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References

Aktuell

Besbris 2015

Max Besbris, Jacob William Faber, Peter Rich & Patrick Sharkey, *Effect of neighborhood stigma on economic transactions*. PNAS **112** (2015), 4994–4998.

The hypothesis of neighborhood stigma predicts that individuals who reside in areas known for high crime, poverty, disorder, and/or racial isolation embody the negative characteristics attributed to their communities and experience suspicion and mistrust in their interactions with strangers. This article provides an experimental test of whether neighborhood stigma affects individuals in one domain of social life: economic transactions. To evaluate the neighborhood stigma hypothesis, this study adopts an audit design in a locally organized, online classified market, using advertisements for used iPhones and randomly manipulating the neighborhood of the seller. The primary outcome under study is the number of responses generated by sellers from disadvantaged relative to advantaged neighborhoods. Advertisements from disadvantaged neighborhoods received significantly fewer responses than advertisements from advantaged neighborhoods. Results provide robust evidence that individuals from disadvantaged neighborhoods bear a stigma that influences their prospects in economic exchanges. The stigma is greater for advertisements originating from disadvantaged neighborhoods where the majority of residents are black. This evidence reveals that residence in a disadvantaged neighborhood not only affects individuals through mechanisms involving economic resources, institutional quality, and social networks but also affects residents through the perceptions of others.

Keywords: neighborhoods | stigma | discrimination | transactions

Significance: Although previously theorized, virtually no rigorous empirical evidence has demonstrated an impact of neighborhood stigma on individual outcomes. To test for the effects of neighborhood stigma on economic transactions, an experimental audit of an online classified market was conducted in 2013–2014. In this market, advertisements were placed for used iPhones in which the neighborhood of the seller was randomly manipulated. Advertisements identifying the seller as a resident of a disadvantaged neighborhood received significantly fewer responses than advertisements identifying the seller as a resident of an advantaged neighborhood. The results provide strong evidence for an effect of neighborhood stigma on economic transactions, suggesting that individuals carry the stigma of their neighborhood with them as they take part in economic exchanges.

Carlson 2015

Richard W. Carlson, *A new recipe for Earth formation*. nature **520** (2015), 299–300.

Experimental results suggest that if Earth initially grew by the accumulation of highly chemically reduced material, its core could contain enough uranium to drive the planet's magnetic field throughout Earth's history.

Dasgupta 2015

Nilanjana Dasgupta, Melissa McManus Scircle & Matthew Hunsinger, *Female peers in small work groups enhance women's motivation, verbal participation, and career aspirations in engineering*. PNAS **112** (2015), 4988–4993.

pnas112-04988-Supplement1.xlsx, pnas112-04988-Supplement2.xlsx

For years, public discourse in science education, technology, and policy-making has focused on the "leaky pipeline" problem: the observation that fewer women than men enter science, technology, engineering, and mathematics fields and more women than men leave. Less attention has focused on experimentally testing solutions to this problem. We report an experiment investigating one solution: we created "microenvironments" (small groups) in engineering with varying proportions of women to identify which environment increases motivation and participation, and whether outcomes depend on students' academic stage. Female engineering students were randomly assigned to one of three engineering groups of varying sex composition: 75 % women, 50 % women, or 25 % women. For first-years, group composition had a large effect: women in female-majority and sex-parity groups felt less anxious than women in female-minority groups. However, among advanced students, sex composition had no effect on anxiety. Importantly, group composition significantly affected verbal participation, regardless of women's academic seniority: women participated more in female-majority groups than sex-parity or female-minority groups. Additionally, when assigned to female-minority groups,women who harbored implicit masculine stereotypes about engineering reported less confidence and engineering career aspirations. However, in sex-parity and female-majority groups, confidence and career aspirations remained high regardless of implicit stereotypes. These data suggest that creating small groups with high proportions of women in otherwise male-dominated fields is one way to keep women engaged and aspiring toward engineering careers. Although sex parity works sometimes, it is insufficient to boost women's verbal participation in group work, which often affects learning and mastery.

Keywords: stereotypes | STEM diversity | science education | gender | social psychology

Delahaye 2015

Jean-Paul Delahaye, *Die verkannte Schwester der Fibonacci-Folge*. Spektrum der Wissenschaft **2015**, v, 64–69.

Trotz ihrer einfachen Deinition hat die Folge von Stern und Brocot eine Fülle überraschender Eigenschaften. Und jedes Jahr kommen neue hinzu.

Hayden 2015

Erika Check Hayden, *Journal buoys code-review push*. nature **520** (2015), 276–277.

Nature Biotechnology asks peer reviewers to check accessibility of software used in computational studies.

Peng 2015

Min-Sheng Peng, Ni-Ni Shi, Yong-Gang Yao & Ya-Ping Zhang, *Caveats about interpretation of ancient chicken mtDNAs from northern China*. PNAS **112** (2015), E1970–E1971.

Xiang et al. use two rounds of PCR amplification and direct Sanger sequencing to obtain a mtDNA control region fragment of 326 bp. The primers were designed in terms of NC_001323, which was suggested to contain errors.

When we removed the primer sequences from these mtDNA fragments (as a result, 285 bp left, np 254–538; Table 1), sequences KC456218–KC456220 from the Nanzhuangtou site could be tentatively assigned as basal branches within macrohaplogroup AB or haplogroups A or B (Fig. 1). Sequence KC456215 from the Cishan site could be allocated into macrohaplogroup EFGHIWZ (Fig. 1). Its mutation motif (256-261-310315-446) was found in 894 chickens belonging to haplogroup E with global distribution and in 5 red junglefowls. Therefore, it is hard to make a conclusion of whether the early Holocene samples were from wild junglefowls or early domesticated chickens.

Reinecke 2015

Elke Reinecke, *Falsche Freunde im Internet*. Spektrum der Wissenschaft **2015**, v, 15–16.

Der neueste Freund bei Facebook oder Twitter erscheint manchmal etwas seltsam? Vielleicht steckt dahinter keine reale Person, sondern ein "Social Bot" – ein Programm, das sich vollautomatisch in den sozialen Netzwerken bewegt und dort nichts als die Absichten seiner Programmierer verfolgt.

Wohlers 2015

Anke Wohlers & Bernard J. Wood, *A Mercury-like component of early Earth yields uranium in the core and high mantle* ^{142}Nd. nature **520** (2015), 337–340.

Recent 142Nd isotope data indicate that the silicate Earth (its crust plus the mantle) has a samarium to neodymium elemental ratio (Sm/Nd) that is greater than that of the supposed chondritic building blocks of the planet. This elevated Sm/Nd has been ascribed either to a 'hidden' reservoir in the Earth1,2 or to loss of an early-formed terrestrial crust by impact ablation3. Since removal of crust by ablation would also remove the heat-producing elements—potassium, uranium and thorium—such removal would make it extremely difficult to balance terrestrial heat production with the observed heat flow3. In the 'hidden' reservoir alternative, a complementary low-Sm/Nd layer is usually considered to reside unobserved in the silicate lower mantle. We have previously shown, however, that the core is a likely reservoir for some lithophile elements such as niobium4. We therefore address the question of whether core formation could have fractionated Nd from Sm and also acted as a sink for heat-producing elements. We show here that addition of a reduced Mercury-like body (or, alternatively, an enstatite-chondrite-like body) rich in sulfur to the early Earth would generate a superchondritic Sm/Nd in the mantle and an 142Nd/144Nd anomaly of approximately +14 parts per million relative to chondrite. In addition, the sulfur-rich core would partition uranium strongly and thorium slightly, supplying a substantial part of the 'missing' heat source for the geodynamo.

Xiang 2015

Hai Xiang, Michael Hofreiter & Xingbo Zhao, *Archaeological contexts should not be ignored for early chicken domestication, Reply to Peng et al.* PNAS **112** (2015), E1972–E1973.

However, they overlooked that we did not use previous haplogroup definitions based on a limited number of sites, but rather, we based haplogroup assignment on phylogenetic results from Bayesian tree reconstruction and network analyses. We redid these analyses, and the structure of the tree stays unchanged, leaving the phylogenetic structure of eight divergent clades (clades A–H) intact (Fig. 1), although the 1,019 sequences analyzed now represent 259 rather than 293 haplotypes (in other words, 34 haplotypes were lost; Table 1).

In addition, Peng et al. point out that short ancient DNA sequences are insufficient to judge the domestic status of early Holocene samples. In fact, we never concluded that the earliest Holocene chicken remains from northern China represent domestic chicken solely on the basis of the phylogenetic position of the ancient DNA sequences. Even if the mtDNA sequences from Nanzhuangtou and Cishan are from wild junglefowl populations, they support the conclusion that chicken domestication would have been possible in northern China at that time.

Anthropologie

Austad 2015

Steven N. Austad, *The human prenatal sex ratio: A major surprise*. PNAS **112** (2015), 4839–4840.

If the sex ratio at or near conception is indeed a Mendelian 50:50, as these extensive data indicate, but is a slightly male-biased 51.3 % at birth, then if anything, during much of gestation female fetuses turn out to be the (slightly) frailer sex.

Davidson 2013

Iain Davidson, *Peopling the last new worlds: The first colonisation of Sahul and the Americas, Guest Editorial*. Quaternary International **285** (2013), 1–29.

The evidence of genetics seems to show the broad outlines of colonization history, including some evidence that has not featured very much in archaeology, such as the back migration from the Americas to Siberia. Sophisticated analysis can also be produced to show support for coastal migration within the Americas and perhaps hint at the isolation after initial separation of groups, which led to the linguistic diversity of the Americas. Much could be learned by similar analysis of populations within northern and southern Sahul. On the other hand, genetics is not so good at other aspects of the differentiation of behaviors within these last NewWorlds.

In particular, questions relating to the symbolic differentiation of populations and their implications are clearly archaeological. By including studies of rock art (PEDS) in this collection, and through the integration of such studies into the rest of the archaeology, these papers contribute to the discussion of the changing ideologies that drove the differentiation between groups. In the end the different groups of people in both new worlds had some of the highest densities of languages in the worlddcountering the tendency to see origins in the regions of highest diversity. That said, there may have been fundamental differences between the two regions in the way in which such symbolic differentiation operated.

Holliday 1997

Trenton W. Holliday, *Postcranial Evidence of Cold Adaptation in European Neandertals*. American Journal of Physical Anthropology **104** (1997), 245–258.

The low brachial and crural indices of the European Neandertals have long been considered indicative of cold adaptation. Recent work has documented lower limb/trunk ratios and deeper chests (anterior-posterior diameter) in European Neandertals than among their successors. The present study uses variables reflective of limb length, body mass and trunk height, and compares European Neandertals to 15 globally diverse recent human samples (1 “Eskimo,” 3 North African, 4

sub-Saharan African and 7 European). Bivariate plots, as well as principal components analysis plots of log shape-transformed data, indicate that European Neandertals had an overall body shape that falls at the extreme end of modern higher latitude groups' range of variation. Cluster analysis (minimum spanning tree on a principal coordinates plot) indicates that the Neandertals are closest in body shape to modern "Eskimos," but even in this dendrogram, they are joined to the "Eskimo" via a long branch. In fact, it appears that European Neandertals were "hyperpolar" in body shape, likely due to two factors: 1) the extremely cold temperatures of glacial Europe and 2) less effective cultural buffering against cold stress.

Keywords: ecogeographical patterning; body proportions; limb length; size and shape

Krause 2007

Johannes Krause et al., *The Derived FOXP2 Variant of Modern Humans Was Shared with Neandertals.* Current Biology **17** (2007), 1908–1912.

Johannes Krause, Carles Lalueza-Fox, Ludovic Orlando, Wolfgang Enard, Richard E. Green, Hernán A. Burbano, Jean-Jacques Hublin, Catherine Hänni, Javier Fortea, Marco de la Rasilla, Jaume Bertranpetit, Antonio Rosas & Svante Pääbo

Although many animals communicate vocally, no extant creature rivals modernhumansin language ability. Therefore, knowing when and under what evolutionary pressures our capacity for language evolved is of great interest. Here, we find that our closest extinct relatives, the Neandertals, share with modern humans two evolutionary changes in FOXP2, a gene that has been implicated in the development of speech and language. Wefurthermorefindthat in Neandertals, these changes lie on the common modern human haplotype, which previously was shown to have been subject to a selective sweep. These results suggest that these genetic changes and the selective sweep predate the common ancestor (which existed about 300,000–400,000 years ago) of modern human and Neandertal populations. This is in contrast to more recent age estimates of the selective sweep based on extant human diversity data. Thus, these results illustrate the usefulness of retrieving direct genetic information from ancient remains for understanding recent human evolution.

Kuhn 2006

Steven L. Kuhn & Mary C. Stiner, *What's a Mother to Do? The Division of Labor among Neandertals and Modern Humans in Eurasia.* Current Anthropology **47** (2006), 953–981.

Recent hunter-gatherers display much uniformity in the division of labor along the lines of gender and age. The complementary economic roles for men and women typical of ethnographically documented hunter-gatherers did not appear in Eurasia until the beginning of the Upper Paleolithic. The rich archaeological record of Middle Paleolithic cultures in Eurasia suggests that earlier hominins pursued more narrowly focused economies, with women's activities more closely aligned with those of men with respect to schedule and ranging patterns than in recent forager systems. More broadly based economies emerged first in the early Upper Paleolithic in the eastern Mediterranean region and later in the rest of Eurasia. The behavioral changes associated with the Upper Paleolithic record signal a wider range of economic and technological roles in forager societies, and these changes may have provided the expanding populations of Homo sapiens with a demographic advantage over other hominins in Eurasia.

Martínez 2004

I. Martínez et al., *Auditory capacities in Middle Pleistocene humans from the Sierra de Atapuerca in Spain*. PNAS **101** (2004), 9976–9981.

pnas101-09976-Supplement.pdf

I. Martínez, M. Rosa, J.-L. Arsuaga, P. Jarabo, R. Quam, C. Lorenzo, A. Gracia, J.-M. Carretero„ J.-M. Bermúdez de Castro & E. Carbonell

Human hearing differs from that of chimpanzees and most other anthropoids in maintaining a relatively high sensitivity from 2 kHz up to 4 kHz, a region that contains relevant acoustic information in spoken language. Knowledge of the auditory capacities in human fossil ancestors could greatly enhance the understanding of when this human pattern emerged during the course of our evolutionary history. Here we use a comprehensive physical model to analyze the influence of skeletal structures on the acoustic filtering of the outer and middle ears in five fossil human specimens from the Middle Pleistocene site of the Sima de los Huesos in the Sierra de Atapuerca of Spain. Our results show that the skeletal anatomy in these hominids is compatible with a human-like pattern of sound power transmission through the outer and middle ear at frequencies up to 5 kHz, suggesting that they already had auditory capacities similar to those of living humans in this frequency range.

Stix 2015

Gary Stix, *Gute Zusammenarbeit*. Spektrum der Wissenschaft **2015**, v, 52–59.

Menschen neigen schon als kleine Kinder in vielen Situationen zu intensiver Kooperation – ganz anders als Affen. Hierbei könnte es sich um das entscheidende Merkmal handeln, in dem sich schon unsere Vorfahren von anderen Primaten unterschieden.

Soziale Normen setzen ein Gruppenbewusstsein und einen gemeinsamen Gruppengeist voraus, wobei jeder der von ihm erwarteten Rolle gerecht wird. Auf die Weise entstanden Moralprinzipien, die dann eine Grundlage für Institutionen abgaben – etwa für Regierungen, Militär, Rechts- und Religionssysteme. Diese sorgen dafür, dass sich alle normkonform benehmen, so dass selbst große Staatsgebilde zusammenhalten. Die Menschenaffen haben diesen Weg nie eingeschlagen.

Tomasello 2007

Michael Tomasello, Brian Hare, Hagen Lehmann & Josep Call, *Reliance on head versus eyes in the gaze following of great apes and human infants, The cooperative eye hypothesis*. Journal of Human Evolution **52** (2007), 314–320.

As compared with other primates, humans have especially visible eyes (e.g., white sclera). One hypothesis is that this feature of human eyes evolved to make it easier for conspecifics to follow an individual's gaze direction in close-range joint attentional and communicative interactions, which would seem to imply especially cooperative (mututalistic) conspecifics. In the current study, we tested one aspect of this cooperative eye hypothesis by comparing the gaze following behavior of great apes to that of human infants. A human experimenter "looked" to the ceiling either with his eyes only, head only (eyes closed), both head and eyes, or neither. Great apes followed gaze to the ceiling based mainly on the human's head direction (although eye direction played some role as well). In contrast, human infants relied almost exclusively on eye direction in these same situations. These results demonstrate that humans are especially reliant on eyes in gaze following situations, and thus, suggest that eyes evolved a new social function in human evolution, most likely to support cooperative (mututalistic) social interactions.

Keywords: Apes; Gaze following; Eyes; Social cognition

de Waal 2015

Frans de Waal, *Die Wurzeln der Kooperation*. Spektrum der Wissenschaft **2015**, v, 60–63.

Dass Menschen in großen Gemeinschaften zusammenhalten und füreinander einstehen, verdanken wir frühen evolutionären Anpassungen anderer Primaten, vielleicht sogar aller Säugetiere.

Unser Hang zum Kooperieren hat alte evolutionäre Wurzeln. Aber nur der Mensch bildet Gruppen, die sonst Unmögliches zu leisten vermögen. Nur er besitzt komplexe Moralvorstellungen, die dem Übernehmen von Verantwortung für andere einen hohen Stellenwert zuschreiben und die sich auch über Bestrafung und das Ansehen des Einzelnen regeln.

Wie eine Studie zeigte, spenden Menschen mehr Geld für einen guten Zweck, wenn an der Wand ein Bild hängt, aus dem sie jemand quasi anschaut. Fühlen wir uns beobachtet, dann ist uns unser guter Ruf nicht egal. Die Sorge um die eigene Reputation könnte den Leim dafür geliefert haben, dass der frühe Homo sapiens zunehmend größere Gemeinschaften bildete. Die längste Zeit unserer Vorgeschichte lebten unsere Urahnen als Nomaden, vermutlich recht ähnlich wie manche heutigen Jäger und Sammler. Diese modernen Völker verfügen über belastbare Ressourcen, um Frieden zu halten und mit anderen Gruppen Handel zu treiben. Anzunehmen ist, dass der frühe Homo sapiens ähnliche Eigenschaften aufwies.

White 2015

Tim D. White, C. Owen Lovejoy, Berhane Asfaw, Joshua P. Carlson & Gen Suwa, *Neither chimpanzee nor human, Ardipithecus reveals the surprising ancestry of both*. PNAS **112** (2015), 4877–4884.

Australopithecus fossils were regularly interpreted during the late 20th century in a framework that used living African apes, especially chimpanzees, as proxies for the immediate ancestors of the human clade. Such projection is now largely nullified by the discovery of Ardipithecus. In the context of accumulating evidence from genetics, developmental biology, anatomy, ecology, biogeography, and geology, Ardipithecus alters perspectives on how our earliest hominid ancestors—and our closest living relatives—evolved.

Keywords: human evolution | Australopithecus | hominid | Ethiopia

Biologie

Germonpré 2009

Mietje Germonpré et al., *Fossil dogs and wolves from Palaeolithic sites in Belgium, the Ukraine and Russia, Osteometry, ancient DNA and stable isotopes*. Journal of Archaeological Science **36** (2009), 473–490.

Mietje Germonpré, Mikhail V. Sablin, Rhiannon E. Stevens, Robert E. M. Hedges, Michael Hofreiter, Mathias Stiller & Viviane R. Després

Using multivariate techniques, several skulls of fossil large canids from sites in Belgium, Ukraine and Russia were examined to look for possible evidence of the presence of Palaeolithic dogs. Reference groups constituted of prehistoric dogs, and recent wolves and dogs. The fossil large canid from Goyet (Belgium), dated at c. 31,700 BP is clearly different from the recent wolves, resembling most closely the prehistoric dogs. Thus it is identified as a Palaeolithic dog, suggesting that dog domestication had already started during the Aurignacian. The Epigravettian Mezin 5490 (Ukraine) and Mezhirich (Ukraine) skulls are also identified as

being Palaeolithic dogs. Selected Belgian specimens were analyzed for mtDNA and stable isotopes. All fossil samples yielded unique DNA sequences, indicating that the ancient Belgian large canids carried a substantial amount of genetic diversity. Furthermore, there is little evidence for phylogeographic structure in the Pleistocene large canids, as they do not form a homogenous genetic group. Although considerable variation occurs in the fossil canid isotope signatures between sites, the Belgian fossil large canids preyed in general on horse and large bovids.

Keywords: Upper Palaeolithic | Canidae | Dog | Skull | Ancient DNA | Stable isotopes

Germonpré 2012

Mietje Germonpré, Martina Lázničková-Galetová & Mikhail V. Sablin, *Palaeolithic dog skulls at the Gravettian Předmostí site, the Czech Republic*. Journal of Archaeological Science **39** (2012), 184–202.

Whether or not the wolf was domesticated during the early Upper Palaeolithic remains a controversial issue. We carried out detailed analyses of the skull material from the Gravettian Predmostí site, Czech Republic, to investigate the issue. Three complete skulls from Predmostí were identified as Palaeolithic dogs, characterized by short skull lengths, short snouts, and wide palates and braincases relative to wolves. One complete skull could be assigned to the group of Pleistocene wolves. Three other skulls could not be assigned to a reference group; these might be remains from hybrids or captive wolves. Modifications by humans of the skull and canine remains from the large canids of Predmostí indicate a specific relationship between humans and large canids.

Keywords: Gravettian | Předmostí | Dog (Canis familiaris) | Wolf (Canis lupus) | Domestication | Skull | Canine

Orzack 2015

Steven Hecht Orzack et al., *The human sex ratio from conception to birth*. PNAS **112** (2015), E2102–E2111.

Steven Hecht Orzack, J. William Stubblefield, Viatcheslav R. Akmaev, Pere Colls, Santiago Munné, Thomas Scholl, David Steinsaltz & James E. Zuckerman

We describe the trajectory of the human sex ratio from conception to birth by analyzing data from (i) 3- to 6-d-old embryos, (ii) induced abortions, (iii) chorionic villus sampling, (iv) amniocentesis, and (v) fetal deaths and live births. Our dataset is the most comprehensive and largest ever assembled to estimate the sex ratio at conception and the sex ratio trajectory and is the first, to our knowledge, to include all of these types of data. Our estimate of the sex ratio at conception is 0.5 (proportion male), which contradicts the common claim that the sex ratio at conception is malebiased. The sex ratio among abnormal embryos is male-biased, and the sex ratio among normal embryos is female-biased. These biases are associated with the abnormal/normal state of the sex chromosomes and of chromosomes 15 and 17. The sex ratio may decrease in the first week or so after conception (due to excess male mortality); it then increases for at least 10–15 wk (due to excess female mortality), levels off after ≈20 wk, and declines slowly from 28 to 35 wk (due to excess malemortality). Total female mortality during pregnancy exceeds total male mortality. The unbiased sex ratio at conception, the increase in the sex ratio during the first trimester, and total mortality during pregnancy being greater for females are fundamental insights into early human development.

Keywords: demography | development | evolution | genetics | sex ratio

Significance: The human sex ratio has long interested cell biologists, developmental biologists, demographers, epidemiologists, evolutionary biologists, gynecologists, and statisticians. Nonetheless, the trajectory of the human sex ratio from

conception to birth has been poorly characterized. We present the most comprehensive analysis of this trajectory ever done. Our dataset is the largest ever assembled to estimate the sex ratio at conception and is the first, to our knowledge, to include data from 3- to- 6-d-old embryos, induced abortions, chorionic villus sampling, amniocentesis, and fetal deaths and live births. Our results indicate that the sex ratio at conception is unbiased, the proportion of males increases during the first trimester, and total female mortality during pregnancy exceeds total male mortality; these are fundamental insights into early human development.

Energie

McCunney 2014

Robert J. McCunney, Kenneth A. Mundt, W. David Colby, Robert Dobie, Kenneth Kaliski & Mark Blais, *Wind Turbines and Health, A Critical Review of the Scientific Literature*. Journal of Occupational & Environmental Medicine **56** (2014).

JOccEnvMed56-e0108-Supplement.pdf

Objective: This review examines the literature related to health effects of wind turbines.

Methods: We reviewed literature related to sound measurements near turbines, epidemiological and experimental studies, and factors associated with annoyance.

Results: (1) Infrasound sound near wind turbines does not exceed audibility thresholds. (2) Epidemiological studies have shown associations between living near wind turbines and annoyance. (3) Infrasound and low-frequency sound do not present unique health risks. (4) Annoyance seems more strongly related to individual characteristics than noise from turbines.

Discussion: Further areas of inquiry include enhanced noise characterization, analysis of predicted noise values contrasted with measured levels postinstallation, longitudinal assessments of health pre- and postinstallation, experimental studies in which subjects are "blinded" to the presence or absence of infrasound, and enhanced measurement techniques to evaluate annoyance.

Grabung

Gargett 2011

Rob Gargett, *Archaeologists Find Neanderthal Dwelling Made from Mammoth Bones*. The Subversive Archaeologist **2011**, Dec. 20. <http://www.thesubversivearchaeologist.com/2011/12/archaeologists-find-neanderthal.html> (2015-04-18).

This paper should never have been published. It lacks any useful discussion of the geomorphological context, which to me appears to be clay-dominated and therefore a mire. It's a place where very large mammals would naturally end up if unlucky enough to lumber by. I've pointed out the shortcomings of the 'hut' hypothesis. There's plenty more.

Gargett 2011

Rob Gargett, *One Mammoth Steppe Too Far*. The Subversive Archaeologist **2011**, Dec. 21. <http://www.thesubversivearchaeologist.com/2011/12/one-mammoth-steppe-too-far.html> (2015-04-18).

The description of the excavated sediments are clear evidence that the site was, for quite some time, a low spot that collected water and fine sediments. I'm not sure what 'scattered soil' is, but it's likely that the authors were trying to say something like 'disturbed sediments.' I'd expect considerable 'disturbance' in such depositional circumstances. Imagine the 'disturbance' that could be wrought by an 8 tonne pachyderm in a quagmire full of the carcasses of newly deceased critters, and the skeletal remains of the long dead.

Jungpaläolithikum

Bocherens 2015

Hervé Bocherens et al., *Reconstruction of the Gravettian food-web at Předmostí I using multi-isotopic tracking (^{13}C, ^{15}N, ^{34}S) of bone collagen*. Quaternary International **359** (2015), 211–228.

Hervé Bocherens, Dorothée G. Drucker, Mietje Germonpré, Martina Lázničková-Galetová, Yuichi I. Naito, Christoph Wissing, Jaroslav Brůžek & Martin Oliva

The Gravettian site of Predmostí I in the central Moravian Plain has yielded a rich and diverse large mammal fauna dated around 25–27,000 14C years BP (ca. 29,500–31,500 cal BP). This fauna includes numerous carnivores (cave lion, wolf, brown bear, polar fox, wolverine) and herbivores (reindeer, large bovine, red deer, muskox, horse, woolly rhinoceros, woolly mammoth) whose trophic position could be reconstructed using stable isotopic tracking (d13C, d15N, d34S) of bone collagen (n = 63). Among large canids, two morphotypes, "Pleistocene wolves" and "Palaeolithic dogs", were considered, and two human bones attributed to the Gravettian assemblage of Predmostí I were also sampled. The trophic system around the Gravettian settlement of Predmostí I showed the typical niche partitioning among herbivores and carnivores seen in other mammoth-steppe contexts. The contribution of the analyzed prey species to the diet of the predators, including humans, was evaluated using a Bayesian mixing model (SIAR). Lions included great amounts of reindeer/muskox and possibly bison in their diet, while Pleistocene wolves were more focused on horse and possibly mammoth. Strong reliance on mammoth meat was found for the human of the site, similarly to previously analyzed individuals from other Gravettian sites in Moravia. Interestingly, the large canids interpreted as "Palaeolithic dogs" had a high proportion of reindeer/muskox in their diet, while consumption of mammoth would be expected from the availability of this prey especially in case of close interaction with humans. The peculiar isotopic composition of the Palaeolithic dogs of Predmostí I may indicate some control of their dietary intake by Gravettian people, who could have use them more for transportation than hunting purpose.

Keywords: Collagen | Dog | Food web | Gravettian | Moravian Plain | Stable isotopes

Marquer 2012

L. Marquer, V. Lebreton, T. Otto, H. Valladas, P. Haesaerts, E. Messager, D. Nuzhnyi & S. Péan, *Charcoal scarcity in Epigravettian settlements with mammoth bone dwellings, The taphonomic evidence from Mezhyrich (Ukraine)*. Journal of Archaeological Science **39** (2012), 109–120.

Fuel management during the Paleolithic periods is an important issue to understand past human subsistence. Numerous Palaeolithic sites relate an abundance of burnt bones in hearths and an absence or scarcity of wood charcoals, which

leads studies to focus on burnt bone remains and the use of bones in hearths. Few works take into account the micro-residues of wood charcoals which can still be present in hearth areas and excavated sediments. We studied the Epigravettian site with mammoth bone dwellings of Mezhyrich (Ukraine) previously characterized by its high content of burnt bones and an "absence" of wood charcoal during the so-called mammoth steppe. The presence or absence and proportions of both wood charcoals and burnt bones were quantified in macro-, meso- and microscale sediment size fractions by an image analysis method. Our results show that excavations during field-works at Mezhyrich give only a partial image of the original anthracological record and that most charcoal materials are lost with standard archaeological and anthracological approaches. The scarcity of charcoals in this site was possibly due to an important mass reduction accentuated by the addition of bones in hearths. By applying our protocol we recovered a significant amount of wood charcoals which provides the first 14C dates from charcoals at Mezhyrich. Numerous charcoals are identified contributing subsequent information about vegetation, environment and burning practices. They indicate, by comparison with pollen data already collected, the presence of forest patches in a mammoth steppe landscape, which might have influenced the collecting behavior of Epigravettian populations.

Keywords: Charcoal | Burnt bones | Taphonomy | Combustion residues | Upper Palaeolithic | Ukraine

Shipman 2015

Pat Shipman, *How do you kill 86 mammoths? Taphonomic investigations of mammoth megasites.* Quaternary International **359** (2015), 38–46.

A series of Eurasian archaeological sites formed between about 40–15 ka feature unusually large numbers of mammoth remains with abundant artefacts and, often, mammoth bone dwellings. None of these mammoth megasites is dated prior to the appearance of modern humans in Eurasia. This unusual type of site begs for taphonomic explanation. The large number of individual mammoths and the scarcity of carnivore toothmarks and gnawing suggest a new ability to retain kill mammoths and control of carcasses. Age profiles of such mammoth-dominated sites with a large minimum number of individuals differ statistically at the $p < 0.01$ level from age profiles of Loxodonta africana populations that died of either attritional or catastrophic causes. However, age profiles from some mammoth sites exhibit a chain of linked resemblances with each other through time and space, suggesting the transmission of behavioral or technological innovation. I hypothesize that this innovation may have been facilitated by an early attempted domestication of dogs, as indicated by a group of genetically and morphologically distinct large canids which first appear in archaeological sites at about 32 ka B.P. (uncal). Testable predictions of this hypothesis are generated based on ethnographic data.

Keywords: Mammoths | Dogs | Wolves | Hunting | Age profiles | Taphonomy

Klima

Barker 2015

Stephen Barker, James Chen, Xun Gong, Lukas Jonkers, Gregor Knorr & David Thornalley, *Icebergs not the trigger for North Atlantic cold events.* nature **520** (2015), 333–336.

n520-0333-Supplement.zip

Abrupt climate change is a ubiquitous feature of the Late Pleistocene epoch1. In particular, the sequence of Dansgaard .Oeschger events (repeated transitions between warm interstadial and cold stadial conditions), as recorded by ice cores in Greenland2, are thought to be linked to changes in the mode of overturning circulation in the Atlantic Ocean3. Moreover, the observed correspondence between North Atlantic cold events and increased iceberg calving and dispersal from ice sheets surrounding the North Atlantic4 has inspired many ocean and climate modelling studies that make use of freshwater forcing scenarios to simulate abrupt change across the North Atlantic region and beyond5.7. On the other hand, previous studies4,8 identified an apparent lag between North Atlantic cooling events and the appearance of ice-rafted debris over the last glacial cycle, leading to the hypothesis that iceberg discharge may be a consequence of stadial conditions rather than the cause4,9.11. Here we further establish this relationship and demonstrate a systematic delay between pronounced surface cooling and the arrival of ice-rafted debris at a site southwest of Iceland over the past four glacial cycles, implying that in general icebergs arrived too late to have triggered cooling. Instead we suggest that—on the basis of our comparisons of ice-rafted debris and polar planktonic foraminifera —abrupt transitions to stadial conditions should be considered as a nonlinear response to more gradual cooling across the North Atlantic. Although the freshwater derived from melting icebergs may provide a positive feedback for enhancing and or prolonging stadial conditions10,11, it does not trigger northern stadial events.

Zarnetske 2012

Phoebe L. Zarnetske, David K. Skelly & Mark C. Urban, *Biotic Multipliers of Climate Change*. science **336** (2012), 1516–1518.

A focus on species interactions may improve predictions of the effects of climate change on ecosystems.

Mittelalter

Koch Madsen 2014

Christian Koch Madsen, *Pastoral Settlement, Farming, and Hierarchy in Norse Vatnahverfi, South Greenland*. Dissertation, University of Copenhagen (Edinburgh 2014).

Around AD 1000 two settlements were founded in Greenland by Norse hunter-farmers: the larger Eastern Settlement in South Greenland and the Western Settlement ca. 500 km north in the inner parts of the Nuuk fjord region. The Norse settlers had a two stringed economy that combined pastoral livestock farming with cattle, sheep, goats, pigs, and horses with extensive hunting, the latter also to sustain trade in wildlife luxury exports to Europe. This economy was based on a settlement pattern of dispersed farmsteads occupying the most fertile niches of the fjords, but extending the entire range of the landscape from the Ice Sheet to outer coast, and from lowland to highland, through specialized sites and shielings. This Norse settlement system lasted for around 450 years, the Western Settlement being abandoned in the mid- to late 14th century, the Eastern Settlement a century later.

In 2005, the Vatnahverfi Project was initiated, a research project under the National Museum of Denmark and coordinated by senior researcher Jette Arneborg, aimed at investigating regional level Norse settlement-, economic, and cultural patterns in a core area of the Norse Eastern Settlement: the Vatnahverfi. From 2005-2011 and in 2013, archaeological ruin group surveys were carried out in the

Vatnahverfi, gradually expanding the research area to include the entire peninsula between the fjords of Igaliku Kangerlua and Alluitsup Kangerlua, an area of some 1560 km2. In these archaeological surveys, 129 Norse ruin groups – among them 18 newly discovered – and 798 individual ruins were DGPS-surveyed and uniformly documented. In 2010, a Ph.D.-scholarship was set up as part of the Northern Worlds initiative at the National Museum of Denmark to investigate this new Norse ruin group survey evidence.

The dissertation Pastoral Settlement, Farming, and Hierarchy in Norse Vatnahverfi, South Greenland concludes on these investigations and part of the Vatnahverfi-Project: the dissertation presents a detailed analysis of the Vatnahverfi survey evidence, as well as of comparative sites from elsewhere in the Eastern Settlement, a total of 1308 ruins divided on 157 ruin groups, abort one third of all the ruin groups registered in the Eastern Settlement. This evidence implies that the Vatnahverfi constituted a small community of an average ca. 225-533 people, inhabiting some 47 farmsteads and 86 shielings, some of the latter likely being small farmsteads at the peak of settlement. Most of these farmsteads seem to have been organized around eight evenly distributed larger farms or manors, the remainder probably being subsidiary farms belonging to cotters and tenants. Overall, analysis of population numbers, settlement- and land use patterns suggest a pastoral farming system heavily dependent on extensive landscape resources and intensive herding strategies.

New dates generated through the Vatnahverfi Project suggest that this community expanded in to stages: first settlement occurred just around AD 1000 in the inner and middle fjords, but only at locations near the fjords; the second state of expansion occurred around AD 1050-1100, during which time the outer fjord, inland and highland areas were occupied. The new dates also suggest that settlement contraction began already from the mid-13th century AD. The contraction first involved abandonment of the outer fjord farmsteads, as well as closing down of small churches. From the late-14th century AD, shieling activities appear to have disintensified, and during the 14th century AD many farmsteads were apparently abandoned, although a few sites in primary farmlands continued into the 15th century AD.

As an explanatory model for this settlement development, the comparative case study of pre-modern Inuit farming has been used. Combined with ice core climate proxy evidence, the analysis suggests that a change towards a more intensive mode of farming was forced by climatic deterioration after AD 1250. Such a change was likely problematic for cottagers and tenants, which may have become more dependent on the large farms and manors. An analysis of foodand environmental securities within different societal strata at different times of settlement, coupled with a resilience theory perspective, suggests such deprivation in lower societal strata caused by poor access to labor and continued environmental stress could eventually have cascaded up through the system to seriously affect large farms and manors. If the Norse settlements in Greenland had one major problem, it was apparently shortage of people.

Mittelpaläolithikum

Defleur 1993

Alban Defleur, Olivier Dutour, Hélène Valladas & Bernard Vandermeersch, *Cannibals among the Neanderthals?* nature **362** (1993), 214.

Although our new osteological data cannot prove the practice of cannibalism among the Neanderthals, they constitute an important argument in favour of the

hypothesis that such practices could have occurred among the Middle Palaeolithic inhabitants of Western Europe.

Defleur 1999

Alban Defleur, Tim White, Patricia Valensi, Ludovic Slimak & Évelyne Crégut-Bonnoure, *Neanderthal Cannibalism at Moula-Guercy, Ardèche, France*. science **286** (1999), 128–131.

The cave site of Moula-Guercy, 80 meters above the modern Rhone River, was occupied by Neanderthals approximately 100,000 years ago. Excavations since 1991 have yielded rich paleontological, paleobotanical, and archaeological assemblages, including parts of six Neanderthals. The Neanderthals are contemporary with stone tools and faunal remains in the same tightly controlled stratigraphic and spatial contexts. The inference of Neanderthal cannibalism at Moula-Guercy is based on comparative analysis of hominid and ungulate bone spatial distributions, modifications by stone tools, and skeletal part representations.

Demay 2012

Laëtitia Demay, Stéphane Péan & Marylène Patou-Mathis, *Mammoths used as food and building resources by Neanderthals, Zooarchaeological study applied to layer 4, Molodova I (Ukraine)*. Quaternary International **276** (2012), 212–226.

Considering Neanderthal subsistence, the use of mammoth resources has been particularly discussed. Apart from procurement for food, the use of mammoth bones as building material has been proposed. The hypothesis was based on the discovery made in Molodova I, Ukraine (Dniester valley). In this large multistratified open-air site, a rich Mousterian layer was excavated. Dated to the Inter-Pleniglacial (MIS 3), it has yielded 40 000 lithic remains associated with ca. 3000 mammal bones, mostly from mammoth. Several areas have been excavated: a pit filled with bones, different areas of activities (butchering, tool production), twenty-five hearths and a circular accumulation made of mammoth bones, described as a dwelling structure set up by Neanderthals. Attested dwelling structures made of mammoth bones are known in Upper Paleolithic sites, from Ukraine and Russia, attributed to the Epigravettian tradition.

This paper presents a zooarchaeological study of large mammal remains from Molodova I layer 4, to understand the modalities of acquisition and utilization of mammoth resources for food and technical purposes, especially to test the hypothesis of using bones as building elements. The number of mammoths is estimated to at least fifteen individuals of all age classes and both sexes, which died during several episodes, near or on the site.

The taphonomic modifications due to weathering, water percolation and plant roots indicate the location of bones in holes, such as the pit and the basement of the circular accumulation. Secondary actions of carnivores, especially of hyaenid type, are rare on bones, showing that the assemblage was not accumulated by these predators. The anatomical preservation, the age and sex features and the taphonomic data indicate several modalities of mammoth acquisition by hunting, scavenging and collecting.

Based on anthropogenic marks, mammoth meat has been eaten. The presence of series of striations and ochre on mammoth bones are associated with a technical or symbolic use. Furthermore, mammoth bones have been deliberately selected (long and flat bones, tusks, connected vertebrae) and circularly arranged. This mammoth bone structure could be described as the basement of a wooden cover or as a wind-screen. The inner presence of fifteen hearths, lithic artifacts and

waste of mammal butchery and cooking is characteristic of a domestic area, which was probably the centre of a residential camp recurrently settled. It appears that Neanderthals were the oldest known humans who used mammoth bones to build a dwelling structure.

Fabre 2011

Virginie Fabre, Silvana Condemi, Anna Degioanni & Estelle Herrscher, *Neanderthals versus Modern Humans*, *Evidence for Resource Competition fromIsotopic Modelling*. IntJEvolBiol **2011**, 689315.

During later MOIS3, in Europe two populations were present, autochthonous Neanderthals and modern humans. Ecological competition between these two populations has often been evoked but never demonstrated. Our aim is to establish whether resource competition occurred. In this paper, in order to examine the possibility of ecological competition between these two populations, 599 isotopic data were subjected to rigorous statistical treatment and analysis through mixing models. The aim of this paper was to compare dietary strategies ofNeanderthals andmodern humans over time. Our conclusions suggest thatNeanderthals and modern humans shared dietary habits in the particular environmental context of MOIS3 characterised in Europe by climatic deterioration. In this environmental context, the resource competition between Neanderthals and modern humans may have accelerated the disappearance of the Neanderthal population.

Finlayson 2009

Clive Finlayson, *The humans who went extinct*, *Why Neanderthals died out and we survived*. (Oxford 2009).

Just 28,000 years ago, the blink of an eye in geological time, the last of Neanderthals died out in their last outpost, in caves near Gibraltar. Thanks to cartoons and folk accounts we have a distorted view of these other humans – for that is what they were. We think of them as crude and clumsy and not very bright, easily driven to extinction by the lithe, smart modern humans that came out of Africa some 100,000 years ago.

But was it really as simple as that? Clive Finlayson reminds us that the Neanderthals were another kind of human, and their culture was not so very different from that of our own ancestors. In this book, he presents a wider view of the events that led to the migration of the moderns into Europe, what might have happened during the contact of the two populations, and what finally drove the Neanderthals to extinction. It is a view that considers climate, ecology, and migrations of populations, as well as culture and interaction.

His conclusion is that the destiny of the Neanderthals and the Moderns was sealed by ecological factors and contingencies. It was a matter of luck that we survived and spread while the Neanderthals dwindled and perished. Had the climate not changed in our favour some 50 million years ago, things would have been very different.

There is much current research interest in Neanderthals, much of it driven by attempts to map some of their DNA. But it's not just a question of studying the DNA. The rise and fall of populations is profoundly moulded by the larger scale forces of climate and ecology. And it is only by taking this wider view that we can fully understand the course of events that led to our survival and their demise. The fact that Neanderthals survived until virtually yesterday makes our relationship with them and their tragedy even more poignant. They almost made it, after all.

Froehle 2009

Andrew W. Froehle & Steven E. Churchill, *Energetic Competition Between Neandertals and Anatomically Modern Humans*. PaleoAnthropology **2009**, 96–116.

The effects of climate on energy expenditure, which include climatic influences on human metabolic physiology and variation in the level of physical activity required for subsistence under different environmental conditions, have been the focus of a considerable amount of research. In general, this work shows that human foragers inhabiting colder climates tend to have higher energy expenditure than those in warmer climates, both in terms of maintenance energy needs (basal metabolic rate, or BMR) and the amount of energy spent obtaining resources. Recently, several authors have applied these findings to the fossil record, with results that indicate that Neandertals would likely have had very high daily energy expenditure (DEE) as part of their adaptive response to the thermoregulatory and subsistence challenges of life in cold climates. These studies imply that anatomically modern humans would have had substantially lower energy requirements than, and thus a competitive advantage over, Neandertals in Europe. Estimates of DEE do not exist for anatomically modern humans in cold climates, however, begging the question of whether they might have required similarly high amounts of energy to survive in glacial Europe.

Here we present an exploratory analysis of climatic effects on energy expenditure in Neandertals and anatomically modern humans, using a new method. This method uses mean annual temperature along with body size, sex and age to predict BMR, thereby directly incorporating the effects of climate on metabolic physiology. We used this method to calculate BMR in a sample of Neandertals and Pleistocene modern humans, obtaining paleo-mean annual temperature values for fossil sites from data available from the Oxygen Isotope Stage 3 Project. We then estimated DEE from these BMR values, using climate-specific physical activity level (PAL) values based on extant human foragers living in different environments.

Our model suggests that Neandertals would have had substantially higher energy needs than anatomically modern humans in similar climates, on the order of 100–350 kcal per day, which corroborates the results of previous studies using different methods. This difference is in large part due to greater body mass in Neandertals, which may have related mainly to a higher proportion of muscle mass compared to anatomically modern humans. Greater muscularity in Neandertals would have provided them with greater thermoregulatory capability, may have served as insulation, and was also probably part of a subsistence strategy of close-range encounters with large mammalian prey. If greater muscle mass served these ends in Neandertals, modern humans must have used other means of dealing with insulation and subsistence in order to maintain less-massive bodies. There is archaeological evidence consistent with this interpretation, suggesting that anatomically modern humans may have brought with them into Europe improved methods of insulating themselves, as well as broadened subsistence techniques. Lower adult energy needs could have provided modern humans with reproductive advantages in the form of reduced birth spacing, greater survivorship, or both. This would likely translate into a competitive advantage over Neandertals who had higher, and thus harder to meet, energy demands.

The "Energetic Studies in Hominin Evolution" Symposium, Paleoanthropology Meetings, Philadelphia, PA, 27—28 March, 2007; symposium papers guest edited by Karen Steudel-Numbers (University of Wisconsin) and Cara Wall-Scheffler (Seattle Pacific University).

Gargett 1989

L. P. Louwe Kooijmans, Yuri Smirnov, Ralph S. Solecki, Paola Villa, Thomas Weber & Robert H. Gargett, *On the Evidence for Neandertal Burial*. Current Anthropology **30** (1989), 322–330.

I cannot overstress that archaeologists must first rule out natural causes for the sediments they recover before concluding that hominids produced them. This is only logical; it does not rely on a priori assumptions. At least in the cases I criticize, this exercise was not always adequately performed. Instead, as was the case at La Ferrassie, elaborate scenarios were constructed in the belief that the corpses could not have been left exposed without disturbance, even when only parts of individuals remained. Likewise, there was no new stratum recognized at La Chapelle-aux-Saints that was created at the time of burial, overlying the burial and itself overlain by naturally occurring sediments and distinguishable from those beneath and those above. Instead, the excavators recognized a continuous deposition above the remains, including the fill of the depression in which the skeleton lay-evidence that it had filled in gradually. And the inference of burial at La Chapelle relied on other criteria that I have argued are insufficient evidence for purposeful burial (e.g., position of the corpse and animal remains and stone tools not clearly in association). Inferences of burial in the Middle Paleolithic have been made without adequate consideration of sedimentary and taphonomic processes and have been accepted in the absence of logical arguments to support them.

Hockett 2005

Bryan Hockett & Jonathan A. Haws, *Nutritional ecology and the human demography of Neandertal extinction*. Quaternary International **137** (2005), 21–34.

Demographic trends in human populations are influenced by natural selection acting upon differential rates of fertility and mortality. In human societies, fertility is primarily influenced by individual decision-making, as well as socially accepted norms of behavior. Many factors influence mortality in human populations. Among the latter, nutrition in the form of diverse essential nutrient intake may greatly influence maternal and fetal-to-infant mortality. Nutritional ecology is the study of the relationship between essential nutrient intake and its effects on human demographic patterns. A demographic revolution occurred in Europe during OIS 3: all Neandertal populations were either subsumed within populations of Anatomically Modern Homo sapiens (AMHS) (genetic swamping) or they were eliminated altogether. Evidence from stable isotopes, faunal remains, and the paleopathology of human skeletons suggest that Neandertals consumed a low diversity diet centered on large and medium-sized terrestrial herbivores. In contrast, populations of early AMHS consumed a slightly more diversified diet. The effect of this dietary shift would have resulted in greater diversity of essential nutrient intake and lower maternal and fetal-to-infant mortality, which in turn would have sparked population increases during the early phases of occupation of the European continent by populations of AMHS. Greater diversity of essential nutrient intake by early populations of AMHS may have been one factor that led to the replacement of Neandertals in Europe during OIS 3.

Hockett 2012

Bryan Hockett, *The consequences of Middle Paleolithic diets on pregnant Neanderthal women*. Quaternary International **264** (2012), 78–82.

Models of Neanderthal energetics and energy requirements suggest they required an average daily caloric intake well above the average for anatomically modern

human foragers. The reasons stated for this include higher basic metabolic rates, less efficiency at thermoregulation, less efficiency at hunting, greater degrees of mobility, and reduced sexual division of labor in Neanderthal populations. These models suggest that Neanderthal Daily Energy Expenditure may have reached or exceeded 5500 calories per day. Given that most subsistence and isotope studies also suggest that Neanderthals focused their diet on large, terrestrial herbivores, this paper asks: what would be the nutritional consequences of such a diet on pregnant Neanderthal women? Applying a nutritional ecology perspective to the issue, a modeled diet consisting of 5500 calories per day derived exclusively from large, terrestrial herbivores indicates that such a diet would kill a pregnant Neanderthal woman and her developing fetus. This suggests that much remains to be learned about Neanderthal subsistence, mobility, and social relations, and that there is a long way to go before explaining the causes of Neanderthal extinction and modern human success in Europe and the Mediterranean region between 30,000 and 50,000 years ago.

Hortolà 2013

Policarp Hortolà & Bienvenido Martínez-Navarro, *The Quaternary megafaunal extinction and the fate of Neanderthals, An integrative working hypothesis.* Quaternary International **295** (2013), 69–72.

The last great extinction that has happened throughout the Earth's life history (the Quaternary Megafaunal Extinction) exterminated more than 178 species of the world's largest mammals. Different hypotheses to explain this extinction have been proposed, from environmental catastrophes to predator avoidance, or even volcanic activity and meteorite impact. Currently, many researchers see the Sixth Extinction as a total or partial result of past climatic changes. The mechanism of Neanderthal extinction is a controversial issue of broad interest among human palaeontologists and evolutionary biologists. This paper presents an integrative working hypothesis to elucidate this extinction, based on their killing/predation as habitual part of the competition strategy of anatomically modern humans, and in the context of the wider Quaternary Megafaunal Extinction. Following this working hypothesis, Neanderthal extinction should be seen as being a mere branch of the Quaternary Megafaunal Extinction. The ecologically K early Homo sapiens would exterminate other K species, most of them megafauna, including the medium-sized non-sapiens human species. Neanderthals were part of the large mammal prey potentially hunted by our species, in the same way that historically orang-utans, gorillas and chimpanzees still are. Most probably, the same happened whenever a technologically more evolved Homo species overlapped with other less technologically evolved one.

Shipman 2015

Pat Shipman, *The Invaders, How humans and their dogs drove Neanderthals to extinction.* (Cambridge 2015).

With their large brains, sturdy physique, sophisticated tools, and hunting skills, Neanderthals are the closest known relatives to humans. Approximately 200,000 years ago, as modern humans began to radiate out from their evolutionary birthplace in Africa, Neanderthals were already thriving in Europe descendants of a much earlier migration of the African genus Homo. But when modern humans eventually made their way to Europe 45,000 years ago, Neanderthals suddenly vanished. Ever since the first Neanderthal bones were identified in 1856, scientists have been vexed by the question, why did modern humans survive while their evolutionary cousins went extinct?

The Invaders musters compelling evidence to show that the major factor in the Neanderthals demise was direct competition with newly arriving humans. Drawing on insights from the field of invasion biology, which predicts that the species ecologically closest to the invasive predator will face the greatest competition, Pat Shipman traces the devastating impact of a growing human population: reduction of Neanderthals geographic range, isolation into small groups, and loss of genetic diversity.

But modern humans were not the only invaders who competed with Neanderthals for big game. Shipman reveals fascinating confirmation of humans partnership with the first domesticated wolf-dogs soon after Neanderthals first began to disappear. This alliance between two predator species, she hypothesizes, made possible an unprecedented degree of success in hunting large Ice Age mammals a distinct and ultimately decisive advantage for humans over Neanderthals at a time when climate change made both groups vulnerable.

Neolithikum

Polley 2015

Shamik Polley et al., *Evolution of the rapidly mutating human salivary agglutinin gene (DMBT1) and population subsistence strategy*. PNAS **112** (2015), 5105–5110.

pnas112-05105-Supplement.xlsx

Shamik Polley, Sandra Louzada, Diego Forni, Manuela Sironi, Theodosius Balaskas, David S. Hains, Fengtang Yang & Edward J. Hollox

The dietary change resulting from the domestication of plant and animal species and development of agriculture at different locations across the world was one of the most significant changes in human evolution. An increase in dietary carbohydrates caused an increase in dental caries following the development of agriculture, mediated by the cariogenic oral bacterium Streptococcus mutans. Salivary agglutinin [SAG, encoded by the deleted in malignant brain tumors 1 (DMBT1) gene] is an innate immune receptor glycoprotein that binds a variety of bacteria and viruses, and mediates attachment of S. mutans to hydroxyapatite on the surface of the tooth. In this study we show that multiallelic copy number variation (CNV) within DMBT1 is extensive across all populations and is predicted to result in between 7–20 scavenger–receptor cysteinerich (SRCR) domains within each SAG molecule. Direct observation of de novo mutation in multigeneration families suggests these CNVs have a very high mutation rate for a protein-coding locus, with a mutation rate of up to 5 % per gamete. Given that the SRCR domains bind S. mutans and hydroxyapatite in the tooth, we investigated the association of sequence diversity at the SAG-binding gene of S. mutans, and DMBT1 CNV. Furthermore, we show that DMBT1 CNV is also associated with a history of agriculture across global populations, suggesting that dietary change as a result of agriculture has shaped the pattern of CNV at DMBT1, and that the DMBT1-S.mutans interaction is a promisingmodel of host-pathogen-culture coevolution in humans.

Keywords: copy number variation | agriculture | DMBT1 | mutation | structural variation

Significance: Humans have undergone an evolutionary very recent change in environment of their own making. The development of agriculture profoundly altered diet and exposure to pathogens, and yet the evolutionary response to this is still poorly understood. Here, we characterize extensive copy number variation (CNV) of the gene encoding salivary agglutinin (deleted in malignant brain tumors 1,

DMBT1). Salivary agglutinin comprises 10 % of salivary protein and binds bacteria, including mediating the attachment of the causative agent of dental caries, Streptococcus mutans, to teeth. We show that DMBT1 is a very fast-mutating proteincoding locus, and DMBT1 CNV correlates with a population history of agriculture. Furthermore, we examine the relationship between variation of the S. mutans region that binds salivary agglutinin and CNV of the DMBT1 gene.

Rigaud 2015

Solange Rigaud, Francesco d'Errico & Marian Vanhaeren, *Ornaments Reveal Resistance of North European Cultures to the Spread of Farming*. PLoS ONE **10** (2015). DOI:10.1371/journal.pone.0121166.

The transition to farming is the process by which human groups switched from hunting and gathering wild resources to food production. Understanding how and to what extent the spreading of farming communities from the Near East had an impact on indigenous foraging populations in Europe has been the subject of lively debates for decades. Ethnographic and archaeological studies have shown that population replacement and admixture, trade, and long distance diffusion of cultural traits lead to detectable changes in symbolic codes expressed by associations of ornaments on the human body. Here we use personal ornaments to document changes in cultural geography during the Mesolithic-Neolithic transition. We submitted a binary matrix of 224 bead-types found at 212 European Mesolithic and 222 Early Neolithic stratigraphic units to a series of spatial and multivariate analyses. Our results reveal consistent diachronic and geographical trends in the use of personal ornaments during the Neolithisation. Adoption of novel bead-types combined with selective appropriation of old attires by incoming farmers is identified in Southern and Central Europe while cultural resistance leading to the nearly exclusive persistence of indigenous personal ornaments characterizes Northern Europe. We argue that this pattern reflects two distinct cultural trajectories with different potential for gene flow.

Physik

Wilczek 2015

Frank Wilczek, *A weighty mass difference*. nature **520** (2015), 303–304.

The neutron–proton mass difference, one of the most consequential parameters of physics, has now been calculated from fundamental theories. This landmark calculation portends revolutionary progress in nuclear physics.

From a broader perspective, it is a milestone achievement to include both QCD and QED accurately in the same calculation, because the techniques usually used in those fields — respectively, direct numerical solution (lattice gauge theory) and perturbation theory (Feynman graphs) — are so different. This progress encourages us to predict a future in which nuclear physics reaches the level of precision and versatility that atomic physics has already achieved, with vast implications for astrophysics, and conceivably for technology. We can look forward to much more accurate modelling of supernovae and neutron stars than has so far been possible, and entertain dreams of refined nuclear chemistry, enabling, for example, dense energy storage and ultrahigh-energy lasers.