

## Literatur

### Aktuell

#### LEBLANC 2014

Lindsay J. LeBlanc, *Polar exploration*. [nature 505 \(2014\), 627–628](#).  
Magnetic monopoles — particles carrying a single magnetic charge — have never been seen. Analogues of these entities have now been produced in an ultracold cloud of rubidium atoms.

#### RAY 2014

M. W. Ray, E. Ruokokoski, S. Kandel, M. Möttönen & D. S. Hall, *Observation of Dirac monopoles in a synthetic magnetic field*. [nature 505 \(2014\), 657–660](#).

[n505-0657-Supplement.pdf](#)

Magnetic monopoles—particles that behave as isolated north or south magnetic poles—have been the subject of speculation since the first detailed observations of magnetism several hundred years ago<sup>1</sup>. Numerous theoretical investigations and hitherto unsuccessful experimental searches<sup>2</sup> have followed Dirac’s 1931 development of a theory of monopoles consistent with both quantum mechanics and the gauge invariance of the electromagnetic field<sup>3</sup>. The existence of even a single Dirac magnetic monopole would have far-reaching physical consequences, most famously explaining the quantization of electric charge<sup>3,4</sup>. Although analogues of magnetic monopoles have been found in exotic spin ices<sup>5,6</sup> and other systems<sup>7–9</sup>, there has been no direct experimental observation of Dirac monopoles within a medium-described by a quantum field, such as superfluid helium-3 (refs 10–13). Here we demonstrate the controlled creation<sup>14</sup> of Dirac monopoles in the synthetic magnetic field produced by a spinor Bose–Einstein condensate. Monopoles are identified, in both experiments and matching numerical simulations, at the termini of vortex lines within the condensate. By directly imaging such a vortex line, the presence of a monopole may be discerned from the experimental data alone. These real-space images provide conclusive and long-awaited experimental evidence of the existence of Dirac monopoles. Our result provides an unprecedented opportunity to observe and manipulate these quantum mechanical entities in a controlled environment.

#### SPETH 2013

Walter Speth, *Nur Befehle befolgt, CPS erfordern sichere Identitäten*. [atp edition 2013, xii, 46–52](#).

From the idea of ad hoc communication of components resembling a cyber physical system quite a few questions arise on security issues, in the first place on potential theft of identity. Beyond this machine to machine communication requires globally defined semantics on commands and responses as well as on functions, roles and rights — not an easy task for standard bodies if third party components of future functionality will have to adopt.

Die Ad-hoc-Kommunikation der Komponenten von cyber-physischen Systemen wirft Fragen der Angriffssicherheit auf. Es bedarf sicherer Identitäten und semantische Aspekte müssen geklärt werden, damit die Komponenten in den gleichen Begriffen für Rollen, Rechte und vor allem Funktionen kommunizieren. Der Beitrag beschreibt die Brisanz dieser Problematik und erklärt die Notwendigkeit, dass sie

auch für Komponenten gelöst sein muss, die erst später und von Dritten hergestellt werden.

Keywords: cyber physical systems / certificate based secure ID systems / trusted platform module / ad hoc communication

Cyber-physische Systeme / Identitätsnachweise / Zertifikate / Trusted Platform Module / Ad-hoc-Kommunikation

DE VRIEZE 2014

Jop de Vrieze, *Gut Instinct*. [science 343 \(2014\), 241–243](#).

Do bacteria in the guts of African hunter-gatherers hold the key to a healthier life? An American anthropologist plans to find out.

Yale University anthropologist Brian Wood, who has studied Hadza health and demography, is also skeptical that the Hadza enjoy rude health. “It seems like they have less cancer and cardiovascular disease than we do, but we do not have good data to evaluate the actual incidence,” he says. In any case, he notes, accidents, malaria, tuberculosis, and other diseases limit the Hadza’s life expectancy at birth to only 34 years, too short for cancer and heart disease to be significant killers. If the Hadza really are healthier than, say, the average German or American, Wood says there’s an explanation that has little to do with microbes: His own research has shown that they eat far fewer calories and are much leaner than Westerners. Scientists think that people in modern societies have so little exposure to microbes in the environment that their diets largely determine the composition of their gut microbiota. But in the Hadza, exposure to a daily microbial bombardment from the environment may override any impact of the food, Leach hypothesizes—and he hopes to test that. “Hadza men eat more meat and less plant foods than women,” he says. “If their microbiota turn out to be similar, the environment is the great equalizer.”

## Anthropologie

CHAPLIN 1994

George Chaplin, Nina G. Jablonski & N. Timothy Cable, *Physiology, thermoregulation and bipedalism*. [Journal of Human Evolution 27 \(1994\), 497–510](#).

It has long been recognized that the bipedal posture reduces the surface area of the body exposed to the sun. In recent years, a theory has been developed by Wheeler that bipedalism evolved in the ancestor of the Hominidae in order to help relieve thermal stress on the animals in open equatorial environments. Bipedalism was said to afford a distinct adaptive advantage over quadrupedalism by permitting hominids to remain active in the open throughout the day. The heat load of the hypothetical hominid comprises the external environment as modelled by Wheeler and the animal’s internal environment (i.e., the internal heat generated by its metabolic and locomotor activities, and its evaporative and respirative cooling capacities). When these factors are integrated in the calculation of the animal’s thermal budget, the putative advantage of the bipedal over the quadrupedal posture is considerably reduced. The simulations conducted in this study suggest that the increased time afforded to early hominids in the open by bipedalism was relatively short and, therefore, of little or no adaptive significance. These results suggest that thermoregulatory considerations cannot be implicated as a first cause in the evolution of bipedalism in the hominid ancestor.

Keywords: bipedality, thermoregulation, energetics, thermophysiology, metabolism, sweating, locomotion, field metabolic rate, hominidae.

#### HALL 2014

Crystal C. Hall, Jiaying Zhao & Eldar Shafir, *Self-Affirmation Among the Poor, Cognitive and Behavioral Implications*. [Psychological Science](#) **25** (2014), 619–625.

[PsychSci25-0619-Supplement.pdf](#)

The poor are universally stigmatized. The stigma of poverty includes being perceived as incompetent and feeling shunned and disrespected. It can lead to cognitive distancing, diminish cognitive performance, and cause the poor to forego beneficial programs. In the present research, we examined how self-affirmation can mitigate the stigma of poverty through randomized field experiments involving low-income individuals at an inner-city soup kitchen. Because of low literacy levels, we used an oral rather than written affirmation procedure, in which participants verbally described a personal experience that made them feel successful or proud. Compared with nonaffirmed participants, affirmed individuals exhibited better executive control, higher fluid intelligence, and a greater willingness to avail themselves of benefits programs. The effects were not driven by elevated positive mood, and the same intervention did not affect the performance of wealthy participants. The findings suggest that self-affirmation can improve the cognitive performance and decisions of the poor, and it may have important policy implications.

**Keywords:** self-affirmation, fluid intelligence, executive control, behavioral intervention, benefits take-up, poverty, intervention, stereotyped attitudes, policy making, cognition(s)

#### MARTÍN-FRANCÉS 2014

Laura Martín-Francés et al., *Palaeopathology of the Pleistocene specimen D2600 from Dmanisi (Republic of Georgia)*. [Comptes Rendus Palevol](#) (2014), preprint, 1–15. DOI:10.1016/j.crpv.2013.10.007.

Laura Martín-Francés, María Martín-Torres, Elena Lacasa-Marquina, Pilar Fernández-Colón, Ana Gracia-Télez & José María Bermúdez de Castro

Here we present a detailed palaeopathological study of the hominin mandible D2600 recovered at the Dmanisi site, Republic of Georgia. The Dmanisi assemblage represents the earliest evidence of hominins outside Africa with an age of 1.8 Ma. D2600 is the holotype of *Homo georgicus* species and its taxonomic assignment is still under debate. Our study reveals severe and unusual dental wear accompanied of extensive root exposure and dental axial migration, periapical abscesses and enamel fractures. In addition, there is evidence of post-eruptive tooth rotation and temporomandibular arthropathy. We propose that the wear pattern observed in this individual is related to a diet with a high intake of fibrous and abrasive foods such as fruits and plants, as it is usually recorded in chimpanzees and gorillas and unlike the wear pattern observed in other *Homo* specimens of our comparative sample. The rounded occlusal surfaces and highly polished labio-lingual surfaces of D2600 anterior teeth could be mainly the consequence of pre- and/or para-masticatory activities such as gripping and stripping. This type of food would be also the origin of the highly cupped occlusal morphology of the posterior dentition in combination with relatively slight approximal attrition. However, the lesions exhibited by D2600 have not significantly altered the morphology of the mandible and do not prevent a proper taxonomic assessment.

**Keywords:** Palaeopathology | *Homo georgicus* | Dmanisi site | Dental wear | Compensatory eruption | Periodontal disease | Cysts

#### RHODES 2009

Jill A. Rhodes & Steven E. Churchill, *Throwing in the Middle and*

*Upper Paleolithic, Inferences from an analysis of humeral retroversion. Journal of Human Evolution* **56** (2009), 1–10.

When in evolutionary history did long-range projectile weapons become an important component of hunting toolkits? The archeological evidence for the development of projectile weaponry is complex and generally indirect, and has led to different conclusions about the origin and spread of this technology. Lithic evidence from the Middle Stone Age (MSA) has led some researchers to suggest that true longrange projectile weaponry developed in Africa perhaps as early as 80,000 years ago, and was part of the subsistence toolkit carried by modern humans who expanded out of Africa after 50,000 years ago. Alternatively, temporal patterns in the morphology of pointed lithics has led others to posit an independent, convergent origin of projectile weaponry in Africa, the Near East, and Europe during the interval between 50,000–40,000 years ago. By either scenario, projectile weapons would not have been a component of the hunting arsenal of Neandertals, but may have been in use by European early modern humans and thus, projectile technology may have entered into the competitive dynamics that existed between these two groups. The origins of projectile weapons can be addressed, in part, through analyses of the skeletal remains of the prehistoric humans who made and used them. Habitual behavior patternsincluding those related to the production and use of technologycan be imprinted on the skeleton through both genetic and epigenetic pathways. Recent studies in the field of sports medicine indicate that individuals who engage in habitual throwing have increased humeral retroversion angles in their throwing arms and a greater degree of bilateral asymmetry in retroversion angles than do nonthrowers. This contribution investigates humeral torsion through analysis of the retroversion angle in samples of Eurasian Neandertals, European early modern humans of the middle and late Upper Paleolithic, and comparative samples of recent humans. This analysis was conducted under the assumption that if throwing-based projectile weaponry was used by early modern Europeans but not Neandertals, Upper Paleolithic samples should be similar to recent human groups engaged in habitual throwing in the degree of humeral retroversion in the dominant limb and in bilateral asymmetry in this feature. Neandertals on the other hand, would not be expected to show marked asymmetry in humeral retroversion. Consistent with other studies, Neandertals exhibit increased retroversion angles (decreased humeral torsion or a more posteriorly oriented humeral head) relative to most modern human samples, although this appears more likely related to body form and overall activity levels than to habitual throwing. Although Neandertals with bilaterally preserved humeri sufficient for measurement are rare (consisting of only two males and one female), levels of bilateral asymmetry in humeral retroversion are low, suggesting a lack of regular throwing. While patterning across fossil and comparative samples in levels of humeral retroversion was not clear cut, males of both the middle and late Upper Paleolithic demonstrate a high level of bilateral asymmetry, comparable to or in excess of that seen in samples of throwing athletes. This may indicate habitual use of throwing-based projectile weaponry by middle Upper Paleolithic times. Small sample sizes and relatively great variance in the fossil samples makes these results, however, suggestive rather than conclusive.

Keywords: Paleoanthropology | Projectile weapons | Neandertals | Functional morphology

SHEA 2008

John J. Shea, *Transitions or turnovers? Climatically-forced extinctions of Homo sapiens and Neanderthals in the east Mediterranean Levant. Quaternary Science Reviews* **27** (2008), 2253–2270.

The East Mediterranean Levant is a focal point for debate about evolutionary continuity among Late Pleistocene hominin populations. Changes in the Levantine Middle and Upper Palaeolithic archaeological records are almost invariably described in terms of adaptive shifts and behavioural transitions, rather than as changes in hominin populations. This paper examines evidence for hominin evolutionary continuity in the Levant between 130 and 25 ka. Two inflection points, one within the Middle Palaeolithic ca 75 ka and the other between the Middle and Upper Palaeolithic ca 45 ka, are examined in light of recently-discovered evidence for rapid climate change and environmental deterioration. It is proposed that both periods mark regional extinctions and turnovers of hominin populations. The first of these occurred among early *Homo sapiens*, the second among Neanderthals. Each event was followed by dispersal of hominin populations into the Levant from adjacent regions. Differences in Middle vs. Upper Palaeolithic *Homo sapiens*' long-term success in the Levant may reflect recently-evolved strategies for coping with rapid climate change and with colder arid habitats.

#### SKUSE 2014

David H. Skuse et al., *Common polymorphism in the oxytocin receptor gene (OXTR) is associated with human social recognition skills*. [PNAS \*\*111\*\* \(2014\), 1987–1992](#).

David H. Skuse, Adriana Lori, Joseph F. Cubells, Irene Lee, Karen N. Conneely, Kaija Puura, Terho Lehtimäki, Elisabeth B. Binder & Larry J. Young

The neuropeptides oxytocin and vasopressin are evolutionarily conserved regulators of social perception and behavior. Evidence is building that they are critically involved in the development of social recognition skills within rodent species, primates, and humans. We investigated whether common polymorphisms in the genes encoding the oxytocin and vasopressin 1a receptors influence social memory for faces. Our sample comprised 198 families, from the United Kingdom and Finland, in whom a single child had been diagnosed with high-functioning autism. Previous research has shown that impaired social perception, characteristic of autism, extends to the first-degree relatives of autistic individuals, implying heritable risk. Assessments of face recognition memory, discrimination of facial emotions, and direction of gaze detection were standardized for age (7–60 y) and sex. A common SNP in the oxytocin receptor (rs237887) was strongly associated with recognition memory in combined probands, parents, and siblings after correction for multiple comparisons. Homozygotes for the ancestral A allele had impairments in the range -0.6 to -1.15 SD scores, irrespective of their diagnostic status. Our findings imply that a critical role for the oxytocin system in social recognition has been conserved across perceptual boundaries through evolution, from olfaction in rodents to visual memory in humans.

#### SLEPIAN 2014

Michael L. Slepian & Nalini Ambady, *Simulating sensorimotor metaphors, Novel metaphors influence sensory judgments*. [Cognition \*\*130\*\* \(2014\), 309–314](#).

Embodied cognition theory proposes that individuals' abstract concepts can be associated with sensorimotor processes. The authors examined the effects of teaching participants novel embodied metaphors, not based in prior physical experience, and found evidence suggesting that they lead to embodied simulation, suggesting refinements to current models of embodied cognition. Creating novel embodiments of abstract concepts in the laboratory may be a useful method for examining mechanisms of embodied cognition.

Keywords: Embodied cognition | Metaphor | Learning | Simulation

TATTERSALL 2009

Ian Tattersall & Jeffrey H. Schwartz, *Evolution of the Genus Homo*. [Annual Review of Earth and Planetary Science](#) **37** (2009), 67–92.

Definition of the genus *Homo* is almost as fraught as the definition of *Homo sapiens*. We look at the evidence for “early *Homo*,” finding little morphological basis for extending our genus to any of the  $\approx 2.5$ –1.6-myrr-old fossil forms assigned to “early *Homo*” or *Homo habilis*/*rudolfensis*. We also point to heterogeneity among “early African *Homo erectus*,” and the lack of apomorphies linking these fossils to the Asian *Homo erectus* group, a cohesive regional clade that shows some internal variation, including brain size increase over time. The first truly cosmopolitan *Homo* species is *Homo heidelbergensis*, known from Africa, Europe, and China following 600 kyr ago. One species sympatric with it included the >500-kyr-old Sima de los Huesos fossils from Spain, clearly distinct from *Homo heidelbergensis* and the oldest hominids assignable to the clade additionally containing *Homo neanderthalensis*. This clade also shows evidence of brain size expansion with time; but although *Homo neanderthalensis* had a large brain, it left no unequivocal evidence of the symbolic consciousness that makes our species unique. *Homo sapiens* clearly originated in Africa, where it existed as a physical entity before it began (also in that continent) to show the first stirrings of symbolism. Most likely, the biological underpinnings of symbolic consciousness were exaptively acquired in the radical developmental reorganization that gave rise to the highly characteristic osteological structure of *Homo sapiens*, but lay fallow for tens of thousands of years before being “discovered” by a cultural stimulus, plausibly the invention of language.  
Keywords: paleoanthropology, human evolution, hominid diversity, human fossil record, hominid systematics

## Biologie

FREEDMAN 2014

Adam H. Freedman et al., *Genome Sequencing Highlights the Dynamic Early History of Dogs*. [PLoS Genetics](#) **10** (2014), e1004016. DOI:10.1371/journal.pgen.1004016.

Adam H. Freedman, Ilan Gronau, Rena M. Schweizer, Diego Ortega-Del Vecchyo, Eunjung Han, Pedro M. Silva, Marco Galaverni, Zhenxin Fan, Peter Marx, Belen Lorente-Galdos, Holly Beale, Oscar Ramirez, Farhad Hormozdiari, Can Alkan, Carles Vilà, Kevin Squire, Eli Geffen, Josip Kusak, Adam R. Boyko, Heidi G. Parker, Clarence Lee, Vasisht Tadigotla, Adam Siepel, Carlos D. Bustamante, Timothy T. Harkins, Stanley F. Nelson, Elaine A. Ostrander, Tomas Marques-Bonet, Robert K. Wayne & John Novembre

To identify genetic changes underlying dog domestication and reconstruct their early evolutionary history, we generated high-quality genome sequences from three gray wolves, one from each of the three putative centers of dog domestication, two basal dog lineages (*Basenji* and *Dingo*) and a golden jackal as an outgroup. Analysis of these sequences supports a demographic model in which dogs and wolves diverged through a dynamic process involving population bottlenecks in both lineages and post-divergence gene flow. In dogs, the domestication bottleneck involved at least a 16-fold reduction in population size, a much more severe bottleneck than estimated previously. A sharp bottleneck in wolves occurred soon after their divergence from dogs, implying that the pool of diversity from which dogs arose was substantially larger than represented by modern wolf populations. We narrow the plausible range for the date of initial dog domestication to an interval spanning 11–16 thousand years ago, predating the rise of agriculture. In light of this finding, we

expand upon previous work regarding the increase in copy number of the amylase gene (AMY2B) in dogs, which is believed to have aided digestion of starch in agricultural refuse. We find standing variation for amylase copy number variation in wolves and little or no copy number increase in the Dingo and Husky lineages. In conjunction with the estimated timing of dog origins, these results provide additional support to archaeological finds, suggesting the earliest dogs arose alongside hunter-gathers rather than agriculturists. Regarding the geographic origin of dogs, we find that, surprisingly, none of the extant wolf lineages from putative domestication centers is more closely related to dogs, and, instead, the sampled wolves form a sister monophyletic clade. This result, in combination with dog-wolf admixture during the process of domestication, suggests that a re-evaluation of past hypotheses regarding dog origins is necessary.

## Grabung

ASHTON 2014

Nick Ashton et al., *Hominin Footprints from Early Pleistocene Deposits at Happisburgh, UK*. [PLoS ONE 9 \(2014\), e88329](#).

[DOI:10.1371/journal.pone.0088329](#).

[pone09-e88329-Supplement.pdf](#)

Nick Ashton, Simon G. Lewis, Isabelle De Groote, Sarah M. Duffy, Martin Bates, Richard Bates, Peter Hoare, Mark Lewis, Simon A. Parfitt, Sylvia Peglar, Craig Williams & Chris Stringer

Investigations at Happisburgh, UK, have revealed the oldest known hominin footprint surface outside Africa at between ca. 1 million and 0.78 million years ago. The site has long been recognised for the preservation of sediments containing Early Pleistocene fauna and flora, but since 2005 has also yielded humanly made flint artefacts, extending the record of human occupation of northern Europe by at least 350,000 years. The sediments consist of sands, gravels and laminated silts laid down by a large river within the upper reaches of its estuary. In May 2013 extensive areas of the laminated sediments were exposed on the foreshore. On the surface of one of the laminated silt horizons a series of hollows was revealed in an area of ca. 12 m<sup>2</sup>. The surface was recorded using multi-image photogrammetry which showed that the hollows are distinctly elongated and the majority fall within the range of juvenile to adult hominin foot sizes. In many cases the arch and front/back of the foot can be identified and in one case the impression of toes can be seen. Using foot length to stature ratios, the hominins are estimated to have been between ca. 0.93 and 1.73 m in height, suggestive of a group of mixed ages. The orientation of the prints indicates movement in a southerly direction on mud-flats along the river edge. Early Pleistocene human fossils are extremely rare in Europe, with no evidence from the UK. The only known species in western Europe of a similar age is *Homo antecessor*, whose fossil remains have been found at Atapuerca, Spain. The foot sizes and estimated stature of the hominins from Happisburgh fall within the range derived from the fossil evidence of *Homo antecessor*.

## Isotope

BOCHERENS 2011

Hervé Bocherens, Dorothee G. Drucker & Heinrich Taubald, *Preservation of bone collagen sulphur isotopic compositions in an early Holocene river-bank archaeological site*. [Palaeo 310 \(2011\), 32–38](#).

This study investigates the reliability of the sulphur isotopic compositions ( $\delta^{34}\text{S}$ ) of collagen in archaeological bones from an early Holocene river-bank site, Noyen-sur-Seine (France). The chemical composition (C, N, S) of whole bones compared to those of bones from cave sites suggests that contamination with sulphur is higher in the bones sampled from river bank deposits compared to those from caves, especially those that occur well above the water table. Sulphur content in fresh bone collagen suggests specific values for different mammal taxa, while sulphur content in reptile bones may not always be higher than those of mammals. In the early Holocene bones from Noyen-sur-Seine, the collagen has chemical characteristics within the overall range observed in modern bone collagen. However, co-variation between some diagenetic indicators, such as sulphur content and N/S in whole bone,

, %S in collagen, and S yield, and  $\delta^{34}\text{S}$  values of collagen from the same species or ecological groups indicate that some diagenetic alteration may have influenced the collagen. Excluding samples possibly affected by this alteration, a difference in  $\delta^{34}\text{S}$  is measured between freshwater and terrestrial fauna. We recommend further work on the collagen sulphur contents in different species. Moreover, whole bone chemical compositions may help to screen samples for sulphur isotopic analyses of collagen that are to be used for palaeodietary reconstructions.

Keywords: Bone | Collagen | Diagenesis | Sulphur | Isotope

## Klima

### BEMENT 2014

Leland C. Bement et al., *Quantifying the distribution of nanodiamonds in pre-Younger Dryas to recent age deposits along Bull Creek, Oklahoma Panhandle, USA*. *PNAS* **111** (2014), 1726–1731.

Leland C. Bement, Andrew S. Madden, Brian J. Carter, Alexander R. Simms, Andrew L. Swindle, Hanna M. Alexander, Scott Fine & Mourad Benamara

High levels of nanodiamonds (nds) have been used to support the transformative hypothesis that an extraterrestrial (ET) event (comet explosion) triggered Younger Dryas changes in temperature, flora and fauna assemblages, and human adaptations [Firestone RB, et al. (2007) *Proc Natl Acad Sci USA* 104(41):16016–16021]. We evaluate this hypothesis by establishing the distribution of nds within the Bull Creek drainage of the Beaver River basin in the Oklahoma panhandle. The earlier report of an abundance spike of nds in the Bull Creek I Younger Dryas boundary soil is confirmed, although no pure cubic diamonds were identified. The lack of hexagonal nds suggests Bull Creek I is not near any impact site. Potential hexagonal nds at Bull Creek were found to be more consistent with graphene/graphane. An additional nd spike is found in deposits of late Holocene through the modern age, indicating nds are not unique to the Younger Dryas boundary. Nd distributions do not correlate with depositional environment, pedogenesis, climate perturbations, periods of surface stability, or cultural activity.

North American Southern Plains | megafauna extinction

## Kultur

### KIENLIN 2014

Tobias L. Kienlin, *Aspects of Metalworking and Society from the Black Sea to the Baltic Sea from the Fifth to the Second Millennium BC*.

In: BENJAMIN W. ROBERTS & CHRISTOPHER P. THORNTON (Hrsg.), *Archaeometallurgy in Global Perspective, Methods and Syntheses*. (New York 2014), 447–472.

In this contribution a review is given of the early evidence of metallurgy in southeastern and central Europe. Starting from the Eneolithic or Copper Age and extending into the Bronze Age, an attempt is made to follow the development of mining for copper minerals and ores, the origins of extractive metallurgy (smelting), the working of copper and the succession of different types of copper and copper-based alloys. From the fifth to the second millennium BC, early metalworking communities between the Baltic and the Black Sea are designated as anything from (Late) Neolithic, via Eneolithic, Chalcolithic or Copper Age to (Early) Bronze Age. Such terminology not only describes technological advances but also carries broader social and cultural implications that tend to go unstated.

SHEA 2006

John J. Shea, *The origins of lithic projectile point technology, Evidence from Africa, the Levant, and Europe*. *Journal of Archaeological Science* **33** (2006), 823–846.

Projectile weaponry is a human cultural universal, but its origins and antiquity remain poorly understood. Stone- and bone-tipped projectile weapons have long been treated as emergent features of the “Upper Paleolithic” behavioral revolution. Recently it has been proposed that projectile technology was in widespread use among *Homo sapiens* populations in Africa during Middle Stone Age (MSA) times. One obstacle to researching the origins of projectile point technology is that the criteria archaeologists employ for recognizing plausible and implausible stone projectile points are largely subjective (overall tool shape, microwear traces). Tip cross-sectional area (TCSA) is a ballistically significant dimension that works well at discriminating North American stone projectile points (spearthrower dart tips and arrowheads) from spear points. This paper compares the TCSA values of ethnographic North American stone projectile points to hypothetical Middle and Upper Paleolithic stone projectile points from Africa, the Levant, and Europe. The results of this comparison do not support the hypothesis of widespread use of stone-tipped projectiles in Africa, the Levant, or Europe prior to 40 Ka. In the New World and in Australia, where we have the richest ethnographic record of stone projectile point use, these implements are largely employed in big-game hunting and in warfare. One or both of these factors may have played a role in the widespread adoption of stone projectile point technology after 40 Ka.

Keywords: Stone tools; Projectile points; Middle Paleolithic/Middle Stone Age; Upper Paleolithic/Later Stone Age

## Metallzeiten

WENDT 2008

Karl Peter Wendt & Andreas Zimmermann, *Bevölkerungsdichte und Landnutzung in den germanischen Provinzen des Römischen Reiches im 2. Jahrhundert A. D. Ein Beitrag zur Landschaftsarchäologie*. *Germania* **86** (2008), 1–36.

The present suggestion for estimating population density in the second half of the 2nd century AD is based on the method of upward scaling for assessing land usage. The villa density in particularly well-investigated key regions is transferred to areas that, on regional and supraregional distribution maps, demonstrate a

comparable concentration of sites. In addition to the number of inhabitants of villas, vici, towns and military bases are taken into account in a way that makes possible the easy integration of future findings. The standardized, GIS-supported process for transferring data among differing levels of scale, developed by the Rhein-LUCIFS Project, makes possible diachronic and regional comparisons of demographic, economic and social developments of prehistoric and early historic periods.

Der vorliegende Vorschlag zur Schätzung der Bevölkerungsdichte für die zweite Hälfte des 2. Jh. n. Chr. beruht für die Nutzung des Landes auf der Methode des Aufwärtsskalierens. Die Villendichte in besonders gut untersuchten Schlüsselgebieten wird auf Areale übertragen, die in regionalen und überregionalen Verbreitungskarten eine gleichmäßige Fundstellendichte aufweisen. Neben der Einwohnerzahl von Villen werden vici, Städte und Militärstandorte in einer Weise berücksichtigt, die es ermöglicht, zukünftige Erkenntnisfortschritte leicht zu integrieren. Der im Rhein-LUCIFS Projekt entwickelte, GIS-gestützte und standardisierte Vorgang des Übertragens von Daten zwischen verschiedenen Maßstabebenen ermöglicht diachrone und regionale Vergleiche der demographischen, wirtschaftlichen und sozialen Entwicklungen ur- und frühgeschichtlicher Perioden.

**Keywords:** Roman Empire / Germania / landscape archaeology / population, demography / interpolation

Römische Kaiserzeit / Germania / Landschaftsarchäologie / Demographie / Interpolationsverfahren

## Methoden

SCHLUMMER 2014

Manuela Schlummer et al., *From Point to Area, Upscaling Approaches for Late Quaternary Archaeological and Environmental Data*. [Earth Science Reviews \(2014\), preprint, 1–63.](#)  
[DOI:10.1016/j.earscirev.2014.01.004](https://doi.org/10.1016/j.earscirev.2014.01.004).

Manuela Schlummer, Thomas Hoffmann, Richard Dikau, Michael Eickmeier, Peter Fischer, Renate Gerlach, Jörg Holzkämper, Arie J. Kalis, Inga Kretschmer, Franziska Lauer, Andreas Maier, Janina Meesenburg, Jutta Meurers-Balke, Ulla Münch, Stefan Pätzold, Florian Steininger, Astrid Stobbe & Andreas Zimmermann  
The study of past socio-environmental systems integrates a variety of terrestrial archives. To understand regional or continental socio-environmental interactions proxy data from local archives need to be transferred to larger spatial scales. System properties like spatial heterogeneity, historical and spatial contingency, nonlinearity, scale dependency or emergence make generalizations from local observations to larger scales difficult. As these are common properties of natural and social systems, the development of an interdisciplinary upscaling framework for socio-environmental systems remains a challenge. For example, the integration of social and environmental data is often hindered by divergent methodological, i.e. qualitative and quantitative, approaches and discipline-specific perceptions of spatial scales. Additionally, joint approaches can be hampered by differences in the predictability of natural systems, which are subject to physical laws, and social systems, which depend on humans' decisions and communication.

Here we present results from an interdisciplinary discussion of upscaling approaches in socioenvironmental research with a special focus on the migration of modern humans in Central Europe during the last 30,000 years. Based on case studies from different disciplines, we develop a classification system for upscaling approaches used in past socio-environmental research. Finally, we present an initial

upscaling framework that fosters the development of an interdisciplinary concept of scales and allows for a consideration of system properties like scale dependency, nonlinearity and contingency. The upscaling framework includes the following steps: i) the identification of relevant spatial and temporal scales at which socio-environmental interactions operate, ii) the definition of appropriate parameters to describe scale-specific interactions iii) a comparison of process and observation scales to evaluate the potential of local archive data for larger scale generalization and for reconstructing scalespecific past socio-environmental interactions, iv) the identification and adaption of appropriate upscaling approaches for the relevant scales, v) the development of scale-specific models of socio-environmental interactions, and vi) the connection of models in a nested hierarchy. Our intention is not to present final results, but rather to stimulate future discussions and to provide a basic reference on scale issues in the emerging field of integrated socio-environmental research.

**Keywords:** upscaling, human-environment interaction, Central Europe, geomorphology, soil science, palaeobotany

## Mittelpaläolithikum

CHU 2009

Wei Chu, *A functional approach to Paleolithic open-air habitation structures*. [World Archaeology 41 \(2009\), 348–362](#).

Advances in hominin bioenergetics and paleoclimate reconstructions suggest that morphology was an insufficient buffer against the cool climate of Pleistocene Europe. To maintain homeostasis, hominins must have supplemented endothermy with various extrasomatic behavioral solutions. It is commonly suggested that one such solution was the use of simple windbreaks, though to date no studies have assessed the thermo-regulatory benefits, if any, they may have conferred on their users. In the experimental project discussed in this article, computer simulations and practical models of simple windbreaks in controlled wind tunnels were used to evaluate their performance. The results were integrated into models of Neandertal cold tolerance and climatic reconstructions of known occupation sites during the Last Glacial Maximum in Northern Europe, in order to assess their usefulness to Pleistocene hominins. It was clear that, within the constraints of their toolkits, early hominins could have constructed habitation structures that would have been highly effective aids to help them stay warm. These new data permit a functional understanding of the archaeological record and have implications for hominin technology as well as range.

**Keywords:** Bioenergetics; habitation structures; experimental archaeology.

## Neolithikum

GERLACH 2012

R. Gerlach, P. Fischer, E. Eckmeier & A. Hilgers, *Buried dark soil horizons and archaeological features in the Neolithic settlement region of the Lower Rhine area, NW Germany: Formation, geochemistry and chronostratigraphy*. [Quaternary International 265 \(2012\), 191–204](#).

The properties and age of buried humic and clay-rich dark soil remains (Bht-horizons and pits) at archaeological excavations in the Lower Rhine Basin (NW Germany) were investigated. These Bht-features were formerly described as a component of Luvic Phaeozems and as relics of chernozemic soils.

Field observations challenge this interpretation. The Bht-horizons in the Lower Rhine Basin occur in a patchy distribution independent of relief position and climatic condition, and they are mostly connected with artefact-free but human-made pits (off-site features) consisting of the same Bht-material. The presence of charred organic matter (pyrogenic carbon) and its radiocarbon ages suggested that these Bht-horizons are not relics of naturally formed soils but rather archaeological features. Pyrogenic carbon, produced during agricultural burning practices (e.g. slash and burn) in the Younger to End Neolithic (4400–2200 BC), led to the characteristic dark colouring of the soil material.

Previously, it was generally presumed that the parent material of those dark soils is Pleistocene loess. New IRSL and OSL ages (around 6.4–4.3 ka) indicate that the Bht-horizons in the Lower Rhine Basin formed in colluvial sediments which also date to the Younger to End Neolithic. Thus, the history of human induced soil erosion in the Lower Rhine area started more than 1000 years earlier than assumed before. It was most likely connected to Neolithic burning practices (slash and burn) which subsequently triggered soil erosion, and then influenced the formation of dark Anthrosols by eluviation and illuviation of the partly charred dark humic material. These Anthrosols are an example of strong human impact on soil forming processes since the onset of agriculture.