupestrian engravings, Applications to an alpine rockshelter*. Journal of Archaeological Science **50** (2014), 31–38.

Image processing software, such as the DStretch plug-in for ImageJ or Photoshop, are currently used to make faint rupestrian pictographs more legible. During the ongoing study of an Alpine rockshelter, these software proved to be equally useful for the visualization of linear engravings and scratchings. This unexpected function of DStretch, created for the study of rupestrian paintings, made it possible to clarify and correct the previous recordings of an incised Iron Age warrior and to facilitate the digital tracing of a modern maritime scene. Even if such convincing results are determined by particular local geological conditions in this case,

this function could facilitate the study of engravings in other contexts where the lithology of smooth rock surfaces produces a sharp contrast with incised images.

Keywords: Rupestrian engravings | Digital enhancement | DStretch | Image analysis | Alps

Mittelpaläolithikum

Richter 2014

Jürgen Richter, *The role of Leaf Points in the late Middle Palaeolithic of Germany*. Praehistoria **9** (2014), 99–113.

Central European Middle Palaeolithic leafpoints are usually seen as elements of one large cultural complex. The present paper informs about chronological problems and regional differences, based on data from the most important leafpoint sites, Mauern and Ranis. In Germany leafpoints occur as occasional elements of the Central European Micoquian/M.M.O. (i.e. Mousterian with Micoquian Option) throughout the whole period of the M.M.O. (ca. 60.000 B.P.–38.000 uncal. B.P.). Moreover, in the fi nal Micoquian/M.M.O.-there seems to have been a tendency towards larger and more perfectly shaped leafpoints. This has been used to forward the term "Altmuehlgruppe" which should now be rejected as a term labelling a distinct cultural unit. In Eastern Germany another kind of leafpoints, known as Jerzmanovice points, occurred at the same time, indicating a development of two distinct cultural units (M.M.O.-C and Jerzmanovician) dividing an area which had previously belonged together within the limits of the distribution of Micoquian/M.M.O. sites. Because of the occurrence of Jerzmanovice points which correspond to those from Poland, also the term "Ranisian" should not be used for German leafpoint assemblages.

Neolithikum

Conolly 2011

James Conolly, Sue Colledge, Keith Dobney, Jean-Denis Vigne, Joris Peters, Barbara Stopp, Katie Manning & Stephen Shennan, *Meta-analysis of zooarchaeological data from SW Asia and SE Europe provides insight into the origins and spread of animal husbandry*. Journal of Archaeological Science **38** (2011), 538–545.

Identifying spatial and temporal variation in animal exploitation patterns is essential for building our understanding of the transition from hunting to stock-keeping. Quantitative analysis of the published records of over 400,000 animal bones recovered from 114 archaeological sites from SW Asia and SE Europe from c12 ka to c7.5 ka cal BP (thousands of calibrated radiocarbon years before present) demonstrates significant spatiotemporal variability in faunal exploitation patterns. Sites in the Euphrates region show adoption of domestic taxa by c10.5 ka cal BP, although on average these taxa contribute less than 10 % to total assemblage size. This rises to a median of about 40 % by c9.5 ka cal BP, and then to about 45 % of total NISP by c8.5 ka cal BP. By c10.5 ka in the Tigris and Zagros region domesticates contribute less than 5 % to faunal assemblages, but then rise to a median of about 20 % by c9.5 ka and 40 % by c8.4 ka cal BP. In contrast, Levantine sites have low numbers of domestic taxa (<1 %) until c8.8 ka cal BP, when the proportion dramatically increases to a median of about 35 %. This apparent delayed-adoption pattern also holds true for the southern Levant, which shows, on average, low levels (<1 %) of domestic taxa until 8.8 ka cal BP, at which point

domesticates contribute a median of about 10 % to assemblages. In the northern parts of SW Asia, the mid- to late-10th millennium cal BP is pivotal, as proportions of domestic taxa show a dramatic increase in frequency during this time, and the 'package' of domestic sheep, goat, cattle and pig becomes more firmly established. This sets the trend for sites of the 9th millennium and the appearance of Neolithic communities in SE Europe from the 8th millennium cal BP onwards, from which point domestic animals are ubiquitous in faunal assemblages.
Keywords: Zooarchaeology | Domestication | Livestock

Kuijt 2002
Ian Kuijt (Hrsg.), *Life in Neolithic Farming Communities, Social Organization, Identity, and Differentiation*. Fundamental Issues in Archaeology (New York 2002).

Kuijt 2009
Ian Kuijt & Nathan Goodale, *Daily practice and the organization of space at the dawn of agriculture, A case study from the Near East*. American Antiquity **74** (2009), 403–422.
Drawing upon the lithic remains from the Late Natufian and Pre-Pottery Neolithic A occupations of 'Iraq ed-Dubb, Jordan, we utilize a quantifiable statistical approach with Geographic Information Systems analysis to interpret shifting practices that influenced site structure. This study indicates that the highly mobile Late Natufian population who inhabited the site had fairly nondelineated use of space compared to a more delineated use of space during the Pre-Pottery Neolithic A. It appears that intensified intra-community organization of space was a byproduct of decreased residential mobility. Moreover, the emergence of more formal intra-community organization likely aided in the development of much more complex human societies that evolved several millennia after the onset of Holocene conditions.

Mayer 2008
Daniella E. Bar-Yosef Mayer & Naomi Porat, *Green stone beads at the dawn of agriculture*. PNAS **105** (2008), 8548–8551.
The use of beads and other personal ornaments is a trait of modern human behavior. During the Middle and Upper Paleolithic periods, beads were made out of shell, bone, ivory, egg shell, and occasionally of minerals. During the transition to agriculture in the Near East, stone, in particular green stone, was used for the first time to make beads and pendants. We observed that a large variety of minerals of green colors were sought, including apatite, several copper-bearing minerals, amazonite and serpentinite. There seems to be an increase with time of distance from which the green minerals were sought. Because beads in white, red, yellow, brown, and black colors had been used previously, we suggest that the occurrence of green beads is directly related to the onset of agriculture. Green beads and bead blanks were used as amulets to ward off the evil eye and as fertility charms.
transition to agriculture | late Natufian | Neolithic | Near East | symbolism

Verhoeven 2004
Marc Verhoeven, *Beyond Boundaries, Nature, Culture and a Holistic Approach to Domestication in the Levant*. Journal of World Prehistory **18** (2004), iii, 179–282.

The main objective of this paper is to suggest an alternative approach for the investigation of domestication in the Levant. First, basic data regarding domestication in the Levant are presented. Then the various traditional approaches towards domestication in the prehistoric Levant, labeled (1) environmental, (2) social and anthropological, and (3) cognitive, are briefly reviewed. This discussion forms the basis for a proposal of a "holistic approach," in which domestication is regarded as a long-term, multidimensional and multirelational phenomenon, including many elements—such as plants, animals, humans, material culture and ancestors—with increasing human manipulation of these various constituents. After a presentation of the theoretical framework, a growth metaphor is used to reconstruct the process of domestication (ca. 20,000–6500 b.p.) as a number of phases: (1) germination in the Kebaran; (2) development in the Early Natufian; (3) retreat/dormancy in the Late/Final Natufian; (4) growth in the Pre-Pottery Neolithic A; (5) florescence in the Early- and Middle Pre-Pottery Neolithic B: (6) further development in the Late Pre-Pottery Neolithic B; (7) dispersal in the Final Pre-Pottery Neolithic B and the Pottery Neolithic. In each of these phases, relations between the various elements are dealt with, special attention being paid to symbolical relations, as evidenced by "art" and ritual.

Keywords: domestication; Levant; Epipaleolithic; Neolithic; nature and culture; holism; ritual; symbolism.

Weiss 2006

Ehud Weiss, Mordechai E. Kislev, Anat Hartmann, *Autonomous Cultivation Before Domestication*. science **312** (2006), 1608–1610.

Early Near Eastern crop cultivation was a trial-and-error process. Some crops continued until full domestication, while others were abandoned and later adopted independently by distant societies.

Wright 1994

Katherine I. Wright, *Ground-stone tools and hunter-gatherer subsistence in Southwest Asia, Implications for the transition to farming*. American Antiquity **59** (1994), 238–263.

Ground-stone tools and hunter-gatherer subsistence in late Pleistocene southwest Asia are examined in light of ethnographic and experimental data on processing methods essential for consumption of various plant foods. In general, grinding and pounding appear to he labor-intensive processing methods. In particular, the labor required to make wild cereals edible has been widely underestimated, and wild cereals were unlikely to have been "attractive" to foragers except under stress conditions. Levantine ground-stone tools were probably used for processing diverse plants. The earliest occurrence of deep mortars coincides with the glacial maximum, camp reoccupations, the onset of increasingly territorial foraging, and the earliest presently known significant samples of wild cereals. Two major episodes of intensification in plant-food processing can be identified in the Levant, coinciding respectively with the earliest evidence for sedentism (12,800-11,500 B.P.) and the transition to farming (11,500-9600 B.P.). The latter episode was characterized by rising frequencies of grinding tools relative to pounding tools, and suggests attempts to maximize nutritional returns of plants harvested from the limited territories characteristic of sedentary foraging and early farming. This episode was probably encouraged by the Younger Drvas, when density and storabilitl of foods may have outweighed considerations of processing costs.

Politik

Yanagizawa-Drott 2014

David Yanagizawa-Drott, *Propaganda and conflict, Evidence from the Rwandan genocide*. Quarterly Journal of Economics (2014), preprint, 1–45. DOI:10.1093/qje/qju020.

QJEcon2014-Yanagizawa-Drott-Supplement.pdf

This paper investigates the role of mass media in times of conflict and state-sponsored mass violence against civilians. We use a unique village-level dataset from the Rwandan Genocide to estimate the impact of a popular radio station that encouraged violence against the Tutsi minority population. The results show that the broadcasts had a significant impact on participation in killings by both militia groups and ordinary civilians. An estimated 51,000 perpetrators, or approximately 10 percent of the overall violence, can be attributed to the station. The broadcasts increased militia violence not only directly by influencing behavior in villages with radio reception, but also indirectly by increasing participation in neighboring villages. In fact, spillovers are estimated to have caused more militia violence than the direct effects. Thus, the paper provides evidence that mass media can affect participation in violence directly due to exposure, and indirectly due to social interactions.

Keywords: Conflict, Genocide, Mass Media, Propaganda, Social Interactions

Religion

Kornienko 2009

Tatiana V. Kornienko, *Notes on the cult buildings of northern Mesopotamia in the Aceramic Neolithic Period*. Journal of Near Eastern Studies **68** (2009), 81–102.

In conclusion, I would like to point out that the definition of types of cult structures in early Neolithic Upper Mesopotamia is quite relative, and it is still difficult to establish certain distinctions between them due to the limited number of data available. Another reason for the impossibility of articulating a profound classification is that at some point there must have been some intermediate forms of cult structures (which gradually evolved in their public significance and decorative design) and interim forms of the rituals that were performed in them.

Despite the limited data, analysis shows to some extent the possibilities that were available to the people (single families or tribes, the entire community, and probably even larger groups of people) who erected the buildings and worshiped the deities living in them.

I share the view that during the Aceramic Neolithic period the land within the borders of the Levant, Upper Mesopotamia, and Iran was a single area in terms of informational links. Moreover, there are signs of probable standardization in PPN Northern Mesopotamian architecture, including the construction of religious buildings and the development in the tradition of symbolic decoration of these types of structures since the earliest period of settlement in Upper Mesopotamia. The evidence indicates that there were even closer links among settlements at the regional level, which may have been the result of cooperation and mutual influence among the dwellers of rural settlements in Aceramic Neolithic Northern Mesopotamia. As a result, a certain cultural unity emerged between separate, local centers, which seem to have played a leading role not only in the manufacturing and exchange of goods but also in the sphere of ideology.

Story or Book

Hurwitz 2014

Jon Hurwitz, *The Method*, *What it takes*. nature **514** (2014), 398.

"Are you seriously telling me real physicists make their own equipment?"

Daker laughed. "Sure. It's cheaper to fabricate parts from a 3D printer and we don't normally get access to a Hollywood production budget."

"What about these?" Jake surveyed the improbable components.