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References

Aktuell

Archer 2015

Edward Archer, Gregory Pavela & Carl J. Lavie, *The Inadmissibility of What We Eat in America and NHANES Dietary Data in Nutrition and Obesity Research and the Scientific Formulation of National Dietary Guidelines*. Mayo Clinic Proceedings (2015), preprint, 1–16. DOI:10.1016/j.mayocp.2015.04.009.

The Scientific Report of the 2015 Dietary Guidelines Advisory Committee was primarily informed by memory-based dietary assessment methods (M-BMs) (eg, interviews and surveys). The reliance on M-BMs to inform dietary policy continues despite decades of unequivocal evidence that M-BM data bear little relation to actual energy and nutrient consumption. Data from M-BMs are defended as valid and valuable despite no empirical support and no examination of the foundational assumptions regarding the validity of human memory and retrospective recall in dietary assessment. We assert that uncritical faith in the validity and value of M-BMs has wasted substantial resources and constitutes the greatest impediment to scientific progress in obesity and nutrition research. Herein, we present evidence that M-BMs are fundamentally and fatally flawed owing to well-established scientific facts and analytic truths. First, the assumption that human memory can provide accurate or precise reproductions of past ingestive behavior is indisputably false. Second, M-BMs require participants to submit to protocols that mimic procedures known to induce false recall. Third, the subjective (ie, not publicly accessible) mental phenomena (ie, memories) from which M-BM data are derived cannot be independently observed, quantified, or falsified; as such, these data are pseudoscientific and inadmissible in scientific research. Fourth, the failure to objectively measure physical activity in analyses renders inferences regarding diet-health relationships equivocal. Given the overwhelming evidence in support of our position, we conclude that M-BM data cannot be used to inform national dietary guidelines and that the continued funding of M-BMs constitutes an unscientific and major misuse of research resources.

Bernstein 2015

Rachel Bernstein, Renee JiJi & Jason Cooley, *All in the family*. science **348** (2015), 1050.

Nobody's going to invite me out for a beer or to coffee even. Female faculty members go out to coffee with female faculty members. There isn't socialization between male and female faculty members. It just doesn't happen.

If I had waited until I had tenure to have kids, it never would have happened. After our daughter was born, I had three miscarriages. Every one of them was horrific. The hormonal shifts were huge and somewhat debilitating, and I decided, for the sake of my career, to not continue to try to have another child. I was in the second half of my 30s, and I think I just waited too long. I tell my grad students that they shouldn't postpone having a family for their career because they never know what their future is going to be.

Bruce 2015

Toby J. A. Bruce et al., *The first crop plant genetically engineered to release an insect pheromone for defence*. Scientific Reports **5** (2015), 11183. DOI:10.1038/srep11183.

SciRep05-11183-Supplement.pdf

Toby J.A. Bruce, Gudbjorg I. Aradottir, Lesley E. Smart, Janet L. Martin, John C. Caulfield, Angela Doherty, Caroline A. Sparks, Christine M. Woodcock, Michael A. Birkett, Johnathan A. Napier, Huw D. Jones & John A. Pickett

Insect pheromones offer potential for managing pests of crop plants. Volatility and instability are problems for deployment in agriculture but could be solved by expressing genes for the biosynthesis of pheromones in the crop plants. This has now been achieved by genetically engineering a hexaploid variety of wheat to release (E)-β-farnesene (Eβf), the alarm pheromone for many pest aphids, using a synthetic gene based on a sequence from peppermint with a plastid targeting amino acid sequence, with or without a gene for biosynthesis of the precursor farnesyl diphosphate. Pure Eβf was produced in stably transformed wheat lines with no other detectable phenotype but requiring targeting of the gene produced to the plastid. In laboratory behavioural assays, three species of cereal aphids were repelled and foraging was increased for a parasitic natural enemy. Although these studies show considerable potential for aphid control, field trials employing the single and double constructs showed no reduction in aphids or increase in parasitism. Insect numbers were low and climatic conditions erratic suggesting the need for further trials or a closer imitation, in the plant, of alarm pheromone release.

Chluba 2015

Christoph Chluba, Wenwei Ge, Rodrigo Lima de Miranda, Julian Strobel, Lorenz Kienle, Eckhard Quandt & Manfred Wuttig, *Ultralow-fatigue shape memory alloy films*. science **348** (2015), 1004–1007.

s348-1004-Supplement.pdf

Functional shape memory alloys need to operate reversibly and repeatedly. Quantitative measures of reversibility include the relative volume change of the participating phases and compatibility matrices for twinning. But no similar argument is known for repeatability. This is especially crucial for many future applications, such as artificial heart valves or elastocaloric cooling, in which more than 10 million transformation cycles will be required. We report on the discovery of an ultralow-fatigue shape memory alloy film system based on TiNiCu that allows at least 10 million transformation cycles. We found that these films contain Ti2Cu precipitates embedded in the base alloy that serve as sentinels to ensure complete and reproducible transformation in the course of each memory cycle.

Davy 2015

Brenda M. Davy & Paul A. Estabrooks, *The Validity of Self-reported Dietary Intake Data, Focus on the "What We Eat In America" Component of the National Health and Nutrition Examination Survey Research Initiative*. Mayo Clinic Proceedings (2015), preprint, 1–3. DOI:10.1016/j.mayocp.2015.05.009.

In doing so, the authors cast doubt on the evidence base used by the US government's 2015 Dietary Guidelines Advisory Committee (DGAC) and its actions to improve public health.

To argue that these data represent a waste of resources, [...] is scientific doublespeak—and an impediment to scientific progress in obesity and nutrition research.

Dong 2015

Guanghui Dong, Dongju Zhang, Xinyi Liu, Fengwen Liu, Fahu Chen & Martin Jones, *"Agriculture facilitated permanent human occupation of the Tibetan Plateau after 3600 B.P."*, *Response to Comment*. science **348** (2015), 872.

Guedes et al. have drawn attention to a mismatch between the predictions of their "thermal niche model" and the records we have published of early barley finds in the northeastern Tibetan Plateau. Here, we consider how that mismatch usefully draws our attention to the additional variables that may account for it—namely, variations in genetic expression and agricultural practice.

Gibbons 2015

Ann Gibbons, *Ancient DNA pinpoints Paleolithic liaison in Europe*. science **348** (2015), 847.

Romanian fossil was the great-great-great-grandson of a Neandertal—but an evolutionary dead end

The young Oase man inherited as much as one-tenth of his DNA from a Neandertal ancestor, and that ancestor lived only 200 years or so previously, according to a talk this month at Cold Spring Harbor Laboratory in New York.

They found that the Oase man had far more Neandertal DNA—composing 4.8 % to 11.3 % of his genome—than either the ancient modern humans from Russia or living Europeans and Asians, Fu said. What's more, the young man had inherited the Neandertal DNA in "large chunks," including several segments more than 50 million base pairs long; one chunk spanned half the length of chromosome 12. Those unbroken stretches of Neandertal DNA suggest that the interbreeding must have been just four to six generations back.

Guedes 2015

Jade d'Alpoim Guedes, R. Kyle Bocinsky & Ethan E. Butler, *Comment on "Agriculture facilitated permanent human occupation of the Tibetan Plateau after 3600 B.P."*. science **348** (2015), 872.

Chen et al. (Reports, 16 January 2015, p. 248) argued that early Tibetan agriculturalists pushed the limits of farming up to 4000 meters above sea level. We contend that this argument is incompatible with the growing requirements of barley. It is necessary to clearly define past crop niches to create better models for the complex history of the occupation of the plateau.

Hautière 2015

Nicolas Hautière, Chantal de la Roche & Jean-Michel Piau, *Die Straßen der 5. Generation*. Spektrum der Wissenschaft **2015**, vii, 78–84.

Ein geringer Material- und Kostenaufwand gehört noch zu den einfachsten Anforderungen an die Straßen der Zukunft. Sie sollen zudem umweltfreundlich sein, Strom für Elektrofahrzeuge erzeugen und vieles mehr.

James 2015

Richard D. James, *Taming the temperamental metal transformation*. science **348** (2015), 968–969.

An alloy can undergo millions of cycles of shape changes in response to stress jumps.

Rea 2015

Philip A. Rea, Peter Yin & Ryan Zahalka, *Mit beigem Fett gegen Übergewicht?* Spektrum der Wissenschaft **2015**, vii, 26–32.

Ein neu entdeckter Typ von Fettzellen kann zwischen dem Speichern und Verbrennen von Fett umschalten. Als Schalter dient unter anderem eine Substanz, die von Muskelzellen bei körperlicher Betätigung freigesetzt wird. Das eröffnet neue Optionen im Kampf gegen Übergewicht.

Wenn ein Mensch regelmäßig mehr energiereiche Nahrung zu sich nimmt, als er verbraucht, legt der Körper weißes Depotfett an, was schließlich zu Fettleibigkeit führt. In dieser Hinsicht bringt die Entdeckung des beigen Fettgewebes nicht viel Neues, denn die wichtigsten Maßnahmen zur Kontrolle des Körpergewichts sind nach wie vor kalorienarme Ernährung und körperliche Bewegung. Zwei unerwartete Erkenntnisse lassen jedoch aufhorchen. Erstens stehen Menge und Aktivität von beigem Fett bei Erwachsenen in umgekehrtem Verhältnis zum Gesamtkörperfett. Magere Menschen haben also im Allgemeinen mehr davon als mollige. Zudem schwindet das beige Fett normalerweise mit dem Alter, und Personen, bei denen es länger erhalten bleibt, nehmen in der zweiten Lebenshälfte weniger leicht zu. Falls es also gelänge, durch Veränderung der Lebensgewohnheiten oder noch zu entwickelnde Medikamente die Menge oder Aktivität von beigen Fettzellen zu steigern, ließe sich eine Gewichtszunahme vielleicht relativ einfach verhindern oder rückgängig machen.

Scharlau 2015

Winfried Scharlau, *Vom Weltstar zum Eremiten*. Spektrum der Wissenschaft **2015**, vii, 52–60.

Der Sohn eines russischen Anarchisten und einer deutschen Aussteigerin entkommt in Frankreich knapp den Nazis, steigt trotz mangelhafter Schulbildung kometenhaft zu einem der bedeutendsten Mathematiker der Welt auf und zieht sich im Alter von 63 Jahren in die selbst gewählte Einsamkeit zurück: Das Leben des Alexander Grothendieck war von einzigartiger Dramatik.

Er hatte eine beinahe mystische Überzeugung, dass die Lösung eines Problems sich fast von selbst, in kleinen, natürlichen, nahezu trivialen Schritten ergibt, wenn das Problem eigentlich in seiner Natur richtig erkannt und offengelegt ist.

Schlichting 2015

H. Joachim Schlichting, *Baumhoher Aufstieg*. Spektrum der Wissenschaft **2015**, vii, 50–51.

Per Verdunstung transportieren Bäume große Mengen Wasser in erstaunliche Höhen – aber wie genau?

Schmidt 2015

Charlie Schmidt, *Alarm over a sinking delta*. science **348** (2015), 845–846.

Rise and Fall project seeks ways to slow land subsidence in Vietnam's populous Mekong delta.

The Mekong delta, which covers some 55,000 square kilometers and sits about 2 meters above sea level, is sinking. Ground- and satellite-based instruments have clocked average subsidence rates of 1 to 4.7 centimeters per year. In Ca Mau, a province on the delta's southern tip, the sinking reaches nearly 5 cm annually.

Syvitski is similarly skeptical of scenarios that envision the delta becoming an Asian version of Holland: a lowland protected from the sea by tall dikes. “Doing that for the Mekong coastline is cost-prohibitive,” he believes. Others disagree. In the meantime, the delta confronts existential threats from abroad. Nations upstream along the Mekong are building dams expected to reduce the flow of sediments that build the delta, and sea level is rising.

Anthropologie

Krings 2000

Matthias Krings et al., *A view of Neandertal genetic diversity*. NatGen **26** (2000), 144–146.

NatGen26-0144-Supplement1.gif, NatGen26-0144-Supplement2.gif

Matthias Krings, Cristian Capelli, Frank Tschentscher, Helga Geisert, Sonja Meyer, Arndt von Haeseler, Karl Grossschmidt, Göran Possnert, Maja Paunovic & Svante Pääbo

In the case of humans, the low genetic diversity seen in both mtDNA and nuclear DNA sequences is likely to be the result of a rapid population expansion from a population of small size, often assumed to have been made possible by some cultural or genetic innovation, such as use of a complex language. If the Neandertals, similar to humans, had a diversity lower than that of the great apes, in spite of inhabiting a region much larger than the apes, this may indicate that they also had expanded from a small population. Analyses of further Neandertal individuals will reveal if a population history similar to that seen in humans underlies the reduced diversity in Neandertals.

Sul 2015

Sunhae Sul, Philippe N. Tobler, Grit Hein, Susanne Leiberg, Daehyun Jung, Ernst Fehr & Hackjin Kim, *Spatial gradient in value representation along the medial prefrontal cortex reflects individual differences in prosociality*. PNAS **112** (2015), 7851–7856.

Despite the importance of valuing another person’s welfare for prosocial behavior, currently we have only a limited understanding of how these values are represented in the brain and,more importantly, how they give rise to individual variability in prosociality. In the present study, participants underwent functional magnetic resonance imaging while performing a prosocial learning task in which they could choose to benefit themselves and/or another person. Choice behavior indicated that participants valued the welfare of another person, although less so than they valued their own welfare. Neural data revealed a spatial gradient in activity within the medial prefrontal cortex (MPFC), such that ventral parts predominantly represented self-regarding values and dorsal parts predominantly represented other-regarding values. Importantly, compared with selfish individuals, prosocial individuals showed a more gradual transition from selfregarding to other-regarding value signals in the MPFC and stronger MPFC–striatum coupling when they made choices for another person rather than for themselves. The present study provides evidence of neural markers reflecting individual differences in human prosociality.

Keywords: medial prefrontal cortex | striatum | anterior insula | reinforcement learning | computational model

Significance: How do selfish and prosocial brains function differently with regard to valuing the welfare of others? The present study addresses this question by combining neuroimaging, computational modeling, and an instrumental conditioning

paradigm. Contrary to the conventional notion of the dorsal medial prefrontal cortex (MPFC) implicated in mentalization, we found that it was selfish individuals who showed greater spatial segregation between ventral and dorsal MPFC, which encoded self- and other-regarding values, respectively. Prosocial individuals, on the other hand, were characterized by overlapping self–other representation in the ventral MPFC and by stronger functional coupling between MPFC and striatum while representing and updating the value of other-regarding choices. These findings provide rigorous scientific evidence of neural markers reflecting individual differences in human prosociality.

Bibel

Hoffmeier 2013

James K. Hoffmeier & Stephen O. Moshier, *"A highway out of Egypt", The main road from Egypt to Canaan.* In: Frank Förster & Heiko Riemer (Hrsg.), *Desert Road Archaeology in Ancient Egypt and Beyond.* Africa Praehistorica 27 (Köln 2013), 485–510.

The Ways of Horus, the well-traveled route across north Sinai, has been the subject of ongoing research for nearly a century because of the importance of this desert road to the military and economic interests of ancient Egypt, especially during the Late Bronze Age/New Kingdom. Until recently, our knowledge of this route was limited to Egyptian texts and carved reliefs of Seti I at Karnak. In the past 30 years archaeological and geological studies in the area now can complement the epigraphic and pictorial sources, permiting us to beter understand and reconstruct this strategic corridor which connected Egypt to western Asia.

Keywords: Ways of Horus | "military road" | fort | toponym | Nile Delta | Sinai | Levant | Late Bronze Age | New | Kingdom

Biologie

Diamond 1990

Jared M. Diamond, *Old dead rats are valuable.* nature **347** (1990), 334–335.

Green 2009

Richard E. Green et al., *The Neandertal genome and ancient DNA authenticity.* EMBO Journal **28** (2009), 2494–2502.

Richard E Green, Adrian W Briggs, Johannes Krause, Kay Prüfer, Hernán A Burbano, Michael Siebauer, Michael Lachmann and Svante Pääbo

Recent advances in high-throughput DNA sequencing have made genome-scale analyses of genomes of extinct organisms possible. With these new opportunities come new difficulties in assessing the authenticity of the DNA sequences retrieved. We discuss how these difficulties can be addressed, particularly with regard to analyses of the Neandertal genome. We argue that only direct assays of DNA sequence positions in which Neandertals differ from all contemporary humans can serve as a reliable means to estimate human contamination. Indirect measures, such as the extent of DNA fragmentation, nucleotide misincorporations, or comparison of derived allele frequencies in different fragment size classes, are unreliable. Fortunately, interim approaches based on mtDNA differences between Neandertals and current humans, detection of male contamination through Y chromosomal

sequences, and repeated sequencing from the same fossil to detect autosomal contamination allow initial large-scale sequencing of Neandertal genomes. This will result in the discovery of fixed differences in the nuclear genome between Neandertals and current humans that can serve as future direct assays for contamination. For analyses of other fossil hominins, which may become possible in the future, we suggest a similar 'boot-strap' approach in which interim approaches are applied until sufficient data for more definitive direct assays are acquired.

Keywords: ancient DNA | DNA contamination | evolution | genome | Neandertal

Höss 1993

Matthias Höss & Svante Pääbo, *DNA extraction from Pleistocene bones by a silica-based purification method*. Nucleic Acids Research **21** (1993), 3913–3914.

This procedure has several advantages for extraction of ancient DNA. Besides its high extraction efficiency, it is simple and fast and therefore allows large numbers of bone samples to be screened in order to identify those that contain surviving DNA molecules. Furthermore, inhibition of the PCR by components of archaeological extracts is abolished. We encountered no example of inhibition in about 50 different bone samples analyzed. In addition, this method has proved very useful for removing inhibitory activities from extracts of other complex sources of DNA, such as animal droppings, which can be of great use for studies of endangered and rare species.

Krings 1997

Matthias Krings, Anne Stone, Ralf W. Schmitz, Heike Krainitzki, Mark Stoneking & Svante Pääbo, *Neandertal DNA Sequences and the Origin of Modern Humans*. Cell **90** (1997), 19–30.

DNA was extracted from the Neandertal-type specimen found in 1856 in western Germany. By sequencing clones from short overlapping PCR products, a hitherto unknown mitochondrial (mt) DNA sequence was determined. Multiple controls indicate that this sequence is endogenous to the fossil. Sequence comparisons with human mtDNA sequences, as well as phylogenetic analyses, show that the Neandertal sequence falls outside the variation of modern humans. Furthermore, the age of the common ancestor of the Neandertal and modern human mtDNAs is estimated to be four times greater than that of the common ancestor of human mtDNAs. This suggests that Neandertals went extinct without contributing mtDNA to modern humans.

Pääbo 1984

Svante Pääbo, *Über den Nachweis von DNA in altägyptischen Mumien*. Das Altertum **30** (1984), 213–218.

Pääbo 1985

Svante Pääbo, *Preservation of DNA in Ancient Egyptian Mummies*. Journal of Archaeological Science **12** (1985), 411–417.

The presence of DNA has been demonstrated in the cell nuclei of an ancient Egyptian mummy fragment. When extracted, this DNA proved to be degraded to a considerable extent and chemically modified. However, the preservation of nucleic acids in this specimen suggests that applying recombinant DNA techniques to the study of ancient mummified tissues might prove to be a fruitful future area of research.

Keywords: Microscopy | Extraction | Agarose Gel Electrophoresis | Absorbance Spectrum | Nucleotide Analysis.

Pääbo 1985

Svante Pääbo, *Molecular cloning of Ancient Egyptian mummy DNA*. nature **314** (1985), 644–645.

Artificial mummification was practised in Egypt from ≈ 2600 BC until the fourth century AD. Because of the dry Egyptian climate, however, there are also many natural mummies preserved from earlier as well as later times. To elucidate whether this unique source of ancient human remains can be used for molecular genetic analyses, 23 mummies were investigated for DNA content. One 2,400-yr-old mummy of a child was found to contain DNA that could be molecularly cloned in a plasmid vector. I report here that one such clone contains two members of the Alu family of human repetitive DNA sequences, as detected by DNA hybridizations and nucleotide sequencing. These analyses show that substantial pieces of mummy DNA (3.4 kilobases) can be cloned and that the DNA fragments seem to contain little or no modifications introduced postmortem.

Pääbo 1989

Svante Pääbo, Russell G. Higuchi & Allan C. Wilson, *Ancient DNA and the Polymerase Chain Reaction, The emerging field of molecular archaeology*. Journal of Biological Chemistry **264** (1989), 9709–9712.

Pääbo 1989

Svante Pääbo, *Ancient DNA: Extraction, characterization, molecular cloning, and enzymatic amplification*. PNAS **86** (1989), 1939–1943.

Several chemical and enzymatic properties were examined in the DNA extracted from dry remains of soft tissues that vary in age from 4 to 13,000 years and represent four species, including two extinct animals (the marsupial wolf and giant ground sloth). The DNA obtained was invariably of a low average molecular size and damaged by oxidative processes, which primarily manifest themselves as modifications of pyrimidines and sugar residues as well as baseless sites and intermolecular cross-links. This renders molecular cloning difficult. However, the polymerase chain reaction can be used to amplify and study short mitochondrial DNA sequences that are of anthropological and evolutionary significance. This opens up the prospect of performing diachronical studies of molecular evolutionary genetics.

Keywords: oxidative damage | electron microscopy | Alu sequences | mitochondrial DNA | polymerase chain reaction

Sidow 1991

Arend Sidow, Allan C. Wilson, Svante Pääbo, S. Hummel, J. L. Bada, P. Westbroek, E. Hagelberg & G. B. Curry, *Bacterial DNA in Clarkia Fossils*. Phil. Trans. Royal Society B **333** (1991), 429–433.

Skinner 2015

Michael K. Skinner, *Vererbung der anderen Art*. Spektrum der Wissenschaft **2015**, vii, 18–25.

Schädliche Chemikalien, Stress und andere Einlüsse können auf Dauer festlegen, welche Gene aktiv sind, und zwar ohne dass sich die Buchstabenabfolge der DNA verändert. Nicht nur das: Offenbar bleiben einige dieser “epigenetischen” Veränderungen sogar in nachfolgenden Generationen erhalten und verursachen auch bei ihnen Krankheiten.

Terhorst 2015

Jonathan Terhorst & Yun S. Song, *Fundamental limits on the accuracy of demographic inference based on the sample frequency spectrum*. PNAS **112** (2015), 7677–7682.

The sample frequency spectrum (SFS) of DNA sequences from a collection of individuals is a summary statistic that is commonly used for parametric inference in population genetics. Despite the popularity of SFS-based inference methods, little is currently known about the information theoretic limit on the estimation accuracy as a function of sample size. Here, we show that using the SFS to estimate the size history of a population has a minimax error of at least O(1/log s), where s is the number of independent segregating sites used in the analysis. This rate is exponentially worse than known convergence rates for many classical estimation problems in statistics. Another surprising aspect of our theoretical bound is that it does not depend on the dimension of the SFS, which is related to the number of sampled individuals. This means that, for a fixed number s of segregating sites considered, using more individuals does not help to reduce the minimax error bound. Our result pertains to populations that have experienced a bottleneck, and we argue that it can be expected to apply to many populations in nature.

Keywords: minimax rate | population genetics | demographic inference

Significance: Numerous empirical studies in population genetics have used a summary statistic called the sample frequency spectrum (SFS), which summarizes the information in a sample of DNA sequences. Despite their popularity, the accuracy of inference methods based on the SFS is difficult to characterize theoretically, and it is currently unknown how the estimation accuracy improves as more sites in the genome are used. Here, we establish information theoretic limits on the accuracy of all estimators that use the SFS to infer population size histories. We study the rate of convergence to the true answer as the amount of data increases, and obtain the surprising result that it is exponentially worse than known convergence rates for many classical estimation problems in statistics.

Zischler 1995

H. Zischler, M. Höss, 0. Handt, A. von Haeseler, A. C. van der Kuyl, J. Goudsmit & S. Pääbo, *Detecting Dinosaur DNA*. science **268** (1995), 1192–1193.

First, our preparation of human nuclear DNA, or other reagents, might be contaminated by dinosaur DNA. Second, dinosaur mitochondrial DNA might have penetrated the mammalian germ line by a hybridization event (or events) between mammalian ancestors and dinosaurs sometime before the end of the Cretaceous. The third, less stimulating alternative is that the dinosaur extracts, or other reagents, used by Woodward et al. were contaminated by small amounts of human DNA.

Datierung

Bosch 2015

Marjolein D. Bosch et al., *New chronology for Ksâr 'Akil (Lebanon) supports Levantine route of modern human dispersal into Europe*. PNAS **112** (2015), 7683–7688.

Marjolein D. Bosch, Marcello A. Mannino, Amy L. Prendergast, Tamsin C. O'Connell, Beatrice Demarchi, Sheila M. Taylor, Laura Niven, Johannes van der Plicht & Jean-Jacques Hublin

Modern human dispersal into Europe is thought to have occurred with the start of the Upper Paleolithic around 50,000–40,000 y ago. The Levantine corridor hypothesis suggests that modern humans from Africa spread into Europe via the Levant. Ksar 'Akil (Lebanon), with its deeply stratified Initial (IUP) and Early (EUP) Upper Paleolithic sequence containing modern human remains, has played an important part in the debate. The latest chronology for the site, based on AMS radiocarbon dates of shell ornaments, suggests that the appearance of the Levantine IUP is later than the start of the first Upper Paleolithic in Europe, thus questioning the Levantine corridor hypothesis. Here we report a series of AMS radiocarbon dates on the marine gastropod Phorcus turbinatus associated with modern human remains and IUP and EUP stone tools from Ksar 'Akil. Our results, supported by an evaluation of individual sample integrity, place the EUP layer containing the skeleton known as "Egbert" between 43,200 and 42,900 cal B.P. and the IUP-associated modern human maxilla known as "Ethelruda" before ≈45,900 cal B.P. This chronology is in line with those of other Levantine IUP and EUP sites and demonstrates that the presence of modern humans associated with Upper Paleolithic toolkits in the Levant predates all modern human fossils from Europe. The age of the IUP-associated Ethelruda fossil is significant for the spread of modern humans carrying the IUP into Europe and suggests a rapid initial colonization of Europe by our species.

Keywords: modern human dispersal | Upper Paleolithic | Near East | chronology | zooarcheology

Significance: Bayesian modeling of AMS radiocarbon dates on the marine mollusk Phorcus turbinatus from Ksâr 'Akil (Lebanon) indicates that the earliest presence of Upper Paleolithic (UP) modern humans in the Levant predates 45,900 cal B.P. Similarities in early UP lithic technology and material culture suggest population dispersals between the Levant and Europe around 50,000–40,000 cal B.P. Our data confirm the presence of modern humans carrying a UP toolkit in the Levant prior to any known European modern human fossils and allow rejection of recent claims that European UP modern humans predate those in the Levant. This result, in turn, suggests the Levant served as a corridor for the dispersal of modern humans out of Africa and into Eurasia.

Jungpaläolithikum

Sitlivy 2012

Valéry Sitlivy et al., *The earliest Aurignacian in Romania: New investigations at the open air site of Românești-Dumbrăviţa I (Banat).* Quartär **59** (2012), 85–130.

Valéry Sitlivy, Victor Chabai, Mircea Anghelinu, Thorsten Uthmeier, Holger Kels, Alexandra Hilgers, Christoph Schmidt, Loredana Nitã, Ion Bãltean, Andrei Veselsky & Thomas Hauck

Previous archaeological research in the Banat area (South-western Romania) resulted in the definition of a chronologically late Krems-Dufour type Aurignacian, followed by the isolated find of several considerably old anatomically modern human (AMH) remains at Oase Cave, several decades later. The last find set the stage for new stratigraphic, chronological and archaeological reassessment of Banat Aurignacian settlements at Tincova, Cosava and Românesti-Dumbrãvita. This study presents the attribute analysis of the Aurignacian lithic assemblage at Românesti-Dumbrãvita I, involving both old and recently excavated collections. Alongside the more accurate identification of the main technological and typological features, pointing to a Protoaurignacian/Early Aurignacian assignation of the

Early Upper Palaeolithic industry here, new chronological landmarks, much older than previously considered, became available. Preliminary thermoluminescence results point to an estimated age between 45 and 40 ka for the main accumulation in GH3 at Românesti, thus indicating a possible contemporaneity of the Banat Aurignacian and the Oase AMH finds. A brief comparative outline of the Banat Aurignacian settlements is also provided, followed by and attempt at placing the local Aurignacian into the European Early Upper Palaeolithic landscape.

Keywords: Banat region | Protoaurignacian | Stratigraphy | Absolute Dating | Technology | Lithic analysis

Bisherige Forschung zum Beginn des Jungpaläolithikums im Banat ergaben widersprüchliche Ergebnisse. Nachdem die von dort bekannt gewordenen Aurignacien-Freilandfundstellen Tincova, Cosava und Românesti-Dumbrãvita zunächst chronologisch an das Ende dieses Technokomplexes gestellt worden waren, wurde nach der Entdeckung der Überreste früher anatomisch moderner Menschen in der Oase-Höhle angenommen, es handele sich um ein Proto-Aurignacien. In dem vorliegenden Artikel werden diese Widersprüche anhand neuer Grabungen und erster absoluter Datierungen sowie einer detaillierten Analyse der Alt- und Neufunde an der Fundstation Românesti-Dumbrãvita aufgelöst. Demnach handelt es sich an diesem Fundplatz um eine Steingeräteindustrie, die sowohl Merkmale des Proto-Aurignacien als auch des klassischen Aurignacien aufweist. Erste Thermolumineszenz-Alter zwischen 45 kyr BP im Liegenden und 40 kyr BP im Hangenden deuten auf eine frühe Zeitstellung von Românesti-Dumbrãvita innerhalb des älteren Jungpaläolithikums und eine zeitliche Überschneidung mit den Menschenresten aus der Oase-Höhle. Vor diesem Hintergrund wird die Bedeutung des Banat im Rahmen der Ausbreitung des frühen modernen Menschen nach Europa diskutiert.

Keywords: Banat Region | Protoaurignacien | Stratigraphie | Absolute Datierung | Technologie | Artefaktanalyse

Klima

Asouti 2015

Eleni Asouti, Ceren Kabukcu, Chantel E. White, Ian Kujit, Bill Finlayson & Cheryl Makarewicz, *Early Holocene woodland vegetation and human impacts in the arid zone of the southern Levant*. The Holocene **25** (2015), 1124–1139.

Palynological archives dating from the Pleistocene–Holocene transition are scarce in the arid zone of the southern Levant. Anthracological remains (the carbonized residues of wood fuel use found in archaeological habitation sites) provide an alternative source of information about past vegetation. This paper discusses new and previously available anthracological datasets retrieved from excavated habitation sites in the southern Levant dating to the PrePottery Neolithic (PPN) period. The available evidence indicates the existence of distinct arboreal floras growing in different ecological niches, which occupied areas that today are either treeless or very sparsely wooded. The anthracological data provide independent confirmation of the hypothesis that early Holocene climate in the southern Levant was significantly moister than at present. Clear North–South and East–West precipitation and associated woodland composition gradients are evidenced. Far from deducing widespread anthropogenic degradation of the regional vegetation, it is suggested that woodland expansion in the semi-arid interiors of the Levant may be attributed to the intensive management of Pistacia woodlands for food, fuel and pasture.

Keywords: anthracology | early Holocene | human impact | Pre-Pottery Neolithic | southern Levant | woodland vegetation

Rhodes 2015

Rachael H. Rhodes et al., *Enhanced tropical methane production in response to iceberg discharge in the North Atlantic*. science **348** (2015), 1016–1019.

s348-1016-Supplement.pdf

Rachael H. Rhodes, Edward J. Brook, John C. H. Chiang, Thomas Blunier, Olivia J. Maselli, Joseph R. McConnell, Daniele Romanini & Jeffrey P. Severinghaus

The causal mechanisms responsible for the abrupt climate changes of the Last Glacial Period remain unclear. One major difficulty is dating ice-rafted debris deposits associated with Heinrich events: Extensive iceberg influxes into the North Atlantic Ocean linked to global impacts on climate and biogeochemistry. In a new ice core record of atmospheric methane with ultrahigh temporal resolution, we find abrupt methane increases within Heinrich stadials 1, 2, 4, and 5 that, uniquely, have no counterparts in Greenland temperature proxies. Using a heuristic model of tropical rainfall distribution, we propose that Hudson Strait Heinrich events caused rainfall intensification over Southern Hemisphere land areas, thereby producing excess methane in tropical wetlands. Our findings suggest that the climatic impacts of Heinrich events persisted for 740 to 1520 years.

Mesolithikum

Gehlen 2003

Birgit Gehlen, *"Dark Ages" nach dem Ende der Eiszeit, Warum wir mehr über die Mittelsteinzeit wissen wollen*. Archäologische Informationen **26** (2003), 63–70.

Mesolithic Studies have always played a less pronounced role in German prehistory. Wrongly so: It was during this period that all geographical regions were settled by human beings for the very first time; at a regional level the natural environment called for, and made possible, new subsistence strategies which led to technological and social innovations and, ultimately, to new forms of economy; substantial intrusions in the natural vegetation opened landscapes to the needs of new life styles; the archaeological sources for the mesolithic period are numerous and there are thousands of sites which could be considered in scientic investigations focusing on a variety of themes; in contrast to the preceeding palaeolithic periods and the following neolithic, a large number of wet-land sites can be expected in most regions of Gemany with exceptionally well preserved organic artifacts. The high potential of known sources, which take the form of material from surveyed surface sites and older excavations, has only been considered sporadically. A large number of landscapes still belong to a mesolithic no-man's land. The absolute chronology of this period is based on only a handful of sites which, with the exception of a very few sites in northern Germany, are poorly dated. This article is to be regarded as a plea for the development of common investigation strategies within a functional archaeological network, in which amateurs, the state offices for the protection of historic monuments, universities and museums alike can all contribute to the comprehensive investigation of the mesolithic period in the future.

Keywords: Mesolithic | state of research | archaeological sources | research gaps | research strategies | mesolithic network

Bisher spielt die Mittelsteinzeit-Forschung in der deutschen Urgeschichte eine untergeordnete Rolle. Zu Unrecht: In dieser Zeit werden zum ersten Mal alle geographischen Räume von den Menschen besiedelt; die natürliche Umwelt hat regional jeweils neue, angepaßte Subsistenzstrategien verlangt und ermöglicht, was zu technischen und sozialen Innovationen geführt hat, wodurch letztendlich erst die Einführung neuer Wirtschaftsformen befördert werden konnte; durch substanzielle Eingriffe in die Vegetation ist Landschaft für neue Lebensbedürfnisse nutzbar gemacht worden; die archäologischen Quellen zur Mittelsteinzeit sind facettenreich und tausende Fundstellen stehen für wissenschaftliche Untersuchungen für verschiedene Fragestellungen zur Verfügung; anders als für das vorausgehende Paläolithikum und das folgende Neolithikum sind Siedlungsplätze im Feuchtbodenmilieu mit ausgezeichneten Erhaltungsbedingungen für organische Materialien in den meisten Regionen Deutschlands zu erwarten. Das Potential der derzeit bekannten Quellen in Form von Materialien aus Oberflächenfundstellen und Altgrabungen wird bisher nur sporadisch genutzt, ganze Regionen sind in Bezug auf die Mittelsteinzeit derzeit unbekannte Landschaften. Die absolute Chronologie dieser Periode stützt sich auf nur wenige Fundstellen, die – von einigen Ausnahmen in Norddeutschland abgesehen – nur als schlecht datiert bezeichnet werden können. Dieser Beitrag ist ein Plädoyer für die Entwicklung gemeinsamer Forschungsstrategien in einem funktionierenden archäologischen Netzwerk, in dem Laien, Bodendenkmalpflege, Universitäten und Museen an verschiedenen Knotenpunkten zukünftig ihren Beitrag zur umfassenden Erforschung der Mittelsteinzeit leisten könnten.

Keywords: Mesolithikum | Forschungsstand | archäologische Quellen | Forschungslücken | Fragestellungen | Forschungsstrategien | Netzwerk Mittelsteinzeit

Metallzeiten

Brück 2013

Joanna Brück & David Fontijn, *The Myth of the Chief, Prestige Goods, Power, and Personhood in the European Bronze Age.* In: Harry Fokkens & Anthony Harding (Hrsg.), *The Oxford Handbook of the European Bronze Age.* (Oxford 2013), 197–215.

In this paper we have argued that it is time to rethink the forms of institutionalized, male-dominated hierarchies so often envisaged in the literature on Bronze Age Europe. Discussions that focus on power and status cannot explain the form that particular acts—including acts of deposition—took. Of course, the meanings ascribed to the objects deposited in graves, wet places, and elsewhere could be drawn on to uphold or to undermine particular value systems—value systems that maintained certain forms of authority. Problems arise, however, when we assume that status (and social identity) was circumscribed and when we impose onto the past concepts of the 'individual' that are a product of the modern, Western world. Although power dif erentials were doubtless a feature of Bronze Age communities, they were not their sole interest. Instead, the material we have discussed from graves, hoards, and other deposits speaks of wider concerns regarding the reproduction of the cosmos and the location of people, animals, and places within it.

There is much to suggest that forms of social identity changed over the human life cycle (and from context to context) and that identity was considered a relational rather than an intrinsic property. Power could be made to reside—temporarily at least—in particular people and objects, but this required ongoing work as their location in networks of interdependency shifted. Whether at the

graveside or as a sword was thrown into a river, power was socially conferred: the objects that defined a person's position were themselves once the gifts of others and had histories that linked them to other people, events, and places. As we have seen, the archaeological evidence indicates that the division between subject and object that underpins modern conceptual frameworks may not have been made in the Bronze Age. If this is so, it is no longer possible to envisage chiefly overlords whose ability to accumulate and control inanimate objects gave them absolute authority. Instead, by re-empowering the objectified 'other'—be it bronze axes, women, or the bodies of dead ancestors—we can construct more nuanced histories in which the productive interactions between people, places, and things together created the communities of Bronze Age Europe.

Story or Book

Spurious 2015

Spurious Correlations. science **348** (2015), 980.

Spurious Correlations. Tyler Vigen. Hachette Books, 2015, 207 pp.

Presented as a series of graphs prepared from real data sets, Spurious Correlations serves as a hilarious reminder that correlation most certainly does not equal causation.