Liste erstellt am 2016-10-08

References

Aktuell

Beauchamp 2016

Jonathan P. Beauchamp, *Natural selection, educational attainment, and cognitive variance components*, *Reply to Woodley of Menie*. PNAS **113** (2016), E5782.

Second, I do not treat EA "as if it were the target of selection". To the contrary, I simply show that natural selection has been slowly favoring genetic variants associated with lower EA in my study sample, and I am agnostic about the precise phenotypes that have been the targets of selection.

Cooney 2016

Gus Cooney, Daniel T. Gilbert & Timothy D. Wilson, *When fairness matters less than we expect*. PNAS **113** (2016), 11168–11171.

Do those who allocate resources know how much fairness will matter to those who receive them? Across seven studies, allocators used either a fair or unfair procedure to determine which of two receivers would receive the most money. Allocators consistently overestimated the impact that the fairness of the allocation procedure would have on the happiness of receivers (studies 1–3). This happened because the differential fairness of allocation procedures is more salient before an allocation is made than it is afterward (studies 4 and 5). Contrary to allocators' predictions, the average receiver was happier when allocated more money by an unfair procedure than when allocated less money by a fair procedure (studies 6 and 7). These studies suggest that when allocators are unable to overcome their own preallocation perspectives and adopt the receivers' postallocation perspectives, they may allocate resources in ways that do not maximize the net happiness of receivers.

Keywords: fairness | affective forecasting | decision-making

Significance: Human beings care a great deal about the fairness of the procedures that are used to allocate resources, such as wealth, opportunity, and power. But in a series of experiments, we show that those towhom resources are allocated often care less about fairness than those who allocate the resources expect them to. This "allocator's illusion" results from the fact that fairness seems more important before an allocation is made (when allocators are choosing a procedure) than afterward (when receivers are reacting to the procedure that allocators chose). This illusion has important consequences for policy-makers, managers, health care providers, judges, teachers, parents, and others who are charged with choosing the procedures by which things of value will be allocated.

Editorial 2016

Unit of contention. nature **537** (2016), 279.

The United States' refusal to use SI units for radiation measurement is confusing and dangerous. It's time to catch up with the rest of the world.

As fear spread and the public and media clamoured for information, the last thing anybody needed was a load of complicated conversions. It was hard enough for most to sort out the difference between millisieverts and microsieverts, never mind then having to convert those to rems. Yet US officials insisted on generating

hazard maps using rems. And that meant that people, including those in the danger zone, could not tell at a glimpse what was really happening.

Gallone 2016

Brigida Gallone et al., *Domestication and Divergence of Saccharomyces cerevisiae Beer Yeasts*. Cell **166** (2016), 1397–1410.

The history and domestication of yeast used for making beer and other types of alcohol are revealed through genomic and phenotypic analyses.

Brigida Gallone, Jan Steensels, Troels Prahl, Leah Soriaga, Veerle Saels, Beatriz Herrera-Malaver, Adriaan Merlevede, Miguel Roncoroni, Karin Voordeckers, Loren Miraglia, Clotilde Teiling, Brian Steffy, Maryann Taylor, Ariel Schwartz, Toby Richardson, Christopher White, Guy Baele, Steven Maere, & Kevin J. Verstrepen

Highlights:

- We sequenced and phenotyped 157 S. cerevisiae yeasts
- Present-day industrial yeasts originate from only a few domesticated ancestors
- Beer yeasts show strong genetic and phenotypic hallmarks of domestication
- Domestication of industrial yeasts predates microbe discovery

Whereas domestication of livestock, pets, and crops is well documented, it is still unclear to what extent microbes associated with the production of food have also undergone human selection and where the plethora of industrial strains originates from. Here, we present the genomes and phenomes of 157 industrial Saccharomyces cerevisiae yeasts. Our analyses reveal that today's industrial yeasts can be divided into five sublineages that are genetically and phenotypically separated from wild strains and originate from only a few ancestors through complex patterns of domestication and local divergence. Large-scale phenotyping and genome analysis further show strong industry-specific selection for stress tolerance, sugar utilization, and flavor production, while the sexual cycle and other phenotypes related to survival in nature show decay, particularly in beer yeasts. Together, these results shed light on the origins, evolutionary history, and phenotypic diversity of industrial yeasts and provide a resource for further selection of superior strains.

Hecht 2016

Jeff Hecht, *What's the Matter?* nature **537** (2016), Supplement, S194–S197.

The leading theory of dark matter is running out of room to hide.

The concern that dark matter may simply be undetectable is a genuine one. "The Universe could be unkind," says Fiorucci. "It may well be that dark matter is either very light or very heavy, or its density is too low where the Earth is." It might be hidden by noise or overlooked for another reason, much like dwarf galaxies were until recently. "We are never guaranteed a positive result," he says.

Lucquin 2016

Alexandre Lucquin, *Untangling complex organic mixture in prehistoric hearths*. PNAS **113** (2016), 10456–10457.

Looking at organic residues contained in fire structure remains would provide an extended testimony of diet and cooking practices complementary to the study of vegetal and faunal remains. Although organic residue analysis of prehistoric hearths began in the late 1980s, such analyses are still an underestimated source of information and only a few studies have explored their potential. In PNAS, Choy et al. use isotopic and molecular analysis of organic residues from hearths to obtain new insights into salmonid exploitation and processing by Alaskan hunter-gatherers of the end of the Pleistocene.

Nutman 2016

Allen P. Nutman, Vickie C. Bennett, Clark R. L. Friend, Martin J. Van Kranendonk & Allan R. Chivas, *Rapid emergence of life shown by discovery of 3,700-million-year-old microbial structures*. nature **537** (2016), 535–538.

Biological activity is a major factor in Earth's chemical cycles, including facilitating CO2 sequestration and providing climate feedbacks. Thus a key question in Earth's evolution is when did life arise and impact hydrosphere–atmosphere–lithosphere chemical cycles? Until now, evidence for the oldest life on Earth focused on debated stable isotopic signatures of 3,800–3,700 million year (Myr)-old metamorphosed sedimentary rocks and minerals1,2 from the Isua supracrustal belt (ISB), southwest Greenland3. Here we report evidence for ancient life from a newly exposed outcrop of 3,700-Myr-old metacarbonate rocks in the ISB that contain 1–4-cm-high stromatolites—macroscopically layered structures produced by microbial communities. The ISB stromatolites grew in a shallow marine environment, as indicated by seawater-like rare-earth element plus yttrium trace element signatures of the metacarbonates, and by interlayered detrital sedimentary rocks with cross-lamination and storm-wave generated breccias. The ISB stromatolites predate by 220 Myr the previous most convincing and generally accepted multidisciplinary evidence for oldest life remains in the 3,480-Myr-old Dresser Formation of the Pilbara Craton, Australia4,5. The presence of the ISB stromatolites demonstrates the establishment of shallow marine carbonate production with biotic CO2 sequestration by 3,700 million years ago (Ma), near the start of Earth's sedimentary record. A sophistication of life by 3,700 Ma is in accord with genetic molecular clock studies placing life's origin in the Hadean eon (>4,000 Ma)6.

Savage 2016

Neil Savage, *4 Big Questions*. nature **537** (2016), Supplement, S206.

Scientists have theories about dark matter and dark energy — and some observations — but both are poorly understood. Here are four of their biggest questions.

Scheffer 2016

Marten Scheffer, *Anticipating societal collapse; Hints from the Stone Age*. PNAS **113** (2016), 10733–10735.

The novel finding now is that leading up to such collapse, the dynamics of populations as reconstructed from summed probability densities of radiocarbondated archaeological sites typically show rising variance and rising temporal correlation, tell-tale signs of declining resilience.

One theory is that societies tend to resist change until it is too late for smooth adjustments. Indeed, some fundamental mechanisms that hamper our capacity for change have been well documented. There is the "sunk-cost effect" preventing people from abandoning acquired property (or ways of living or beliefs) even if that would rationally be better (20). Then there is the "bystander effect," leading one to copy the behavior of others in case of doubt. This effect is known for explaining why often no-one in a crowd of by-standers comes to the rescue (21). Finally, elites may have a vested interest in maintaining the status quo, thus delaying societal change (8). Certainly such mechanisms are not specific to the Stone Age. Indeed, it may be argued that in more sophisticated societies with more elaborate physical structures and social systems, some of those mechanisms that prevent change might become stronger rather than weaker.

Smith 2016

Eric Alden Smith, *Status effects on men's reproductive success*. PNAS **113** (2016), 10739–10741.

Most hunter-gatherer societies known to anthropology are characterized by relatively egalitarian politics, extensive resource sharing, and norms sanctioning aggrandizement, displays of superiority, and stinginess; in a word, status differences are muted (although exceptions exist). In addition, most documented foragers exhibit low levels of polygyny, although it is generally permitted.

The authors go on to argue that the association between status and reproduction may have been stronger before the spread of agriculture if the egalitarianism of more recent foragers is a consequence of restriction to marginal habitats. However, this conclusion seems premature, if not problematic. First, substantial evidence indicates that the large increase in climate stability in the Holocene led to dramatic changes in huntergatherer lifeways compared with their Pleistocene forebears: broader diets, often higher population densities, lower mobility, probably increased intergroup conflict, and presumably greater control over fixed resources, such as foraging sites (12, 13). This last variable is a strong predictor of political and economic inequality (14) as well as polygyny (15). In sum, there are reasons to think modern foragers are more likely to develop status differences tied to control of resource patches than was the case over most of human history.

Wang 2016

Andrew Wang et al., *Opposing Effects of Fasting Metabolism on Tissue Tolerance in Bacterial and Viral Inflammation*. Cell **166** (2016), 1512–1525.

Starve a fever, stuff a cold: why anorexia helps the organism to tolerate bacterial infections but makes viral infections hard to endure.

Andrew Wang, Sarah C. Huen, Harding H. Luan, Shuang Yu, Cuiling Zhang, Jean-Dominique Gallezot, Carmen J. Booth & Ruslan Medzhitov

Highlights:

- Fasting metabolism is protective in bacterial, but not viral, inflammation
- Ketone bodies limit ROS-induced neuronal damage during bacterial inflammation
- Glucose utilization prevents UPR-mediated neuronal damage during viral inflammation

Acute infections are associated with a set of stereotypic behavioral responses, including anorexia, lethargy, and social withdrawal. Although these socalled sickness behaviors are the most common and familiar symptoms of infections, their roles in host defense are largely unknown. Here, we investigated the role of anorexia in models of bacterial and viral infections. We found that anorexia was protective while nutritional supplementation was detrimental in bacterial sepsis. Furthermore, glucose was necessary and sufficient for these effects. In contrast, nutritional supplementation protected against mortality from influenza infection and viral sepsis, whereas blocking glucose utilization was lethal. In both bacterial and viral models, these effects were largely independent of pathogen load and magnitude of inflammation. Instead, we identify opposing metabolic requirements tied to cellular stress adaptations critical for tolerance of differential inflammatory states.

Woodley of Menie 2016

Michael A. Woodley of Menie, *Consideration of cognitive variance components potentially solves Beauchamp's paradox*. PNAS **113** (2016), E5780–E5781.

Beauchamp treats educational attainment as if it were the target of selection, which is problematic. Educational attainment is better conceptualized as an outcome that arises from facultative calibration over childhood and young adulthood in response to the action of heritable phenotypic characteristics, chief among these being IQ, with which it shares ≈60 % of its (linkage-pruned) genetic variance. Consistent with this finding, polygenic "educational attainment" scores similar to those used by Beauchamp (1) also directly predict variation in IQ.

IQ itself is comprised of several variance components, with a general cognitive ability (GCA) factor accounting for ≈50 % of the performance variance among individuals, and various specialized abilities accounting for the remainder. GCA is the most heritable variance component of IQ. The Flynn effect, however, is more pronounced on IQ measures that are less GCA-loaded, and less heritable as well. Thus, specialized cognitive skills are being enhanced to a greater degree than GCA is declining, masking the decline at the aggregate IQ level.

Anthropologie

Kappelman 2016

John Kappelman et al., *Perimortem fractures in Lucy suggest mortality from fall out of tall tree*. nature **537** (2016), 503–507.

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John Kappelman, Richard A. Ketcham, Stephen Pearce, Lawrence Todd, Wiley Akins, Matthew W. Colbert, Mulugeta Feseha, Jessica A. Maisano & Adrienne Witzel

The Pliocene fossil 'Lucy' (Australopithecus afarensis) was discovered in the Afar region of Ethiopia in 1974 and is among the oldest and most complete fossil hominin skeletons discovered. Here we propose, on the basis of close study of her skeleton, that her cause of death was a vertical deceleration event or impact following a fall from considerable height that produced compressive and hinge (greenstick) fractures in multiple skeletal elements. Impacts that are so severe as to cause concomitant fractures usually also damage internal organs; together, these injuries are hypothesized to have caused her death. Lucy has been at the centre of a vigorous debate about the role, if any, of arboreal locomotion in early human evolution. It is therefore ironic that her death can be attributed to injuries resulting from a fall, probably out of a tall tree, thus offering unusual evidence for the presence of arborealism in this species.

Anthropologie Kultur

von Rueden 2016

Christopher R. von Rueden & Adrian V. Jaeggi, *Men's status and reproductive success in 33 nonindustrial societies, Effects of subsistence, marriage system, and reproductive strategy*. PNAS **113** (2016), 10824–10829.

pnas113-10824-Supplement.xlsx, pnas113-10824-Comment1.pdf

Social status motivates much of human behavior. However, status may have been a relatively weak target of selection for much of human evolution if ancestral foragers tended to be more egalitarian. We test the "egalitarianism hypothesis"

that status has a significantly smaller effect on reproductive success (RS) in foragers compared with nonforagers. We also test between alternative male reproductive strategies, in particular whether reproductive benefits of status are due to lower offspring mortality (parental investment) or increased fertility (mating effort). We performed a phylogenetic multilevel metaanalysis of 288 statistical associations between measures of male status (physical formidability, hunting ability, material wealth, political influence) and RS (mating success, wife quality, fertility, offspring mortality, and number of surviving offspring) from 46 studies in 33 nonindustrial societies. We found a significant overall effect of status on RS (r = 0.19), though this effect was significantly lower than for nonhuman primates (r = 0.80). There was substantial variation due to marriage system and measure of RS, in particular status associated with offspring mortality only in polygynous societies (r = -0.08), and with wife quality only in monogamous societies (r = 0.15). However, the effects of status on RS did not differ significantly by status measure or subsistence type: foraging, horticulture, pastoralism, and agriculture. These results suggest that traits that facilitate status acquisition were not subject to substantially greater selection with domestication of plants and animals, and are part of reproductive strategies that enhance fertility more than offspring well-being.

Keywords: status | hierarchy | reproduction | egalitarianism | evolution

Significance: Much of human behavior results from a desire for social status. From an evolutionary perspective, answering the question of why we pursue status must consider how status affects reproduction, especially in nonindustrial societies with natural fertility. In a metaanalysis of 288 results from 33 nonindustrial populations, we find that status is significantly associated with men's reproductive success, consistent with an evolved basis for status pursuit. Status hierarchies have changed dramatically throughout human history, yet we find that the association between status and reproductive success does not depend on subsistence category (foraging, horticulture, pastoralism, agriculture) or how status is measured. These findings suggest no significant increase in selection on statusenhancing traits with the domestication of plants and animals.

Bibel

Knohl 2003

Israel Knohl, *The Divine Symphony, The Bible's many voices.* (Philadelphia 2003).

In this fascinating book, Knohl shares his understanding of how the Torah was edited into its final form. He bridges the gap between ancient Israel (c. 1400–586 B.C.E.) and Second Temple times (c. 536

B.C.E.–70 C.E.) by showing the continuity between these eras and the gradual evolution of the biblical worldview, which formed the foundation of later rabbinic Judaism. The book focuses on the editing of the Torah, interpreting the textual evidence, most notably contradictions and redundancies, to show that the idea of a pluralistic understanding of Revelation can be traced back to the editing of the Torah itself. Knohl s interpretation of biblical composition challenges a popular trend in contemporary biblical scholarship: the idea that ancient Israel never existed as a historical reality, but was invented and retrojected back in time by later Israelite priests as part of their national myth.

Ussishkin 2016

David Ussishkin, *Was Jerusalem a fortified stronghold in the Middle Bronze Age? An alternative view.* Levant **48** (2016), 135–151.

Segments of massive walls identified as city walls dated to the Middle Bronze II (MB II) period were uncovered on the eastern slope of the City of David by Kathleen Kenyon, and later by Yigal Shiloh. A massive fortifications complex was uncovered in the area of the Gihon Spring by Ronny Reich and Eli Shukron, this too was dated to the MB II period. New analysis of the data from all three excavation projects possibly indicates that these fortifications date to the Iron II B–C period, to the 8th–7th centuries BC, rather than the MB II. This suggestion cannot be conclusively proven and it is presented here as an alternative concept to the current, generally accepted one. If that is so MB II Jerusalem was an unfortified settlement. The 'Cyclopean' city wall in Tell Rumeidah/ancient Hebron, usually dated to the MB II is discussed at the end of the paper. It is argued that this wall too possibly dates to Iron II B–C rather than MB II.

Keywords: City of David | Biblical Jerusalem | Gihon Spring | Hebron | Middle Bronze fortifications | Iron II B–C period

Isotope

Lidén 1990

Kerstin Lidén, *A Diet Study from the Middle Neolithic Site Ire, Analyses of stable carbon isotopes, amino acids and trace elements*. Laborativ arkeologi **4** (1990), 21–28.

This study is an attempt to enhance the knowledge of the diet from the middle neolithic site Ire, Gotland. In order to complement earlier research a comparison between analyses of trace elements, such as zinc and copper, and delta 13C on skull bones were made. Delta 13C gives information on the relation between marine versus terrestrial protein intake, and trace element analyses give information on the amount of different kinds of protein intake. It was found that the delta 13C results correlated well with the results of the trace element analyses as well as with the earlier known osteological data. It could hereby be concluded that marine protein dominated the dietary intake on Ire. It could be stated that though the food remains from the pottery was of a vegetable origin, vegetable protein did not contribute to a major part of the dietary intake.

The diet on Ire was dominated by marine protein with the addition of terrestrial protein as e.g. wild boar, (domesticated?) and vegetables. This picture given to us by stable carbon isotope- and trace element analyses agrees surprisingly well with that given by the archaeological and osteological data. The vegetable element has been established by analyses of potsherds through which it also could be stated that they had been mixed with some blood product. It could further be emphasized the importance of including as many different dietary elements as possible to get the most accurate picture of prehistoric diet and also to be able to separate diet from dietary input. One can finally state that the introduction of farming on Gotland at this time, seems to have had no or little impact on the dietary input.

Teegen 2007

Wolf-Rüdiger Teegen & Michael P. Richards , *Untersuchungen zur Ernährung mit Hilfe der Analyse stabiler Isotope an neolithischen Menschen- und Tierknochen aus Kerpen, Lan*. Funde und Ausgrabungen im Bezirk Trier **39** (2007), 7–14.

Insgesamt wurden fünf menschliche Knochen sowie drei Tierknochen aus der Eifel (Michelsberger Kultur, zweite Hälfte des 4. Jahrtausends v. Chr.) erfolgreich auf den Gehalt an den stabilen Isotopen 13C und 15N untersucht. Die Daten

ergaben für die Menschen eine Ernährung, die zu einem wesentlichen Teil auf C3-Pflanzen (wahrscheinlich Getreide) basierte. Aufgrund der Stickstoffwerte ist insgesamt eine proteinreiche Ernährung anzunehmen, die auch dem Jugendlichen zugute kam. Der hohe 15N-Gehalt der menschlichen Knochen könnte auf einen beachtlichen Anteil von Süßwasserfisch bzw. -mollusken weisen. Die Klärung dieser Frage bedarf allerdings noch weiterer Untersuchungen.

Im Gegensatz zu den Haustieren lagen die Analyseergebnisse der Menschen dicht zusammen. Dies trifft auch für das jugendliche, 14–19-jährige Individuum zu, das ein zu den Erwachsenen gleichartiges Muster zeigte, Dies weist darauf hin, dass die Erwachsenen und der Jugendliche eine sehr ähnliche Nahrung zu sich genommen haben.

Judentum

Knohl 2000

Israel Knohl, *The Messiah before Jesus, The suffering servant of the Dead Sea Scrolls.* (Berkeley 2002).

In a work that challenges notions that have dominated New Testament scholarship for more than a hundred years, Israel Knohl gives startling evidence for a messianic precursor to Jesus who is described as the "Suffering Servant" in recently published fragments of the Dead Sea Scrolls. "The Messiah before Jesus" clarifies many formerly incomprehensible aspects of Jesus' life and confirms the story in the New Testament about his messianic awareness. The book shows that, around the time of Jesus' birth, there came into being a conception of "catastrophic" messianism in which the suffering, humiliation, and death of the messiah were regarded as an integral part of the redemptive process. Scholars have long argued that Jesus could not have foreseen his suffering, death, and resurrection because the concept of a slain savior who rises from the dead was alien to the Judaism of his time. But, on the basis of hymns found at Qumran among the Dead Sea Scrolls, Knohl argues that, one generation before Jesus, a messianic leader arose in the Qumran sect who was regarded by his followers as ushering in an era of redemption and forgiveness. This messianic leader was killed by Roman soldiers in the course of a revolt that broke out in Jerusalem in 4 B.C.E. The Romans forbade his body to be buried and after the third day his disciples believed that he was resurrected and rose to heaven. This formed the basis for Jesus' messianic consciousness, Knohl argues; it was because of this model that Jesus anticipated he would suffer, die, and be resurrected after three days. Knohl takes his fascinating inquiry one step further by suggesting that this messiah was a figure known to us from historical sources of the period. This identification may shed new light on the mystery of the "Paraclete" in the Gospel of John. A pathbreaking study, "The Messiah before Jesus" will reshape our understanding of Christianity and its relationship to Judaism.

Knohl 2009

Israel Knohl, *Messiahs and resurrection in 'The Gabriel revelation'.* (London 2009).

It features the first discussion of the recently discovered text 'The Gabriel Revelation' – an apocalyptic text written on stone at the turn of the Common Era. This tablet provides revolutionary paths to the understanding of the historical Jesus and the birth of Christianity.

It explores the formation of the conception of "catastrophic messianism" in the Gabriel Revelation. According to this conception, the death of a messianic leader

and his resurrection by the angel Gabriel after three days is an essential part of the redemptive process. This conception is a new key which enables us for the first time to understand the messianic vision of the historical Jesus. This important and fascinating book will thus shed new and revolutionary light on our basic view of Christianity.

Klima

deMenocal 2016

Peter B. deMenocal & Chris Stringer, *Climate and the peopling of the world*. nature **538** (2016), 49–50.

The human dispersal out of Africa that populated the world was probably paced by climate changes. This is the inference drawn from computer modelling of climate variability during the time of early human migration.

Quinif 2006

Yves Quinif, *Complex Stratigraphic Sequences in Belgian Caves, Correlation With Climatic Changes During the Middle, the Upper Pleistocene and the Holocene*. Geologica Belgica **9** (2006), 231–244.

Studies of cave sediments in Belgian caves suggest that continuous sedimentary records through several climatic cycles do not exist. Climate variations induce lithologic variations. In Western Europe, cold periods mainly generate detrital sediments while warm periods are more favourable to speleothems formation. Other factors, as tectonics, can modify type and rate of sedimentation. Uranium-series disequilibrium dating and pollen analysis in karstic sediments allow to reconstruct the chronological evolution of the palaeoenvironments. In this paper, we reconstruct a synthetic climate evolution from cave sedimentary records of the Upper, Middle Pleistocene and Holocene, based on the biorhexistasy theory. Cold periods are the frame of mainly physical erosion (freeze, debris flows, etc.). Warm periods represent the biostasy conditions characterized by the development of forested soils and the predominance of chemical alteration. O anks to examples coming from Belgian caves, the described phenomena are universal and can be applied to diverse karstic systems, taking into account the local environment.

Keywords: Karst | sediments | palaeoclimate reconstructions | palynology | U/O dating.

Timmermann 2016

Axel Timmermann & Tobias Friedrich, *Late Pleistocene climate drivers of early human migration*. nature **538** (2016), 92–95.

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On the basis of fossil and archaeological data it has been hypothesized that the exodus of Homo sapiens out of Africa and into Eurasia between ≈50–120 thousand years ago occurred in several orbitally paced migration episodes1–4. Crossing vegetated pluvial corridors from northeastern Africa into the Arabian Peninsula and the Levant and expanding further into Eurasia, Australia and the Americas, early H. sapiens experienced massive timevarying climate and sea level conditions on a variety of timescales. Hitherto it has remained difficult to quantify the effect of glacialand millennial-scale climate variability on early human dispersal and evolution. Here we present results from a numerical human dispersal model, which is forced by spatiotemporal estimates of climate and sea level changes over the past 125 thousand years. The model simulates the overall dispersal of H. sapiens

in close agreement with archaeological and fossil data and features prominent glacial migration waves across the Arabian Peninsula and the Levant region around 106–94, 89–73, 59–47 and 45–29 thousand years ago. The findings document that orbital-scale global climate swings played a key role in shaping Late Pleistocene global population distributions, whereas millennial-scale abrupt climate changes, associated with Dansgaard–Oeschger events, had a more limited regional effect.

Verheyden 2014

Sophie Verheyden, Eddy Keppens, Yves Quinif, Hai J. Cheng & & Laurence R. Edwards, *Late-glacial and Holocene climate reconstruction as inferred from a stalagmite, Grotte du Pere Noel, Han-sur-Lesse, Belgium*. Geologica Belgica **17** (2014), 83–89.

The 64.5 cm long Pere Noel stalagmite PN-95-5 was deposited between 12.9 ka and 1.8 ka (U-series dated) with an uncertainty on the ages of the order of ca. 100 years. Besides changes in the macroscopic aspect of the stalagmite along its longitudinal section, changes in its isotopic (d18O and d13C) and chemical (Sr/Ca, Mg/Ca) composition are observed. These changes, combined with changes in stalagmite diameter are interpreted in terms of changes in climate in the Han-sur-Lesse region. This multi-proxy approach based on previous studies of the chemical and isotopic functioning of the cave suggests a generally wet early Holocene, important and rapid dry-wet changes around 8.5 ka, a wetter and warmer period between 7.9 ka and 6.6 ka and a dry and/or colder climate after 6.6 ka. This preliminary interpretation from the Pere Noel speleothem should be further tested against other speleothems and other archives to construct a regional climate model for the Holocene.

Keywords: Speleothem | stable isotopes | Mg | Sr | growth rate | U-series dating

Kultur

Bischoff 2016

Jürgen Bischoff, *Tempel einer Neuen Zeit*. Geo **2016**, x, 30–48.

Warum wurde Stonehenge gebaut? Wie, und von wem? Aufwendige Technik half Archäologen jetzt, die großen Rätsel zu lösen, die das geheimnisvollste Monument der europäischen Steinzeit seit Jahrhunderten umgeben.

Im frühen Neolithikum bestimmten die Clans noch mit den Kreisanlagen die Zeitpunkte der Sonnenwenden in Sommer und Winter, um Ernte und Aussaat festzulegen. “Zuständig für eine gute Ernte waren die Ahnen, die man im Inneren der Anlagen bestattete”, sagt Ina Wunn. Die Hannoveraner Religionswissenschaftlerin ist eine der profiliertesten Forscherinnen auf dem Gebiet steinzeitlicher Kulte und Religionen. Mit der Metallurgie aber veränderten sich die Gemeinschaften – Arbeitsteilung entstand. Für arbeitsteilige Gesellschaften aber sei eine andere Religion typisch: “Das Ahnenritual wird ersetzt durch den Kult um Helden, um herausragende Tote.” Anzunehmen sei, so die Professorin, “dass diese Verstorbenen auch mit dem Lauf von Sonne und Mond assoziiert wurden”. Aus dem Ahnenritual wird ein Sonnenkult. “Diese Zeit markiert Stonehenge”, sagt Ina Wunn.

Als das Symbol einer Zeitenwende betrachtet auch Mike Parker Pearson den neuen Tempel. “Während innerhalb der Gemeinschaften die Ungleichheiten wuchsen”, schreibt er, “gab es zugleich zwischen ihnen ein zunehmendes Bewusstsein von gemeinsamer Identität.” So gesehen sei die Aufstellung der Waliser Bluestones in Stonehenge möglicherweise “ein Akt gewesen, der unterschiedliche Stämme aus Britannien zusammenbrachte”.

Stonehenge, der englische Sonnentempel, wäre demnach gleichfalls eine Art neolithisches Multi-kulti-Monument an der Schwelle zu einer neuen Zeit. Einer Zeit, die neue Technologien, neue Waffen, eine neue Gesellschaft hervorbringen wird. Und neue Eliten, die bald schon über den jahrtausendealten Kultplätzen der steinzeitlichen Bauern ihre eigenen, prächtigen Gräber bauen.

de Dreu 2016

Carsten K. W. De Dreu, Jörg Gross, Zsombor Méder, Michael Giffin, Eliska Prochazkova, Jonathan Krikeb & Simon Columbus, *In-group defense, out-group aggression, and coordination failures in intergroup conflict*. PNAS **113** (2016), 10524–10529.

Intergroup conflict persists when and because individuals make costly contributions to their group's fighting capacity, but how groups organize contributions into effective collective action remains poorly understood. Here we distinguish between contributions aimed at subordinating out-groups (out-group aggression) from those aimed at defending the in-group against possible out-group aggression (in-group defense). We conducted two experiments in which three-person aggressor groups confronted three-person defender groups in a multiround contest game (n = 276; 92 aggressor –defender contests). Individuals received an endowment from which they could contribute to their group's fighting capacity. Contributions were always wasted, but when the aggressor group's fighting capacity exceeded that of the defender group, the aggressor group acquired the defender group's remaining resources (otherwise, individuals on both sides were left with the remainders of their endowment). In-group defense appeared stronger and better coordinated than out-group aggression, and defender groups survived roughly 70 % of the attacks. This low success rate for aggressor groups mirrored that of group-hunting predators such as wolves and chimpanzees (n = 1,382 cases), hostile takeovers in industry (n = 1,637 cases), and interstate conflicts (n = 2,586). Furthermore, whereas peer punishment increased out-group aggression more than in-group defense without affecting success rates (Exp. 1), sequential (vs. simultaneous) decision-making increased coordination of collective action for out-group aggression, doubling the aggressor's success rate (Exp. 2). The relatively high success rate of in-group defense suggests evolutionary and cultural pressures may have favored capacities for cooperation and coordination when the group goal is to defend, rather than to expand, dominate, and exploit.

Keywords: competition | parochial altruism | coordination | collective action | intergroup relations

Significance: Across a range of domains, from group-hunting predators to laboratory groups, companies, and nation states, we find that out-group aggression is less successful because it is more difficult to coordinate than in-group defense. This finding explains why appeals for defending the in-group may be more persuasive than appeals to aggress a rivaling out-group and suggests that (third) parties seeking to regulate intergroup conflict should, in addition to reducing willingness to contribute to one's group's fighting capacity, undermine arrangements for coordinating out-group aggression, such as leadership, communication, and infrastructure.

Mittelpaläolithikum

Caramelli 2006

David Caramelli et al., *A highly divergent mtDNA sequence in a Neandertal individual from Italy*. Current Biology **16** (2006), R630–R632.

David Caramelli, Carles Lalueza-Fox, Silvana Condemi, Laura Longo, Lucio Milani, Alessandro Manfredini, Michelle de Saint Pierre, Francesca Adoni, Martina Lari, Paolo Giunti, Stefano Ricci, Antonella Casoli, Francesc Calafell, Francesco Mallegni, Jaume Bertranpetit, Roscoe Stanyon, Giorgio Bertorelle & Guido Barbujani

The MLS sequence documents a greater diversity among the European Neandertals than previously estimated. In particular, the MLS and MEZ sequences appear separated from a cluster of sequences from Germany and Croatia. All sequences in the cluster share two derived alleles, 16078G and 16154C. The analysis of Neandertal genetic diversity confirms that Neandertals were separated from modern humans by several fixed mtDNA differences. However, their internal diversity was rather large.

Excoffier 2006

Laurent Excoffier, *Neandertal Genetic Diversity, A Fresh Look from Old Samples*. Current Biology **16** (2006), R650–R652.

The recent publication of three old Neandertal mitochondrial sequences shows that the genetic diversity of the Neandertals has been largely underestimated. It suggests that the Neandertal population was extensively subdivided geographically, and that its genetic diversity changed markedly over time.

The analysis of the non-coding control region of the mitochondrial DNA (mtDNA) in a few Neandertal specimens has revealed that their sequences are very similar to each other, but clearly different from those found in modern and early humans, suggesting that modern humans did not interbreed with Neandertals when they colonized Europe.

Hérisson 2016

David Hérisson et al., *The emergence of the Middle Palaeolithic in north-western Europe and its southern fringes*. Quaternary International (2016), preprint, 1–40. DOI:10.1016/j.quaint.2016.02.049.

David Hérisson, Michel Brenet, Dominique Cliquet, Marie-Hélène Moncel, Jürgen Richter, Beccy Scott, Ann Van Baelen, Kévin Di Modica, Dimitri De Loecker, Nick Ashton, Laurence Bourguignon, Anne Delagnes, Jean-Philippe Faivre, Milagros Folgado-Lopez, Jean-Luc Locht, Matt Pope, Jean-Paul Raynal, Wil Roebroeks, Carmen Santagata, Alain Turq & Philip Van Peer

The nature of the LowereMiddle Palaeolithic transition has been one of the most debated questions in early Prehistory since the mid-20th century. The root of these debates lies primarily in how early prehistorians constructed chronological models, relying heavily upon index fossils. Such models have "artificial boundaries designed to provide structure to a complex record and, rather than being conceived of as permanent or real, should be frequently examined and revised (Corbey and Roebroeks, 2001)" (Monnier, 2006). In this paper, we will not focus our efforts on issues relating to nomenclature and systems of classification. Instead, we will focus on a time frame within which rapid behavioural and technological changes have been documented: the period between MIS 9 to 6. Working on a large scale, and taking account of all of north-western Europe and its southern fringes, a group of researchers working on the main sites from this period propose an assessment of current research on the emergence of the "Middle Palaeolithic". Using a rich corpus of archaeological sites, we discuss how humans occupied north-western Europe and its southern margins between MIS 9 to 6, focusing particularly on questions of taphonomy, conservation, chronology and environment, as well as reviewing the pattern of technological change within lithic assemblages. This overview of current research into the emergence of the Middle Palaeolithic will help to define

future research paths and advance our understanding of this key period of human evolution.

Keywords: Early Middle Palaeolithic | Lower Palaeolithic | Middle Palaeolithic | Acheulean | Mousterian | Technocomplex

Lalueza-Fox 2006

Carles Lalueza-Fox et al., *Mitochondrial DNA of an Iberian Neandertal suggests a population affinity with other European Neandertals.* Current Biology **16** (2006), R629–R630.

Carles Lalueza-Fox, Johannes Krause, David Caramelli, Giulio Catalano, Lucio Milani, María Lourdes Sampietro, Francesc Calafell, Cayetana Martínez- Maza, Markus Bastir, Antonio García-Tabernero, Marco de la Rasilla, Javier Fortea, Svante Pääbo, Jaume Bertranpetit & Antonio Rosas

The retrieval and the analysis of Neandertal mtDNA sequences have allowed the exclusion of the possibility of a mitochondrial contribution of Neandertals to the modern human gene pool. In addition, a low genetic diversity was observed among Neandertals, similar to that observed among modern humans.

Orlando 2006

Ludovic Orlando, Pierre Darlu, Michel Toussaint, Dominique Bonjean, Marcel Otte & Catherine Hänni, *Revisiting Neandertal diversity with a 100,000 year old mtDNA sequence.* Current Biology **16** (2006), R400–R402.

Our goal was to recover a Neandertal sequence that unambiguously predates the cohabitation period. A comparison of this sequence with published Neandertal sequences might reveal either the long-time stability of the Neandertal mtDNA-pool or drastic modifications around the time of cohabitation. We, therefore, retrieved 123 bp of the mtDNA HVR-1 from a 100,000 year old Neandertal tooth from the Scladina cave (Meuse Basin, Belgium), which represents the most ancient Neandertal sample analyzed at the DNA level.

Welker 2016

Frido Welker et al., *Palaeoproteomic evidence identifies archaic hominins associated with the Châtelperronian at the Grotte du Renne.* PNAS **113** (2016), 11162–11167.

pnas113-11162-Supplement1.txt, pnas113-11162-Supplement2.xlsx

Frido Welker, Mateja Hajdinjak, Sahra Talamo, Klervia Jaouen, Michael Dannemann, Francine David, Michèle Julien, Matthias Meyer, Janet Kelso, Ian Barnes, Selina Brace, Pepijn Kamminga, Roman Fischer, Benedikt M. Kessler, John R. Stewart, Svante Pääbo, Matthew J. Collins & Jean-Jacques Hublin

In Western Europe, the Middle to Upper Paleolithic transition is associated with the disappearance of Neandertals and the spread of anatomically modern humans (AMHs). Current chronological, behavioral, and biological models of this transitional period hinge on the Chatelperronian technocomplex. At the site of the Grotte du Renne, Arcy-sur-Cure, morphological Neandertal specimens are not directly dated but are contextually associated with the Chatelperronian, which contains bone points and beads. The association between Neandertals and this "transitional" assemblage has been controversial because of the lack either of a direct hominin radiocarbon date or of molecular confirmation of the Neandertal affiliation. Here we provide further evidence for a Neandertal–Chatelperronian association at the Grotte du Renne through biomolecular and chronological analysis. We identified 28 additional hominin specimens through zooarchaeology by

mass spectrometry (ZooMS) screening of morphologically uninformative bone specimens from Chatelperronian layers at the Grotte du Renne. Next, we obtain an ancient hominin bone proteome through liquid chromatography-MS/MS analysis and error-tolerant amino acid sequence analysis. Analysis of this palaeoproteome allows us to provide phylogenetic and physiological information on these ancient hominin specimens. We distinguish Late Pleistocene clades within the genus Homo based on ancient protein evidence through the identification of an archaic-derived amino acid sequence for the collagen type X, alpha-1 (COL10^{a}Á1) protein. We support this by obtaining ancient mtDNA sequences, which indicate a Neandertal ancestry for these specimens. Direct accelerator mass spectometry radiocarbon dating and Bayesian modeling confirm that the hominin specimens date to the Chatelperronian at the Grotte du Renne.

Keywords: palaeoproteomics | ZooMS | Chatelperronian | Neandertal

Significance: The displacement of Neandertals by anatomically modern humans (AMHs) 50,000–40,000 y ago in Europe has considerable biological and behavioral implications. The Châtelperronian at the Grotte du Renne (France) takes a central role in models explaining the transition, but the association of hominin fossils at this site with the Châtelperronian is debated. Here we identify additional hominin specimens at the site through proteomic zooarchaeology by mass spectrometry screening and obtain molecular (ancient DNA, ancient proteins) and chronometric data to demonstrate that these represent Neandertals that date to the Châtelperronian. The identification of an amino acid sequence specific to a clade within the genus Homo demonstrates the potential of palaeoproteomic analysis in the study of hominin taxonomy in the Late Pleistocene and warrants further exploration.

Ozeanien

Fujita 2016

Masaki Fujita et al., *Advanced maritime adaptation in the western Pacific coastal region extends back to 35,000–30,000 years before present.* PNAS **113** (2016), 11184–11189.

Masaki Fujita, Shinji Yamasaki, Chiaki Katagiri, Itsuro Oshiro, Katsuhiro Sano, Taiji Kurozumi, Hiroshi Sugawara, Dai Kunikita, Hiroyuki Matsuzaki, Akihiro Kano, Tomoyo Okumura, Tomomi Sone, Hikaru Fujita, Satoshi Kobayashi, Toru Naruse, Megumi Kondo, Shuji Matsu'ura, Gen Suwa & Yousuke Kaifu

Maritime adaptation was one of the essential factors that enabled modern humans to disperse all over the world. However, geographic distribution of early maritime technology during the Late Pleistocene remains unclear. At this time, the Indonesian Archipelago and eastern New Guinea stand as the sole, well-recognized area for secure Pleistocene evidence of repeated ocean crossings and advanced fishing technology. The incomplete archeological records also make it difficult to know whether modern humans could sustain their life on a resource-poor, small oceanic island for extended periods with Paleolithic technology. We here report evidence from a limestone cave site on Okinawa Island, Japan, of successive occupation that extends back to 35,000-30,000 y ago. Well-stratified strata at the Sakitari Cave site yielded a rich assemblage of seashell artifacts, including formally shaped tools, beads, and the world's oldest fishhooks. These are accompanied by seasonally exploited food residue. The persistent occupation on this relatively small, geographically isolated island, as well as the appearance of Paleolithic sites on nearby islands by 30,000 y ago, suggest wider distribution of successful maritime adaptations than previously recognized, spanning the lower to midlatitude areas in the western Pacific coastal region.

Keywords: Homo sapiens | early modern humans | Late Pleistocene | Late Paleolithic | maritime adaptation

Significance: Moving into oceanic islands after c. 50,000 years ago was a remarkable step forward in the history of worldwide expansion of modern humans. However, the developmental process of Pleistocene maritime technology remains unclear. So far, the only secure sources of information for such discussions were the Indonesian Archipelago and northern New Guinea as steppingstones from the Asian continent to Australia. This article reports a successful maritime adaptation that extended from ≈35,000 to 13,000 years ago on a small island environment in the southern Japanese Archipelago. The new evidence demonstrates a geographically wider distribution of early maritime technology that extended north to the midlatitude areas along the western Pacific coast.