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References

Anthropologie

Speth 2017

John D. Speth, *Putrid Meat and Fish in the Eurasian Middle and Upper Paleolithic, Are We Missing a Key Part of Neanderthal and Modern Human Diet?* PaleoAnthropology **2017**, 44–72.

This paper begins by exploring the role of fermented and deliberately rotted (putrefied) meat, fish, and fat in the diet of modern hunters and gatherers throughout the arctic and subarctic. These practices partially 'pre-digest' the high protein and fat content typical of northern forager diets without the need for cooking, and hence without the need for fire or scarce fuel. Because of the peculiar properties of many bacteria, including various lactic acid bacteria (LAB) which rapidly colonize decomposing meat and fish, these foods can be preserved free of pathogens for weeks or even months and remain safe to eat. In addition, aerobic bacteria in the early stages of putrefaction deplete the supply of oxygen in the tissues, creating an anaerobic environment that retards the production of potentially toxic byproducts of lipid autoxidation (rancidity). Moreover, LAB produce B-vitamins, and the anaerobic environment favors the preservation of vitamin C, a critical but scarce micronutrient in heavily meat-based northern diets. If such foods are cooked, vitamin C may be depleted or lost entirely, increasing the threat of scurvy. Psychological studies indicate that the widespread revulsion shown by many Euroamericans to the sight and smell of putrefied meat is not a universal hard-wired response, but a culturally learned reaction that does not emerge in young children until the age of about five or later, too late to protect the infant from pathogens during the highly vulnerable immediate-post-weaning period. Ethnohistoric and ethnographic evidence clearly show that putrefied meat and fish were not used solely as starvation foods, but served instead as ubiquitous, desirable, and nutritionally important components of forager diets throughout these northern environments. In the second part of the paper, I extend these arguments to suggest that putrefied meat, fish, and fat are likely to have been equally important to the lifeways and adaptations of Eurasian Paleolithic hominins inhabiting analogous environments. If such food practices were in fact widespread during the mid- to late Pleistocene, they may help account for aspects of the archaeological record that are presently difficult to comprehend, such as the 'on again, off again' evidence for fire use (and hence cooking) during the Eurasian Middle Paleolithic. Putrefaction also may alter the isotopic composition of the diet. As meat and fish decompose, a variety of volatile compounds are produced, including ammonia. Loss of NH3, along with lesser amounts of two other nitrogenous gases—cadaverine and putrescine—would very likely leave rotted meat and fish enriched in 15N by comparison to the isotopic composition of these foods in their fresh state. Such enrichment may have contributed to the elevated values seen in many Neanderthals, values that are widely taken as prima facie evidence of Neanderthal's status as a 'top predator.' Finally, if Paleolithic foragers relied upon putrefaction to prepare and store meat, archaeologists may have to rethink the way they interpret a number of widely used taphonomic signatures, including the number and distribution of cutmarks, the extent of carnivore damage, the incidence of burning on both animal bones and

stone tools, and the frequency and scale of hearths, ash lenses, and other features of combustion.

Datierung

Abrams 2024

Grégory Abrams & Thibaut Devièse et al., *Investigating the co-occurrence of Neanderthals and modern humans in Belgium through direct radiocarbon dating of bone implements*. Journal of Human Evolution **186** (2024), 103471, 1–8.

These new HYP dates on Mousterian and Aurignacian industries change the narrative for the MUPT in the region. While the dates obtained on ultrailtered collagen opened the possibility of a co-occurrence of the Mousterian and Aurignacian cultures in northwestern Europe (Table 1), the HYP dates are pointing to a hiatus between the end of the Mousterian (45,900–42,900 cal BP) and the earliest Aurignacian (42,100–40,300 cal BP).

Keywords: Bone implements | Early Aurignacian | Late Mousterian | Northwestern Europe | Middle to Upper Paleolithic transition | Compound speciic radiocarbon analysis

Grégory Abrams, Thibaut Devièse, Stéphane Pirson, Isabelle De Groote, Damien Flas, Cécile Jungels, Ivan Jadin, Pierre Cattelain, Dominique Bonjean, Aurore Mathys, Patrick Semal, Thomas Higham & Kévin Di Modica

Energie

Grünwald 2017

Reinhard Grünwald & Claudio Caviezel, *Lastfolgefähigkeit deutscher Kernkraftwerke*. TAB-Hintergrundpapier 21 (online 2017). <http://publikationen.bibliothek.kit.edu/1000102277/121070976>.

Zusammenfassend zeigt sich hier, dass es bei konservativen Rahmenbedingungen hinsichtlich der Flexibilität der KKW und bei ambitionierten Ausbaubauplänen für die EE zu einem Konfliktpotenzial zwischen der Kernenergie und den EE kommt. Die konservativen Rahmenbedingungen für den KKW-Betrieb unterstellen dabei schon einen relativ flexiblen Betrieb, der auf täglicher Basis keine kurzfristigen Fahrvorgänge im unteren Lastbereich zulässt, aber im oberen Lastbereich für den hier vorliegenden Untersuchungsrahmen völlige Flexibilität unterstellt und damit über die bisher praktizierten Betriebsbedingungen hinausgeht. Dieses Konfliktpotenzial gilt auch bei Annahme verschiedener Systemerweiterungen wie zusätzliche Speicherkapazitäten. Die Abregelungsmengen verringern sich dadurch generell, doch Laufzeitverlängerungen führen weiterhin zu einer starken Zunahme der Abregelungsmengen im Vergleich zu einem System ohne Kernenergie. Für ein konfliktfreies Zusammenspiel von EE und KKW ist daher ein flexiblerer Betrieb der KKW erforderlich.

Grabung

Lewis 2023

Dyani Lewis, *A 27,000-year-old pyramid? Controversy hits bold claim*. nature **624** (2023), 15–16.

Gunung Padang would be much older than Egypt's great pyramids — if it is even human-made at all.

Natawidjaja says that because Gunung Padang was constructed before the end of the last ice age, it shows that people from that time were capable of building complex structures, and "this makes it a very interesting monument".

But Bill Farley, an archaeologist at Southern Connecticut State University in New Haven, says the paper has not provided evidence that an advanced civilization existed during the last ice age. The 27,000-year-old soil samples from Gunung Padang, although accurately dated, do not carry hallmarks of human activity, such as charcoal or bone fragments, he says.

Jungpaläolithikum

Pedersen 2023

Jesper Borre Pedersen, Jakob Johann Assmann, Signe Normand, Dirk Nikolaus Karger & Felix Riede, *Climate Niche Modeling Reveals the Fate of Pioneering Late Pleistocene Populations in Northern Europe*. Current Anthropology **64** (2023), 599–608.

CurrAnth64-599-Supplement.pdf

Following deglaciation during the final stages of the Pleistocene, vast landscapes became increasingly accessible for human dispersal. With no historical analogs, it remains uncertain how people were adapting to these unknown and often unstable environments and whether dispersals were sustained or characterized by local retreat or extinction events. We here address these uncertainties by using climate niche modeling to investigate the relationship between climate and the archaeological record of such a dispersal event: the Late Upper Paleolithic Hamburgian settlement of northern Europe. Our models consider temperature and precipitation from paleoclimate models with high temporal and spatial resolution. They suggest that rising temperatures instead of precipitation changes drove dispersal events by allowing carriers of the Hamburgian tradition to occupy a specific northward-shifting climate space. Similarly, our models suggest a subsequent constriction and fragmentation of this climate space caused by declining temperatures. This climatic downturn and shifting climate space coincide with the disappearance of the Hamburgian tradition from the archaeological record. We argue that this sudden climatic change altered the social and demographic costs of northward dispersal to become unsustainable, leading to a depopulation of the region.

Klima

Artaxo 2023

Paulo Artaxo, *Amazon deforestation implications in local/regional climate change*. PNAS **120** (2023), e2317456120.

These discussions highlight the role of deforestation in regional and global climate change and emphasize the importance of reducing deforestation for climate adaptation and resilience in the Amazon. Several recent works mention that tropical forests could be close to a tipping point, where the hydrological cycle that sustains these tropical forests could be severely perturbed and bring the forests to a different ecosystem, able to store much less carbon.

Dutton 2023

A. Dutton & R. M. DeConto, *Genetic insight on ice sheet history*. science **382** (2023), 1356–1357.

Octopus DNA reveals timing of the most recent collapse of the West Antarctic Ice Sheet.

If the WAIS retreated early in the Last Interglacial as some data suggest, was this event the consequence of changes in ocean currents, temperatures, and/or solid earth response that preceded the interglacial? If the trigger occurred just before the warm period, then perhaps the simplistic emphasis on how warm it got during the interglacial should not be a focus.

Lau 2023

Sally C. Y. Lau et al., *Genomic evidence for West Antarctic Ice Sheet collapse during the Last Interglacial*. science **382** (2023), 1384–1389.

s382-1384-Supplement.pdf

The marine-based West Antarctic Ice Sheet (WAIS) is considered vulnerable to irreversible collapse under future climate trajectories, and its tipping point may lie within the mitigated warming scenarios of 1.5° to 2°C of the United Nations Paris Agreement. Knowledge of ice loss during similarly warm past climates could resolve this uncertainty, including the Last Interglacial when global sea levels were 5 to 10 meters higher than today and global average temperatures were 0.5° to 1.5°C warmer than preindustrial levels. Using a panel of genome-wide, single-nucleotide polymorphisms of a circum-Antarctic octopus, we show persistent, historic signals of gene flow only possible with complete WAIS collapse. Our results provide the first empirical evidence that the tipping point of WAIS loss could be reached even under stringent climate mitigation scenarios.

Sally C. Y. Lau, Nerida G. Wilson, Nicholas R. Golledge, Tim R. Naish, Phillip C. Watts, Catarina N. S. Silva, Ira R. Cooke, A. Louise Allcock, Felix C. Mark, Katrin Linse & Jan M. Strugnell

Methoden

Dyer 2023

Eva L. Dyer & Konrad Kording, *Why the simplest explanation isn't always the best*. PNAS **120** (2023), e2319169120.

Any result found with dimensionality reduction is compatible with a large family of potential realities.

Regardless of how we do dimensionality reduction, if the assumptions and biases underlying a method are not understood then it can be possible to see things in the data that aren't there.

Price 2023

Michael Price, *Dinosaur extinction researcher guilty of research misconduct*. science **382** (2023), 1225.

But Robert DePalma did not commit fraud in paper claiming asteroid hit in springtime, university report finds.

In allegations to Science last year and in a preprint, During and Ahlberg alleged that DePalma had fabricated data in order to publish the claim first.

Mittelpaläolithikum

Gaudzinski-Windheuser 2023

Sabine Gaudzinski-Windheuser, Lutz Kindler & Wil Roebroeks, *Widespread evidence for elephant exploitation by Last Interglacial Neanderthals on the North European plain*. PNAS **120** (2023), e2309427120.

pnas120-e2309427120-Supplement.pdf

Neanderthals hunted and butchered straight-tusked elephants, the largest terrestrial mammals of the Pleistocene, in a lake landscape on the North European plain, 125,000 years ago, as recently shown by a study of the Last Interglacial elephant assemblage from Neumark-Nord (Germany). With evidence for a remarkable focus on adult males and on their extended utilization, the data from this location are thus far without parallel in the archaeological record. Given their relevance for our knowledge of the Neanderthal niche, we investigated whether the Neumark-Nord subsistence practices were more than a local phenomenon, possibly determined by local characteristics. Analyzing elephant remains from two other Last Interglacial archaeological sites on the North European plain, Gröbern and Taubach, we identiied in both assemblages similar butchering patterns as at Neumark-Nord, demonstrating that extended elephant exploitation was a widespread Neanderthal practice during the (early part of the) Last Interglacial. The substantial eforts needed to process these animals, weighing up to 13 metric tons, and the large amounts of food generated suggest that Neanderthals either had ways of storing vast amounts of meat and fat and/or temporarily aggregated in larger groups than commonly acknowledged. The data do not allow us to rule out one of the two explanations, and furthermore both factors, short-term larger group sizes as well as some form of food preservation, may have played a role. What the data do show is that exploitation of large straight-tusked elephants was a widespread and recurring phenomenon amongst Last Interglacial Neanderthals on the North European plain.

Keywords: Neanderthals | Last Interglacial | group size | evolution of cooperation | megaherbivores

Significance: We have recently learned that around 125,000 years ago, hunting of straight-tusked elephants, the largest terrestrial mammals of the Pleistocene, was part of the Neanderthal behavioral repertoire, for several dozens of generations. This knowledge is based on data from one lake-side location in northern Europe only, and hence possibly of limited value for our knowledge of the Neanderthal niche. This new study presents data from two other, contemporaneous sites on the North European plain, demonstrating that elephant exploitation was a widespread phenomenon there. The sheer quantities of food generated by the butchering activities, aimed at extensive exploitation of the carcasses, suggest that Neanderthals had some form of food preservation and/or at least temporarily operated in larger groups than commonly acknowledged.

Hunt 2023

Chris O. Hunt, Emma Pomeroy, Tim Reynolds, Emily Tilby & Graeme Barker, *Shanidar et ses fleurs? Reflections on the palynology of the Neanderthal 'Flower Burial' hypothesis*. Journal of Archaeological Science **159** (2023), 105822, 1–10.

Pollen clumps associated with the skeleton of the Shanidar 4 Neanderthal were interpreted by the excavator as evidence for a purposeful burial with lowers. This was one of several indings from Shanidar Cave that helped to shape modern perceptions of Neanderthals as sharing empathic characteristics with Middle Palaeolithic Homo sapiens (modern humans). Here the available evidence is reviewed

critically from a palynological viewpoint. It seems likely that at least some of the pollen clumps were emplaced by nesting solitary bees, though other mechanisms may also have been involved. Shanidar 4 remains of notable importance, however, in being part of a tight cluster of remarkably complete and deliberately emplaced Neanderthal skeletal remains.

Keywords: Neanderthals | Bees | Burial | Flowers | Insect nests | Caves | Mortuary behaviour

Neolithikum

Schlütz 2023

Frank Schlütz & Robert Hofmann et al., *Isotopes prove advanced, integral crop production, and stockbreeding strategies nourished Trypillia mega-populations*. PNAS **120** (2023), e2312962120.

pnas120-e2312962120-Supplement.pdf

After 500 y of colonizing the forest-steppe area northwest of the Black Sea, on the territories of what is today Moldova and Ukraine, Trypillia societies founded large, aggregated settlements from ca. 4150 BCE and mega-sites (>100 ha) from ca. 3950 BCE. Covering up to 320 ha and housing up to 15,000 inhabitants, the latter were the world's largest settlements to date. Some 480 d13C and d15N measurements on bones of humans, animals, and charred crops allow the detection of spatio-temporal patterns and the calculation of complete agricultural Bayesian food webs for Trypillia societies. The isotope data come from settlements of the entire Trypillia area between the Prut and the Dnieper rivers. The datasets cover the development of the Trypillia societies from the early phase (4800–4200/4100 BCE), over the agglomeration of mega-sites (4200/4100–3650 BCE), to the dispersal phase (3650–3000 BCE). High d15N values mostly come from the mega-sites. Our analyses show that the subsistence of Trypillia mega-sites depended on pulses cultivated on strongly manured (dung-)soils and on cattle that were kept fenced on intensive pastures to easy collect the manure for pulse cultivation. The food web models indicate a low proportion of meat in human diet (approximately 10 %). The largely crop-based diet, consisting of cereals plus up to 46 % pulses, was balanced in calories and indispensable amino acids. The flourishing of Europe's irst mega-populations depended on an advanced, integral mega-economy that included sophisticated dung management. Their demise was therefore not economically, but socially, conditioned [Hofmann et al., PLoS One. 14, e0222243 (2019)].

Keywords: Chalcolithic | Trypillia economy | paleodiet | manure production | legumes

Frank Schlütz, Robert Hofmann, Marta dal Corso, Galyna Pashkevych, Stefan Dreibrodt, Mila Shatilo, Andreea Terna, Katharina Fuchs, Mykhailo Videiko, Vitalii Rud, Johannes Müller & Wiebke Kirleis

Significance: Human social development from foragers to citizens was linked to ampliied agricultural production to feed the growing settlement populations. The irst settlements in Europe with large numbers of inhabitants (up to 15,000) were built some 6,100 B.P. by Trypillia societies in modern-day Moldova and Ukraine. Each of these "mega-sites" existed for multiple generations. The isotopic composition of bones and plants tells us that cattle were intensively pastured to provide manure for the labor-intensive growing of pulses and that the human diet was based mostly on pulses and cereals. There is no discernible economic reason for the demise of these mega-sites. Developing sociopolitical inequalities likely caused people to leave the mega-sites and re-establish smaller settlements.

Ostasien

Chen 2023

Ningbo Chen, Zhengwei Zhang, Hongliang Lü, Fiona Marshall & Xinyi Liu et al., *Evidence for early domestic yak, taurine cattle, and their hybrids on the Tibetan Plateau.* Science Advances **9** (2023), eadi6857. DOI:10.1126/sciadv.adi6857.

SciAdv09-eadi6857-Supplement.pdf

Domestic yak, cattle, and their hybrids are fundamental to herder survival at high altitudes on the Tibetan Plateau. However, little is known about their history. Bos remains are uncommon in this region, and ancient domestic yak have not been securely identiied. To identify Bos taxa and investigate their initial management, we conducted zooarchaeological analyses of 193 Bos specimens and sequenced ive nuclear genomes from recently excavated assemblages at Bangga. Morphological data indicated that more cattle than yak were present. Ancient mitochondrial DNA and nuclear genome sequences identiied taurine cattle and provided evidence for domestic yak and yak-cattle hybridization ≈2500 years ago. Reliance on diverse Bos species and their hybrid has increased cattle adaptation and herder resilience to plateau conditions. Ancient cattle and yak at Bangga were closely related to contemporary livestock, indicating early herder legacies and the continuity of cattle and yak husbandry on the Tibetan Plateau.

Ningbo Chen, Zhengwei Zhang, Jiawen Hou, Jialei Chen, Xuan Gao, Li Tang, Shargan Wangdue, Xiaoming Zhang, Mikkel-Holger S. Sinding, Xuexue Liu, Jianlin Han, Hongliang Lü, Chuzhao Lei, Fiona Marshall & Xinyi Liu

Physik

Chen 2023

Eddy Keming Chen, *The preordained quantum Universe.* nature **624** (2023), 513–515.

Quantum theory might make the cosmos more certain than classical physics ever did.

If the quantum Universe is strongly deterministic, then there is no other path to make the Universe than the way it is. The ultimate laws of the quantum cosmos might tell us why it is this one.

Mann 2023

Adam Mann, *Do tiny black holes from cosmic dawn hide within giant stars?* science **382** (2023), 1222.

Idea could account for universe's mysterious dark matter.

If pervasive enough, these primordial black holes could function as the dark matter thought to make up 85 % of the matter in the universe. Astronomers have searched for them by looking for flashes that would arise when they eclipse a distant object and magnify its light like a lens. None have been spotted. But if a black hole was tiny enough, with a mass of an asteroid and a diameter as small as a hydrogen atom, the flashes would be too dim to be picked up in such surveys.

Some would get trapped within the gas clouds that give birth to stars, and would end up sinking to the cores of newly formed stars. At first, very little would happen. Even a dense stellar core is mostly empty space. The most microscopic of the black holes would have a hard time finding matter to consume, Bellinger says. "It could take longer than the lifetime of the universe to eat the star."

Sprachlehre

Lewis 2023

Molly Lewis, Aoife Cahill, Nitin Madnani & James Evans, *Local similarity and global variability characterize the semantic space of human languages*. PNAS **120** (2023), e2300986120.

pnas120-e2300986120-Supplement.pdf

How does meaning vary across the world's languages? Scholars recognize the existence of substantial variability within specific domains, ranging from nature and color to kinship. The emergence of large language models enables a systems-level approach that directly characterizes this variability through comparison of word organization across semantic domains. Here, we show that meanings across languages manifest lower variability within semantic domains and greater variability between them, using models trained on both 1) large corpora of native language text comprising Wikipedia articles in 35 languages and also 2) Test of English as a Foreign Language (TOEFL) essays written by 38,500 speakers from the same native languages, which cluster into semantic domains. Concrete meanings vary less across languages than abstract meanings, but all vary with geographical, environmental, and cultural distance. By simultaneously examining local similarity and global difference, we harmonize these findings and provide a description of general principles that govern variability in semantic space across languages. In this way, the structure of a speaker's semantic space influences the comparisons cognitively salient to them, as shaped by their native language, and suggests that even successful bilingual communicators likely think with "semantic accents" driven by associations from their native language while writing English. These findings have dramatic implications for language education, cross-cultural communication, and literal translations, which are impossible not because the objects of reference are uncertain, but because associations, metaphors, and narratives interlink meanings in different, predictable ways from one language to another.

Keywords: human cognition | language | semantics | culture | communication

Significance: The degree to which meanings align across the world's languages suggests the limits of translation and cross-cultural communication. Approaching this question demands a systems-level view to compare the structure of meanings across many languages. Using machine learning we construct word embeddings—dense, continuous, high-dimensional spaces that characterize word meanings from context—across large samples of multi-lingual text. With these representations, we find that 1) meanings across languages are similar within semantic domains and variable across them and that 2) concrete meanings are less variable across languages than abstranes, but all vary with distance. This suggests that associations and analogies, which interlink meanings within language, propose predictably different intuitions across distinct languages and confound the transmission of complex ideas.