

Literatur

Aktuell

CACIOPPO 2013

John T. Cacioppo, Stephanie Cacioppo, Gian C. Gonzaga, Elizabeth L. Ogburn & Tyler J. VanderWeele, *Marital satisfaction and break-ups differ across on-line and off-line meeting venues*. [PNAS 110 \(2013\), 10135–10140](#).

[pnas110-10135-Supplement1.pdf](#), [pnas110-10135-Supplement2.pdf](#),
[pnas110-10135-Supplement3.xlsx](#)

Marital discord is costly to children, families, and communities. The advent of the Internet, social networking, and on-line dating has affected how people meet future spouses, but little is known about the prevalence or outcomes of these marriages or the demographics of those involved. We addressed these questions in a nationally representative sample of 19,131 respondents who married between 2005 and 2012. Results indicate that more than one-third of marriages in America now begin on-line. In addition, marriages that began online, when compared with those that began through traditional offline venues, were slightly less likely to result in a marital breakup (separation or divorce) and were associated with slightly higher marital satisfaction among those respondents who remained married. Demographic differences were identified between respondents who met their spouse through on-line vs. traditional off-line venues, but the findings for marital break-up and marital satisfaction remained significant after statistically controlling for these differences. These data suggest that the Internet may be altering the dynamics and outcomes of marriage itself.

marital outcomes | social relationships | dyads

DUARTE 2013

João C. Duarte et al., *Are subduction zones invading the Atlantic? Evidence from the southwest Iberia margin*. [Geology \(2013\), preprint, 1–4](#). DOI:10.1130/G34100.1.

João C. Duarte, Filipe M. Rosas, Pedro Terrinha, Wouter P. Schellart, David Boutelier, Marc-André Gutscher & António Ribeiro

Subduction initiation at passive margins plays a central role in the plate tectonics theory. However, the process by which a passive margin becomes active is not well understood. In this paper we use the southwest Iberia margin (SIM) in the Atlantic Ocean to study the process of passive margin reactivation. Currently there are two tectonic mechanisms operating in the SIM: migration of the Gibraltar Arc and Africa-Eurasia convergence. Based on a new tectonic map, we propose that a new subduction zone is forming at the SIM as a result of both propagation of compressive stresses from the Gibraltar Arc and stresses related to the large-scale Africa-Eurasia convergence. The Gibraltar Arc and the SIM appear to be connected and have the potential to develop into a new eastern Atlantic subduction system. Our work suggests that the formation of new subduction zones in Atlantic-type oceans may not require the spontaneous foundering of its passive margins. Instead, subduction can be seen as an invasive process that propagates from ocean to ocean.

KORMAN 2013

Jonathan Korman & Robert J. McCann, *Insights into capacity-constrained optimal transport*. [PNAS 110 \(2013\), 10064–10067](#).

A variant of the classical optimal transportation problem is the following: among all joint measures with fixed marginals and that are dominated by a given density, find the optimal one. Existence and uniqueness of solutions to this variant were established by Korman and McCann. In the present article, we expose an unexpected symmetry leading to explicit examples in two and more dimensions. These are inspired in part by simulations in one dimension that display singularities and topology and in part by two further developments: the identification of all extreme points in the feasible set and an approach to uniqueness based on constructing feasible perturbations.

free boundary | infinite dimensional linear programming | Monge–Kantorovich mass | coupling | resource allocation

Anthropologie

ALLEN 2013

Timothy A. Allen & Norbert J. Fortin, *The evolution of episodic memory*. [PNAS 110 \(2013\), 10379–10386](#).

One prominent view holds that episodic memory emerged recently in humans and lacks a “(neo)Darwinian evolution” [Tulving E (2002) *Annu Rev Psychol* 53:1–25]. Here, we review evidence supporting the alternative perspective that episodic memory has a long evolutionary history. We show that fundamental features of episodic memory capacity are present in mammals and birds and that the major brain regions responsible for episodic memory in humans have anatomical and functional homologs in other species. We propose that episodic memory capacity depends on a fundamental neural circuit that is similar across mammalian and avian species, suggesting that protoepisodic memory systems exist across amniotes and, possibly, all vertebrates. The implication is that episodic memory in diverse species may primarily be due to a shared underlying neural ancestry, rather than the result of evolutionary convergence. We also discuss potential advantages that episodic memory may offer, as well as species-specific divergences that have developed on top of the fundamental episodic memory architecture. We conclude by identifying possible time points for the emergence of episodic memory in evolution, to help guide further research in this area.

animal models | hippocampus | prefrontal cortex | parahippocampal region | entorhinal cortex

CARRUTHERS 2013

Peter Carruthers, *Evolution of working memory*. [PNAS 110 \(2013\), 10371–10378](#).

Working memory (WM) is fundamental to many aspects of human life, including learning, speech and text comprehension, prospection and future planning, and explicit “system 2” forms of reasoning, as well as overlapping heavily with fluid general intelligence. WM has been intensively studied for many decades, and there is a growing consensus about its nature, its components, and its signature limits. Remarkably, given its central importance in human life, there has been very little comparative investigation of WM abilities across species. Consequently, much remains unknown about the evolution of this important human capacity. Some questions can be tentatively answered from the existing comparative literature.

Even studies that were not intended to do so can nonetheless shed light on the WM capacities of nonhuman animals. However, many questions remain.
attention | default network | episodic memory | mental rehearsal | primate

CELA-CONDE 2013

Camilo J. Cela-Conde, Raúl Gutiérrez Lombardo, John C. Avise & Francisco J. Ayala, *In the light of evolution VII, The human mental machinery*. [PNAS 110 \(2013\), 10339–10342](#).

This collection of colloquium papers aims to survey what has been learned about the human “mental machinery” since Darwin’s insights. The colloquium brought together leading scientists who have worked on brain and mental traits. Their 16 contributions focus the objective of better understanding human brain processes, their evolution, and their eventual shared mechanisms with other animals. The articles are grouped into three primary sections: current study of the mind/ brain relationships; the primate evolutionary continuity; and the human difference: from ethics to aesthetics.

CELA-CONDE 2013

Camilo J. Cela-Conde et al., *Dynamics of brain networks in the aesthetic appreciation*. [PNAS 110 \(2013\), 10454–10461](#).

Camilo J. Cela-Conde, Juan García-Prieto, José J. Ramasco, Claudio R. Mirasso, Ricardo Bajo, Enric Munar, Albert Flexas, Francisco del-Pozo & Fernando Maestú
Neuroimage experiments have been essential for identifying active brain networks. During cognitive tasks as in, e.g., aesthetic appreciation, such networks include regions that belong to the default mode network (DMN). Theoretically, DMN activity should be interrupted during cognitive tasks demanding attention, as is the case for aesthetic appreciation. Analyzing the functional connectivity dynamics along three temporal windows and two conditions, beautiful and not beautiful stimuli, here we report experimental support for the hypothesis that aesthetic appreciation relies on the activation of two different networks, an initial aesthetic network and a delayed aesthetic network, engaged within distinct time frames. Activation of the DMN might correspond mainly to the delayed aesthetic network. We discuss adaptive and evolutionary explanations for the relationships existing between the DMN and aesthetic networks and offer unique inputs to debates on the mind/brain interaction.

CHUKOSKIE 2013

Leanne Chukoskie, Joseph Snider, Michael C. Mozer, Richard J. Krauzlis & Terrence J. Sejnowski, *Learning where to look for a hidden target*. [PNAS 110 \(2013\), 10438–10445](#).

Survival depends on successfully foraging for food, for which evolution has selected diverse behaviors in different species. Humans forage not only for food, but also for information. We decide where to look over 170,000 times per day, approximately three times per wakeful second. The frequency of these saccadic eye movements belies the complexity underlying each individual choice. Experience factors into the choice of where to look and can be invoked to rapidly redirect gaze in a context and task-appropriate manner. However, remarkably little is known about how individuals learn to direct their gaze given the current context and task. We designed a task in which participants search a novel scene for a target whose location was drawn stochastically on each trial from a fixed prior distribution. The target was invisible on a blank screen, and the participants were rewarded when they fixated the hidden target location. In just a few trials, participants rapidly found

the hidden targets by looking near previously rewarded locations and avoiding previously unrewarded locations. Learning trajectories were well characterized by a simple reinforcement-learning (RL) model that maintained and continually updated a reward map of locations. The RL model made further predictions concerning sensitivity to recent experience that were confirmed by the data. The asymptotic performance of both the participants and the RL model approached optimal performance characterized by an ideal-observer theory. These two complementary levels of explanation show how experience in a novel environment drives visual search in humans and may extend to other forms of search such as animal foraging.

ideal observer | oculomotor | reinforcement learning | saccades

MCGAUGH 2013

James L. McGaugh, *Making lasting memories: Remembering the significant*. [PNAS 110 \(2013\), 10402–10407](#).

Although forgetting is the common fate of most of our experiences, much evidence indicates that emotional arousal enhances the storage of memories, thus serving to create, selectively, lasting memories of our more important experiences. The neurobiological systems mediating emotional arousal and memory are very closely linked. The adrenal stress hormones epinephrine and corticosterone released by emotional arousal regulate the consolidation of long-term memory. The amygdala plays a critical role in mediating these stress hormone influences. The release of norepinephrine in the amygdala and the activation of noradrenergic receptors are essential for stress hormone-induced memory enhancement. The findings of both animal and human studies provide compelling evidence that stress-induced activation of the amygdala and its interactions with other brain regions involved in processing memory play a critical role in ensuring that emotionally significant experiences are well-remembered. Recent research has determined that some human subjects have highly superior autobiographic memory of their daily experiences and that there are structural differences in the brains of these subjects compared with the brains of subjects who do not have such memory. Understanding of neurobiological bases of such exceptional memory may provide additional insights into the processes underlying the selectivity of memory.

MASHOUR 2013

George A. Mashour & Michael T. Alkire, *Evolution of consciousness: Phylogeny, ontogeny, and emergence from general anesthesia*. [PNAS 110 \(2013\), 10357–10364](#).

Are animals conscious? If so, when did consciousness evolve? We address these long-standing and essential questions using a modern neuroscientific approach that draws on diverse fields such as consciousness studies, evolutionary neurobiology, animal psychology, and anesthesiology. We propose that the stepwise emergence from general anesthesia can serve as a reproducible model to study the evolution of consciousness across various species and use current data from anesthesiology to shed light on the phylogeny of consciousness. Ultimately, we conclude that the neurobiological structure of the vertebrate central nervous system is evolutionarily ancient and highly conserved across species and that the basic neurophysiologic mechanisms supporting consciousness in humans are found at the earliest points of vertebrate brain evolution. Thus, in agreement with Darwin's insight and the recent "Cambridge Declaration on Consciousness in Non-Human Animals," a review of modern scientific data suggests that the differences between species in terms of the ability to experience the world is one of degree and not kind.

OAKLEY 2013

Barbara A. Oakley, *Concepts and implications of altruism bias and pathological altruism*. [PNAS 110 \(2013\), 10408–10415](#).

The profound benefits of altruism in modern society are self-evident. However, the potential hurtful aspects of altruism have gone largely unrecognized in scientific inquiry. This is despite the fact that virtually all forms of altruism are associated with tradeoffs—some of enormous importance and sensitivity—and notwithstanding that examples of pathologies of altruism abound. Presented here are the mechanistic bases and potential ramifications of pathological altruism, that is, altruism in which attempts to promote the welfare of others instead result in unanticipated harm. A basic conceptual approach toward the quantification of altruism bias is presented. Guardian systems and their overarching importance in the evolution of cooperation are also discussed. Concepts of pathological altruism, altruism bias, and guardian systems may help open many new, potentially useful lines of inquiry and provide a framework to begin moving toward a more mature, scientifically informed understanding of altruism and cooperative behavior.

cooperation | empathy | codependency | narcissism | philanthropy

SEARLE 2013

John Searle, *Theory of mind and Darwin's legacy*. [PNAS 110 \(2013\), 10343–10348](#).

We do not have an adequate theory of consciousness. Both dualism and materialism are mistaken because they deny consciousness is part of the physical world. False claims include (i) behaviorism, (ii) computationalism, (iii) epiphenomenalism, (iv) the readiness potential, (v) subjectivity, and (vi) materialism. Ontological subjectivity does not preclude epistemic objectivity. Observer relative phenomena are created by consciousness, but consciousness is not itself observer relative. Consciousness consists of feeling, sentience, or awareness with (i) qualitiveness, (ii) ontological subjectivity, (iii) unified conscious field, (iv) intentionality, and (v) intentional causation. All conscious states are caused by lower level neurobiological processes in the brain, and they are realized in the brain as higher level features. Efforts to get a detailed scientific account of how brain processes cause consciousness are disappointing. The Darwinian revolution gave us a new form of explanation; two levels were substituted: a causal level, where we specify the mechanism by which the phenotype functions, and a functional level, where we specify the selectional advantage that the phenotype provides. Sociobiology attempted to explain general features of human society, ethics, etc. It failed. For the incest taboo, it confuses inhibition with prohibition. It did not explain the moral force of the taboo. To explain the function of consciousness we cannot ask, “What would be subtracted if we subtracted consciousness but left everything else the same?” We cannot leave everything else the same because consciousness is necessary for higher functions of human and animal life. The unified conscious field gives the organism vastly increased power.

objective/subjective | unconscious

SEYFARTH 2013

Robert M. Seyfarth & Dorothy L. Cheney, *Affiliation, empathy, and the origins of theory of mind*. [PNAS 110 \(2013\), 10349–10356](#).

To understand the evolution of a Theory of Mind, we need to understand the selective factors that might have jumpstarted its initial evolution. We argue that a subconscious, reflexive appreciation of others' intentions, emotions, and perspectives is at the roots of even the most complex forms of Theory of Mind and that these abilities may have evolved because natural selection has favored individuals

that are motivated to empathize with others and attend to their social interactions. These skills are adaptive because they are essential to forming strong, enduring social bonds, which in turn enhance reproductive success. We first review evidence from both humans and other animals indicating that reflexive and reflective mental state attributions are inextricably linked and play a crucial role in promoting affiliative social bonds. We next describe results from free-ranging female baboons showing that individuals who show high rates of affiliative behavior form stronger social bonds with other females. These bonds, in turn, are linked to fitness. We then provide data from three different types of social challenges (male immigration, changes in grooming behavior after the death of a close relative, and responses during playback experiments), suggesting that females who manifest high rates of affiliative behavior may also be more motivated to anticipate challenges, react adaptively to setbacks, and respond appropriately to social interactions.

personality | primates

WEEDEN 2006

Jason Weeden, Michael J. Abrams, Melanie C. Green & John Sabini, *Do High-Status People Really Have Fewer Children? Education, Income, and Fertility in the Contemporary U.S.* *Human Nature* **17** (2006), [377–392](#).

Evolutionary discussions regarding the relationship between social status and fertility in the contemporary U.S. typically claim that the relationship is either negative or absent entirely. The published data on recent generations of Americans upon which such statements rest, however, are solid with respect to women but sparse and equivocal for men. In the current study, we investigate education and income in relation to age at first child, childlessness, and number of children for men and women in two samples—one of the general American population and one of graduates of an elite American university. We find that increased education is strongly associated with delayed childbearing in both sexes and is also moderately associated with decreased completed or near-completed fertility. Women in the general population with higher adult income have fewer children, but this relationship does not hold within all educational groups, including our sample with elite educations. Higher-income men, however, do not have fewer children in the general population and in fact have lower childlessness rates. Further, higher income in men is positively associated with fertility among our sample with elite educations as well as within the general population among those with college educations. Such findings undermine simple statements on the relationship between status and fertility.

Keywords: Education; Fertility; Income; Status

YOELI 2013

Erez Yoeli, Moshe Hoffman, David G. Rand & Martin A. Nowak, *Powering up with indirect reciprocity in a large-scale field experiment.* *PNAS* **110** (2013), [10424–10429](#).

A defining aspect of human cooperation is the use of sophisticated indirect reciprocity. We observe others, talk about others, and act accordingly. We help those who help others, and we cooperate expecting that others will cooperate in return. Indirect reciprocity is based on reputation, which spreads by communication. A crucial aspect of indirect reciprocity is observability: reputation effects can support cooperation as long as peoples' actions can be observed by others. In evolutionary models of indirect reciprocity, natural selection favors cooperation when observability is sufficiently high. Complementing this theoretical work are experiments

where observability promotes cooperation among small groups playing games in the laboratory. Until now, however, there has been little evidence of observability's power to promote large-scale cooperation in real world settings. Here we provide such evidence using a field study involving 2413 subjects. We collaborated with a utility company to study participation in a program designed to prevent blackouts. We show that observability triples participation in this public goods game. The effect is over four times larger than offering a \$25 monetary incentive, the company's previous policy. Furthermore, as predicted by indirect reciprocity, we provide evidence that reputational concerns are driving our observability effect. In sum, we show how indirect reciprocity can be harnessed to increase cooperation in a relevant, real-world public goods game.

evolutionary game theory | experimental economics

Bibel

VAN DER SPEK 2013

R. J. van der Spek, *Cyrus the Great, Exiles and Foreign Gods, A Comparison of Assyrian and Persian Policies on Subject Nations*. In: WOUTER HENKELMAN, CHARLES JONES, MICHAEL KOZUH & CHRISTOPHER WOODS (Hrsg.), *Extraction and Control, Studies in Honor of Matthew W. Stolper*. (Chicago 2013), preprint.

The Persian attitude towards subject nations did not principally differ from the Assyrian attitude. Cyrus did not introduce a new policy. Cyrus' much-praised religious 'tolerance' was not a new, but a time-honored policy pursued by many ancient Near Eastern kings, who wanted to have as many gods as possible on their side and hoped to gain the support of their worshippers. 'Tolerance,' in antiquity, was almost never a matter of principle. If a conqueror deemed it useful, he could also forcefully compel a nation into submission, and Cyrus did not abstain from this policy. Such a harsh policy incidentally does not constitute evidence for religious 'intolerance.' Destruction of temples, removal of cult images and the like were not intended to prove that a particular god did not exist, or to prove the correctness of a dogma or creed. Repression of religious practices was rare in antiquity; it was, however, at issue when a monotheistic religion (of the victor or the vanquished) was involved, when religion had become the vehicle of rebellion, or was considered to be hostile towards the state.

This does not mean that all kings and emperors pursued exactly the same policy. Different kings have different characters and have to cope with different problems. Some rulers are more inclined to clemency than others, and Cyrus' reputation must have some basis in his deeds. What I have tried to show, however, is that this policy was part and parcel of well-established customs among ancient Near Eastern kings and that the interpretation of the Cyrus Cylinder as "the first declaration of human rights" is anachronistic and certainly a misnomer.

Biologie

BIANCHI 2013

Serena Bianchi et al., *Synaptogenesis and development of pyramidal neuron dendritic morphology in the chimpanzee neocortex resembles humans*. *PNAS* **110** (2013), 10395–10401.

Serena Bianchi, Cheryl D. Stimpson, Tetyana Duka, Michael D. Larsen, William G. M. Janssen, Zachary Collins, Amy L. Bauernfeind, Steven J. Schapiro, Wallace

B. Baze, Mark J. McArthur, William D. Hopkins, Derek E. Wildman, Leonard Lipovich, Christopher W. Kuzawa, Bob Jacobs, Patrick R. Hof & Chet C. Sherwood
Neocortical development in humans is characterized by an extended period of synaptic proliferation that peaks in mid-childhood, with subsequent pruning through early adulthood, as well as relatively delayed maturation of neuronal arborization in the prefrontal cortex compared with sensorimotor areas. In macaque monkeys, cortical synaptogenesis peaks during early infancy and developmental changes in synapse density and dendritic spines occur synchronously across cortical regions. Thus, relatively prolonged synapse and neuronal maturation in humans might contribute to enhancement of social learning during development and transmission of cultural practices, including language. However, because macaques, which share a last common ancestor with humans ≈ 25 million years ago, have served as the predominant comparative primate model in neurodevelopmental research, the paucity of data from more closely related great apes leaves unresolved when these evolutionary changes in the timing of cortical development became established in the human lineage. To address this question, we used immunohistochemistry, electron microscopy, and Golgi staining to characterize synaptic density and dendritic morphology of pyramidal neurons in primary somatosensory (area 3b), primary motor (area 4), prestriate visual (area 18), and prefrontal (area 10) cortices of developing chimpanzees (*Pan troglodytes*). We found that synaptogenesis occurs synchronously across cortical areas, with a peak of synapse density during the juvenile period (3–5 y). Moreover, similar to findings in humans, dendrites of prefrontal pyramidal neurons developed later than sensorimotor areas. These results suggest that evolutionary changes to neocortical development promoting greater neuronal plasticity early in postnatal life preceded the divergence of the human and chimpanzee lineages.
evolution | Golgi stain | brain | ontogeny

BROSINAN 2013

Sarah F. Brosnan, *Justice- and fairness-related behaviors in nonhuman primates*. [PNAS 110 \(2013\), 10416–10423](#).

A distinctive feature across human societies is our interest in justice and fairness. People will sometimes invest in extremely costly behavior to achieve fair outcomes for themselves and others. Why do people care so much about justice? One way to address this is comparatively, exploring behaviors related to justice and fairness in other species. In this paper, I review work exploring responses to inequity, prosocial behavior, and other relevant behaviors in nonhuman primates in an effort to understand both the potential evolutionary function of these behaviors and the social and ecological reasons for the individual differences in behavior. I also consider how these behaviors relate to human behavior, particularly in the case of experimental studies using games derived from experimental economics to compare nonhuman primates' responses to those of humans in similar experimental conditions. These results emphasize the importance of a comparative approach to better understand the function and diversity of human behavior.

comparative economics | decision-making | game theory | behavioral phylogeny | cooperation

CHANG 2013

Steve W. C. Chang et al., *Neuroethology of primate social behavior*. [PNAS 110 \(2013\), 10387–10394](#).

Steve W. C. Chang, Lauren J. N. Brent, Geoffrey K. Adams, Jeffrey T. Klein, John M. Pearson, Karli K. Watson & Michael L. Platt

A neuroethological approach to human and nonhuman primate behavior and cognition predicts biological specializations for social life. Evidence reviewed here indicates that ancestral mechanisms are often duplicated, repurposed, and differentially regulated to support social behavior. Focusing on recent research from nonhuman primates, we describe how the primate brain might implement social functions by coopting and extending preexisting mechanisms that previously supported nonsocial functions. This approach reveals that highly specialized mechanisms have evolved to decipher the immediate social context, and parallel circuits have evolved to translate social perceptual signals and nonsocial perceptual signals into partially integrated social and nonsocial motivational signals, which together inform general-purpose mechanisms that command behavior. Differences in social behavior between species, as well as between individuals within a species, result in part from neuromodulatory regulation of these neural circuits, which itself appears to be under partial genetic control. Ultimately, intraspecific variation in social behavior has differential fitness consequences, providing fundamental building blocks of natural selection. Our review suggests that the neuroethological approach to primate behavior may provide unique insights into human psychopathology.

decision | evolution | reward | serotonin | oxytocin

CLARK 2013

Robert E. Clark & Larry R. Squire, *Similarity in form and function of the hippocampus in rodents, monkeys, and humans*. [PNAS 110 \(2013\), 10365–10370](#).

We begin by describing an historical scientific debate in which the fundamental idea that species are related by evolutionary descent was challenged. The challenge was based on supposed neuroanatomical differences between humans and other primates with respect to a structure known then as the hippocampus minor. The debate took place in the early 1860s, just after the publication of Darwin's famous book. We then recount the difficult road that was traveled to develop an animal model of human memory impairment, a matter that also turned on questions about similarities and differences between humans and other primates. We then describe how the insight that there are multiple memory systems helped to secure the animal model and how the animal model was ultimately used to identify the neuroanatomy of long-term declarative memory (sometimes termed explicit memory). Finally, we describe a challenge to the animal model and to cross-species comparisons by considering the case of the concurrent discrimination task, drawing on findings from humans and monkeys. We suggest that analysis of such cases, based on the understanding that there are multiple memory systems with different properties, has served to emphasize the similarities in memory function across mammalian species.

TULJAPURKAR 2013

Shripad Tuljapurkar, *Mutations and the age pattern of death*. [PNAS 110 \(2013\), 10057–10058](#).

This is a remarkable mathematical result; even better, it comes with a computable expression for the equilibrium. That equilibrium in turn tells us what the population's equilibrium age pattern of mortality and reproduction should be.

Energie

KRAUSMANN 2013

Fridolin Krausmann et al., *Global human appropriation of net primary*

production doubled in the 20th century. [PNAS 110 \(2013\), 10324–10329.](#)

Fridolin Krausmann, Karl-Heinz Erb, Simone Gingrich, Helmut Haberl, Alberte Bondeau, Veronika Gaube, Christian Lauk, Christoph Plutzer & Timothy D. Searchinger

Global increases in population, consumption, and gross domestic product raise concerns about the sustainability of the current and future use of natural resources. The human appropriation of net primary production (HANPP) provides a useful measure of human intervention into the biosphere. The productive capacity of land is appropriated by harvesting or burning biomass and by converting natural ecosystems to managed lands with lower productivity. This work analyzes trends in HANPP from 1910 to 2005 and finds that although human population has grown fourfold and economic output 17-fold, global HANPP has only doubled. Despite this increase in efficiency, HANPP has still risen from 6.9 Gt of carbon per y in 1910 to 14.8 GtC/y in 2005, i.e., from 13 % to 25 % of the net primary production of potential vegetation. Biomass harvested per capita and year has slightly declined despite growth in consumption because of a decline in reliance on bioenergy and higher conversion efficiencies of primary biomass to products. The rise in efficiency is overwhelmingly due to increased crop yields, albeit frequently associated with substantial ecological costs, such as fossil energy inputs, soil degradation, and biodiversity loss. If humans can maintain the past trend lines in efficiency gains, we estimate that HANPP might only grow to 27–29 % by 2050, but providing large amounts of bioenergy could increase global HANPP to 44 %. This result calls for caution in refocusing the energy economy on land-based resources and for strategies that foster the continuation of increases in land-use efficiency without excessively increasing ecological costs of intensification.

agriculture | food | land use intensity | resource use | global carbon cycle

Isotope

GRAUEL 2013

Anna-Lena Grauel et al., *What do SST proxies really tell us? A high-resolution multiproxy study in the Gulf of Taranto, central Mediterranean Sea, (UK'_{37} , TEX^H_{86} and foraminifera $\delta^{18}O$).* [Quaternary Science Reviews 73 \(2013\), 115–131.](#)

qsr73-0115-Supplement1.pdf, qsr73-0115-Supplement2.xls

Anna-Lena Grauel, Arne Leider, Marie-Louise S. Goudeau, Inigo A. Müller, Stefano M. Bernasconi, Kai-Uwe Hinrichs, Gert J. de Lange, Karin A. F. Zonneveld & Gerard J. M. Versteegh

We present a multiproxy reconstruction of sea surface temperatures (SST) and coastal environmental changes covering the last 600 years on sediments from the Gulf of Taranto, central Mediterranean Sea. The reconstruction is based on UK'_{37} (alkenones from haptophytes), TEX^H_{86} (membrane lipids of marine crenarchaeota), and $d_{18}O$ and $d_{13}C$ of *Globigerinoides ruber* (white and pink) and of *Uvigerina mediterranea*. The amplitudes of the temperature signals reconstructed from $d_{18}O$ of *G. ruber* (white), TEX^H_{86} and UK'_{37} exceed the amplitudes observed in other reconstructions of local and Northern Hemisphere temperature. UK'_{37} -based SSTs reflect mainly winter/spring conditions with an additional influence of changing nutrient supplies related to water column mixing and runoff. TEX^H_{86} -based temperatures reflect SSTs of the oligotrophic summer season, while influences from near-coastal areas may complicate its interpretation. Co-variation between both lipid-based SST records suggests a common environmental mechanism during the

last 600 years. $\delta^{18}\text{O}$ of *G. ruber* (white) also reflects summer conditions and is amplified by changes in salinity and nutrient availability, which are caused by variations in the relative influence of the Western Adriatic Current (WAC) and of the Ionian Surface Waters (ISW). The combination of SST TEXH86 and $\delta^{18}\text{O}$ of *G. ruber* (white) shows that the circulation in the Gulf of Taranto underwent significant changes during the last 600 years.

SHACKLETON 1974

N. J. Shackleton, *Attainment of isotopic equilibrium between ocean water and the benthonic foraminifera genus *Uvigerina*, Isotopic changes in the ocean during the last glacial*. *Colloques Internationaux du C.N.R.S.* **219** (1974), 203–209.

It is shown that even when the oxygen isotopic composition of foraminiferal tests is examined using non-standard analytical methods, the measurements may be expressed in terms of the PDB standard. In order to investigate departure from isotopic equilibrium, comparison must be made not with an empirical relationship determined for molluscs in a limited temperature range, but with a relationship based on inorganic calcite precipitation in the temperature range of interest. By such a comparison it is found that *Uvigerina* deposits its test at or near isotopic equilibrium in the temperature range 0.8 °C to 7 °C. Values for the isotopic composition of tests of this genus which lived during the last glacial can only be explained in terms of a change in the mean oxygen isotopic composition of the oceans which probably exceeded 1 ‰ for about 20 000 years, and exceeded 0.5 ‰ for about 70 000 years.

Jungpaläolithikum

RICHTER 2012

Jürgen Richter, *Die Zeit der Wiederbesiedlung nach dem zweiten Kältemaximum der letzten Kaltzeit und die Spätphase der jäger-sammelerischen Wirtschaftsweise in Nordrhein-Westfalen*. In: JÜRGEN RICHTER (Hrsg.), *Rietberg und Salzkotten-Thüle, Anfang und Ende der Federmessergruppen in Westfalen*. Kölner Studien zur prähistorischen Archäologie 2 (Rahden 2012), 11–18.

Mit dem Magdalénien endete um 14.000 calBP das Jungpaläolithikum, die kaltzeitlichen Steppentiere starben in unserem Gebiet aus, und es begann das Spätpaläolithikum. Das ältere Spätpaläolithikum wird nach dem Fundort Mas d’Azil/Ariège am Nordrand der Pyrenäen auch “Azilien” genannt oder “Federmessergruppen” nach der typischen Geschosspitzenform, die vermutlich den frühen Gebrauch von Pfeil und Bogen anzeigt. Eine kürzlich als Kölner Dissertation fertiggestellte Neubearbeitung der Altfunde aus Mas d’Azil belegt den formenkundlich identischen Charakter des französischen Azilien und der mitteleuropäischen Federmessergruppen, so dass beide Begriffe als Synonym für denselben kulturellen Komplex anzusehen sind (Kegler 2008); die gelegentlich anzutreffende Unterscheidung zwischen “Azilien” und “Groupes à Federmesser” ist damit obsolet geworden.

WEBER 2011

Mara-Julia Weber, Sonja B. Grimm & Michael Baales, *Between warm and cold: Impact of the Younger Dryas on human behavior in Central Europe*. *Quaternary International* **242** (2011), 277–301.

Following a thorough review of high-resolution environmental archives, this paper aims at discriminating the factors determining the heterogeneous repercussion of the Lateglacial Younger Dryas in Central Europe. When examining the archaeological implications of human adaptation to the subsequent changes in the natural environment two divergent biotic regions are of special interest: the North European Plain and adjacent areas; and the Alpine foothills and surrounding mountain ranges. In these regions, two different archaeological technocomplexes (traditions) are found: the Tanged Point Complex and the Curve-Backed Point Groups. Considering the distribution of the archaeological sites witnessing changes in the material culture and subsistence pattern, the intensity of the environmental changes caused by the Younger Dryas is a decisive element. Settlement discontinuity during the Younger Dryas is questioned. Moreover, the potential existence of established social networks between the two regions expressed by comparable developments such as microlithization is considered. Finally, the authors assess whether the Younger Dryas acted as an accelerator or a brake in the process of regional diversification prior to the Early Mesolithic.

Kultur

FORTUNATO 2006

Laura Fortunato, Clare Holden & Ruth Mace, *From Bridewealth to Dowry? A Bayesian Estimation of Ancestral States of Marriage Transfers in Indo-European Groups*. *Human Nature* **17** (2006), 355–376. Significant amounts of wealth have been exchanged as part of marriage settlements throughout history. Although various models have been proposed for interpreting these practices, their development over time has not been investigated systematically. In this paper we use a Bayesian MCMC phylogenetic comparative approach to reconstruct the evolution of two forms of wealth transfers at marriage, dowry and bridewealth, for 51 Indo-European cultural groups. Results indicate that dowry is more likely to have been the ancestral practice, and that a minimum of four changes to bridewealth is necessary to explain the observed distribution of the two states across the cultural groups.

Keywords: Ancestral states; Bayesian MCMC phylogenetic and comparative methods; Bridewealth; Dowry; Indo-European; Marriage transfers

MCGOVERN 2013

Patrick E. McGovern et al., *Beginning of viniculture in France*. *PNAS* **110** (2013), 10147–10152.

pnas110-10147-Supplement1.xls, pnas110-10147-Supplement2.xls,

pnas110-10147-Supplement3.xls, pnas110-10147-Supplement4.xls

Patrick E. McGovern, Benjamin P. Luley, Nuria Rovira, Armen Mirzoian, Michael P. Callahan, Karen E. Smith, Gretchen R. Hall, Theodore Davidson & Joshua M. Henkin

Chemical analyses of ancient organic compounds absorbed into the pottery fabrics of imported Etruscan amphoras (ca. 500–475 B.C.) and into a limestone pressing platform (ca. 425–400 B.C.) at the ancient coastal port site of Lattara in southern France provide the earliest biomolecular archaeological evidence for grape wine and viniculture from this country, which is crucial to the later history of wine in Europe and the rest of the world. The data support the hypothesis that export of wine by ship from Etruria in central Italy to southern Mediterranean France fueled an ever-growing market and interest in wine there, which, in turn, as evidenced by the winepress, led to transplantation of the Eurasian grapevine and the beginning of

a Celtic industry in France. Herbal and pine resin additives to the Etruscan wine point to the medicinal role of wine in antiquity, as well as a means of preserving it during marine transport.

ancient medicine | biomolecular archaeology | viticulture | Western Mediterranean

RÖDER 1996

Brigitte Röder, Juliane Hummel & Brigitta Kunz, *Göttinnendämmerung, Das Matriarchat aus archäologischer Sicht*. (Königsförde 2001).

Ist das Matriarchat in der Frühzeit der Menschheit eine historische Tatsache?

Oder ist der einstige Kampfbegriff der Frauenbewegung nicht mehr als ein moderner Mythos?

An diesen Fragen scheiden sich die Geister. Während Matriarchatsforscherinnen ein Goldenes Zeitalter der Frauenherrschaft mit archäologischen Funden 'beweisen', hüllt sich die Archäologie in akademisches Schweigen. Drei junge Archäologinnen haben dieses Schweigen gebrochen. Nach beiden Seiten kritisch, trennen sie mit Witz und Ironie Fakten von Fiktionen und wagen den Brückenschlag zwischen populärer Matriarchatsforschung und Wissenschaft.

Ist es Zeit eine Göttinnendämmerung einzuläuten?

TESTART 2013

Alain Testart, *Reconstructing Social and Cultural Evolution, The Case of Dowry in the Indo-European Area*. [Current Anthropology 54 \(2013\), 23–50](#).

This article presents a systematic critique of phylogenetic linguistic methodology as applied to social or cultural data. The example that occasions this criticism is a 2006 article by Fortunato, Holden, and Mace on marriage transfers (dowry) in the Indo-European areas. The present article advances certain general proposals for methods of reconstructing the evolution of a custom or an institution. The concepts needed to properly consider the question of marriage transfers include the notion of combination and of differentiated social practice. After having reviewed the data from comparative anthropology and historical sources, the author concludes that the most plausible evolutionary scheme for the Indo-European area is the replacement of an ancient bridewealth, or a combination of bridewealth and dowry, by dowry.

VARTANIAN 2013

Oshin Vartanian et al., *Impact of contour on aesthetic judgments and approach-avoidance decisions in architecture*. [PNAS 110 \(2013\), 10446–10453](#).

Oshin Vartanian, Gorka Navarrete, Anjan Chatterjee, Lars Brorson Fich, Helmut Leder, Cristián Modroño, Marcos Nadal, Nicolai Rostrup & Martin Skov

On average, we urban dwellers spend about 90% of our time indoors, and share the intuition that the physical features of the places we live and work in influence how we feel and act. However, there is surprisingly little research on how architecture impacts behavior, much less on how it influences brain function. To begin closing this gap, we conducted a functional magnetic resonance imaging study to examine how systematic variation in contour impacts aesthetic judgments and approach-avoidance decisions, outcome measures of interest to both architects and users of spaces alike. As predicted, participants were more likely to judge spaces as beautiful if they were curvilinear than rectilinear. Neuroanatomically, when contemplating beauty, curvilinear contour activated the anterior cingulate cortex exclusively, a region strongly responsive to the reward properties and emotional

salience of objects. Complementing this finding, pleasantness—the valence dimension of the affect circumplex—accounted for nearly 60 % of the variance in beauty ratings. Furthermore, activation in a distributed brain network known to underlie the aesthetic evaluation of different types of visual stimuli covaried with beauty ratings. In contrast, contour did not affect approach-avoidance decisions, although curvilinear spaces activated the visual cortex. The results suggest that the well-established effect of contour on aesthetic preference can be extended to architecture. Furthermore, the combination of our behavioral and neural evidence underscores the role of emotion in our preference for curvilinear objects in this domain.
neuroaesthetics | design | curvature | habitat theory

Mathematik

WACHTER 2013

Kenneth W. Wachter, Steven N. Evans & David Steinsaltz, *The age-specific force of natural selection and biodemographic walls of death*. *PNAS* **110** (2013), 10141–10146.

W. D. Hamilton’s celebrated formula for the age-specific force of natural selection furnishes predictions for senescent mortality due to mutation accumulation, at the price of reliance on a linear approximation. Applying to Hamilton’s setting the full nonlinear demographic model for mutation accumulation recently developed by Evans, Steinsaltz, and Wachter, we find surprising differences. Nonlinear interactions cause the collapse of Hamilton-style predictions in the most commonly studied case, refine predictions in other cases, and allow walls of death at ages before the end of reproduction. Haldane’s principle for genetic load has an exact but unfamiliar generalization.

biodemography | hazard functions | senescence

Metallzeiten

MARAN 2001

Joseph Maran, *Political and religious aspects of architectural change on the upper citadel of Tiryns, The case of building T*. In: ROBERT LAFFINEUR & ROBIN HÄGG (Hrsg.), *Potnia – Deities and Religion in the Aegean Bronze Age, Proceedings of the 8th International Aegean Conference Göteborg, Göteborg University, 12–15 April 2000*. *Aegaeum* **22** (2001), 113–122.

Characteristic are the indications for the reference to the past as a means of legitimizing the existing political power. This may mark the beginning of the glorification of the palatial era and in this way anticipate phenomena, which would become conspicuous during the Iron Age,⁵² the main difference consisting in the fact, that the people in the 12th century B.C. did not appeal to a mythical past, but rather to a past they still knew very well. If our interpretation is correct the specific way of turning to the past reflects the weakness of rulership. Although the mere existence of the place of the throne suggests a social hierarchy still focussing on one person, and although this person probably had the responsibility of carrying out cultic activities in the public, the actual power and political authority of this ruler were limited and his position rather fragile. He may still have claimed the title wanax,⁵³ but clearly, the days of the strong king of this designation had gone forever, and the process leading to the basileus of the Iron Age had begun.

MARAN 2004

Joseph Maran, *Wessex und Mykene, Zur Deutung des Bernsteins in der Schachtgräberzeit Süd Griechenlands*. In: BERNHARD HÄNSEL & ETELA STUDENÍKOVÁ (Hrsg.), *Zwischen Karpaten und Ägäis, Neolithikum und Ältere Bronzezeit, Gedenkschrift für Viera Němejcová-Pavůvková*. Studia honoraria 21 (Rahden 2004), 47–65.

As part of an investigation of the factors behind the sudden appearance of amber artefacts in the Peloponnesus at the beginning of the Mycenaean era, the archaeological context of these objects as well as how they were worn and their possible conceptual significance are discussed. Although amber reached Greece during the Shaft Grave period presumably as secondary goods accompanying the tin trade linking Southern England, via Western Europe and the Central Mediterranean with the Peloponnesus, a great importance was attached to amber both in Wessex and Mycenae. It is argued that amber prized by the highest social stratum during the Shaft Grave period because it was possessed a supernatural significance. This throws a new light on the frequent grave gift of amber necklaces in early Mycenaean warrior graves and could explain why, in one case at least in the shaft graves of Mycenae, the amber beads are not part of a necklace, functioning perhaps like the sword pendants of the Early Middle Ages.

Im Rahmen einer Untersuchung der Hintergründe des unvermittelten Auftretens von Bernsteinobjekten am Beginn der mykenischen Zeit auf der Peloponnes werden der Fundkontext dieser Objekte, das Problem ihrer Trageweise sowie die mögliche Bedeutung in der Vorstellungswelt der damaligen Oberschicht erörtert. Auch wenn Bernstein in der Schachtgräberzeit Griechenland vermutlich nur als Begleiterscheinung eines Zinnhandels, der Südengland über Westeuropa und den Zentralmitteleuropa mit der Peloponnes verbunden hat, erreichte, so wurde besonders Halsschmuck aus Bernstein in Wessex und Mykene eine außerordentlich große Bedeutung beigemessen. Es wird argumentiert, daß Bernstein in der Schachtgräberzeit vor allem deshalb ein Privileg der obersten Gesellschaftsschicht bildete, weil diesem Material übernatürliche Wirkung zugeschrieben wurde. Dies wirft ein neues Licht auf die häufige Beigabe von Bernsteinketten in frühmykenischen Kriegergräbern und könnte erklären, warum in den Schachtgräbern von Mykene zumindest in einem Fall eine Bernsteinperle nicht als Kettenglied, sondern in einer ähnlichen Weise wie frühmittelalterliche Schwertanhänger verwendet worden sein könnte.

MARAN 2012

Joseph Maran, *Architektonischer Raum und soziale Kommunikation auf der Oberburg von Tiryns, Der Wandel von der mykenischen Palastzeit zur Nachpalastzeit*. In: FELIX ARNOLD, ALEXANDRA BUSCH, RUDOLF HAENSCH & ULRIKE WULF-RHEIDT (Hrsg.), *Orte der Herrschaft, Charakteristika von antiken Machtzentren*. Menschen – Kulturen – Traditionen; Forschungscluster 3 3 (Rahden 2012), 149–162.

Using the upper citadel of Tiryns as a case study this contribution aims at understanding aspects of the interplay between architecture, imagery and social practice during the final Mycenaean palatial period and interpreting the changes in the configuration of political space in the aftermath of the palace's destruction. Arguments are presented that allow an attribution of the great women's procession fresco to the central part of the palace, i.e. the area of the great court and the great megaron. Even if at first sight the centre of power remained the same before and after 1200 B.C., the intended use of the upper citadel must have changed significantly. While ritual practices of the palatial period had a centripetal direction,

with increasing exclusivity of participants and screened by high walls, culminating in the great megaron and its court, the post-palatial reorganization abandoned the emphasis on centrality as well as the use of decorative imagery. Instead, it attempted to ensure the visibility of social practices, in order to draw on the integrative power of rituals.

Der Beitrag zielt darauf ab, am Beispiel der Oberburg von Tiryns Aspekte des Zusammenspiels zwischen Architektur, Bildern und sozialem Handeln in der ausgehenden mykenischen Palastzeit zu erfassen und die Veränderungen, die sich nach der Zerstörung des Palastes, in der Ausgestaltung des politischen Raumes ergeben haben, nachzuvollziehen und zu interpretieren. Es werden Argumente vorgestellt, die es erstmalig ermöglichen, eine Anbringung des Freskos der Großen Frauenprozession in dem aus Großem Hof und Großem Megaron bestehenden zentralen Teil des Palastes wahrscheinlich zu machen. Auch wenn vordergründig das Zentrum der Macht vor und nach 1200 v. Chr. das gleiche blieb, muss sich die Intention der Nutzung der Oberburg markant verändert haben. Dem zentripetal ausgerichteten palastzeitlichen rituellen Handeln, das in immer größerer Exklusivität der Teilnehmer und von hohen Mauern abgeschirmt im Großen Megaron und seinem Hof kulminierte, stand eine nachpalastzeitliche Neugestaltung gegenüber, bei der auf die Betonung der zentripetalen Wegführung ebenso verzichtet wurde wie auf Bilderschmuck. Stattdessen strebte man an, die Sichtbarkeit sozialer Handlungen zu gewährleisten, um sich der integrativen Kraft von Ritualen zu bedienen.

Methoden

AUSTIN 2013

Christine Austin et al., *Barium distributions in teeth reveal early-life dietary transitions in primates*. [nature 498 \(2013\), 216–219](#).

[n498-0216-Supplement1.pdf](#)

Christine Austin, Tanya M. Smith, Asa Bradman, Katie Hinde, Renaud Joannes-Boyau, David Bishop, Dominic J. Hare, Philip Doble, Brenda Eskenazi & Manish Arora

Early-life dietary transitions reflect fundamental aspects of primate evolution and are important determinants of health in contemporary human populations^{1,2}. Weaning is critical to developmental and reproductive rates; early weaning can have detrimental health effects but enables shorter inter-birth intervals, which influences population growth³. Uncovering early-life dietary history in fossils is hampered by the absence of prospectively validated biomarkers that are not modified during fossilization⁴. Here we show that large dietary shifts in early life manifest as compositional variations in dental tissues. Teeth from human children and captive macaques, with prospectively recorded diet histories, demonstrate that barium (Ba) distributions accurately reflect dietary transitions from the introduction of mother's milk through the weaning process. We also document dietary transitions in a Middle Palaeolithic juvenile Neanderthal, which shows a pattern of exclusive breastfeeding for seven months, followed by seven months of supplementation. After this point, Ba levels in enamel returned to baseline prenatal levels, indicating an abrupt cessation of breastfeeding at 1.2 years of age. Integration of Ba spatial distributions and histological mapping of tooth formation enables novel studies of the evolution of human life history, dietary ontogeny in wild primates, and human health investigations through accurate reconstructions of breastfeeding history.

RICHTER 2013

Jürgen Richter, *Bewusste geometrische Gestaltung bei Homo heidelbergensis? Arbeitsschrittanalyse an einem Faustkeil aus Bad Salzungen*

(*Ostwestfalen-Lippe*). *Archäologisches Korrespondenzblatt* **43** (2013), 1–17.

The hand axe from Bad Salzuflen (Kr. Lippe) is probably one of the oldest – if not oldest – artefacts discovered in EastWestphalia and the whole of Westphalia so far. This single find of an intricately manufactured tool provided the occasion for a standardised analysis of production process allowing a clear characterisation of the technological properties and formula of the hand axe. It is a symmetrical flat-convex reworked hand axe of the group “biface-outil” with functional edges as point, for sharpening, cutting, scratching and splitting. The geometrical concept of the hand axe combines two different figures: a pointed part in the shape of a cut open (half) pyramid and a basis part in the shape of a flat cuboid or cylinder. Two alternating thinning strokes were applied in order to connect these two figures. This suggests that the manufacturer was familiar with the described geometrical conception. Typological and technological comparison leads to an age estimation of the hand axe of 350,000-300,000 years and therefore provides an insight into the conceptual and technical abilities of the late *Homo heidelbergensis* at the transition to the early Neanderthal man. If this hand axe lacking stratigraphical context, is dated correctly it is a rare evidence of the Acheulian in Central Europe. At the same time, it demonstrates the use of a technological medium of design indicating the conscious perception of a geometrical problem. Translation: M. Struck

Beim Faustkeil von Bad Salzuflen (Kr. Lippe) handelt es sich wohl um eines der ältesten – wenn nicht das älteste – Artefakte, das bisher in Ostwestfalen bzw. ganz Westfalen zutage kam. Der Einzelfund dieses komplex gearbeiteten Faustkeils dient als Anlass dafür, eine standardisierte Form der Arbeitsschrittanalyse vorzustellen, die eine genaue Charakterisierung der technologischen Eigenheiten und der Rezeptur des Faustkeils ermöglicht. Es handelt sich um einen symmetrischen, plan-konvex formüberarbeiteten Faustkeil der Gruppe “biface-outil” mit Arbeitskanten für die Funktionen Spitze/Schneiden, Schaben und Trennen. Das geometrische Konzept des Faustkeils kombiniert zwei verschiedene Körper: einen Spitzenteil in der Form einer aufgeschnittenen (halben) Pyramide und einen Basisteil in der Form eines plattigen Quaders oder Zylinders. Zur Überbrückung der beiden Körper wurden eigens zwei alternierende Verdünnungsschläge angelegt, die vermuten lassen, dass die geometrische Konzeption dem Hersteller bewusst war. Nach formenkundlichen und technologischen Vergleichen entstand der Faustkeil wahrscheinlich vor 350 000-300 000 Jahren und gibt damit Einblick in die konzeptuellen und technischen Fähigkeiten der spätesten Vertreter des *Homo heidelbergensis*, nahe dem zeitlichen Übergang zu den frühen Neandertalern. Wenn die Datierungshypothese für diesen ohne stratigraphischen Kontext aufgefundenen Faustkeil richtig ist, handelt es sich um eines der seltenen Zeugnisse des Acheuléens in Mitteleuropa. Zugleich zeigt der Faustkeil den Einsatz eines technologischen Gestaltungsmittels, das auf die bewusste Wahrnehmung eines geometrischen Problems schließen lässt. Der älteste Faustkeil der Welt ist 1,76 Millionen Jahre alt und wurde kürzlich in Kokiselei, West Turkana (Kenia), gefunden (Lepre u. a. 2011). Faustkeile gelten als die kennzeichnende Artefaktform des Acheuléens (Altpaläolithikum; Überblick: Baales 2006; Haidle / Pawlik 2011), dessen Beginn nun mit dem Neufund aus Kenia auf fast 1,8 Millionen Jahre vor heute datiert wird, und dessen Ende um 300 000 Jahre vor heute vermutet wird (Richter 2011). Auch im Mittelpaläolithikum (ca. 300 000 bis ca. 40 000 BP) gibt es noch Faustkeile.

Faustkeile begleiteten also für viele Jahrhunderttausende die Entwicklung der frühen Menschen und – in Afrika – wohl auch der frühesten modernen Menschen. Ihre wechselnde Gestalt und die Komplexität ihrer Bearbeitung wurden deshalb häufig als Belege für die kognitive und technische Entwicklung der frühen Menschen

herangezogen (z. B. Klix 1993, 69).

Merkmale, die vergleichend untersucht wurden, waren hierbei vor allem die Form und die Umrisslinien der Faustkeile (z. B. Wymer 1968, Abb. 27). Erst später trat die technische Rezeptur der Faustkeile in den Vordergrund der Betrachtung. Als methodisches Mittel entwickelte sich hierzu die Arbeitsschrittanalyse zur Erforschung von Operationsketten.

Neolithikum

ASOUTI 2013

Eleni Asouti & Dorian Q. Fuller, *A Contextual Approach to the Emergence of Agriculture in Southwest Asia, Reconstructing Early Neolithic Plant-Food Production*. *Current Anthropology* **54** (2013), 299–345.

[CurrAnth54-299-Supplement1.pdf](#)

The scale and nature of early cultivation are topics that have received relatively limited attention in research on the origins of agriculture. In Southwest Asia, one of the earliest centers of origin worldwide, the transition to food production is commonly portrayed as a macroevolutionary process from hunter-gatherer through to cultivator-forager and farming stages. Climate change, resource intensification, sedentism, rising population densities, and increasing social complexity are widely considered by prehistorians as pivotal to the emergence of protoagricultural village life. In this paper we revisit these narratives that have been influenced by culture-history and social evolution, together forming the dominant theoretical paradigms in the prehistory of Southwest Asia. We propose a complementary contextual approach seeking to reconstruct the historical development of Early Holocene plant-food production and its manifold sociocultural environments by intersecting multiple lines of evidence on the biology of plant domestication, resource management strategies, settlement patterns, cultivation and harvesting technologies, food storage, processing and consumption, ritual practices and symbolic behaviors. Furthermore, we propose that early plant-food production in Southwest Asia should be dissociated from ethnographically derived notions of sedentary village life. Plants emerge as important components of community interactions and ritual performances involving suprahousehold groups that were mediated through communal food consumption.

HILLMAN 1990

Gordon C. Hillman & M. Stuart Davies, *Measured Domestication Rates in Wild Wheats and Barley Under Primitive Cultivation, and Their Archaeological Implications*. *Journal of World Prehistory* **4** (1990), 157–222.

Man's (or, more probably, Woman's) first cereal crops were sown from seed gathered from wild stands, and it was in the course of cultivation that domestication occurred. Experiments in the measurement of domestication rates indicate that in wild-type crops of einkorn, emmer, and barley under primitive systems of husbandry: (a) domestication will occur only if they are harvested when partially or nearly ripe, using specific harvesting methods; (b) exposure to shifting cultivation may sometimes have been required; and (c) under these conditions, the crops could become completely domesticated within 200 years, and perhaps only 20-30 years, without any conscious selection. This paper (a) considers possible delays in the start of domestication due to early crops of wild-type cereals lacking domestic-type mutants; (b) examines the husbandry practices necessary for these mutants to enjoy any selective advantage; (c) considers the state of ripeness at

harvest necessary for the crops to respond to these selective pressures; (d) outlines field measurements of the selective intensities arising from analogous husbandry practices applied experimentally to living wild-type crops; (e) summarizes a mathematical model which incorporates the measured selective intensities and other key variables and which describes the rate of increase in domestic-type mutants in early populations of wild-type cereals under specific combinations of primitive husbandry practices; (f) considers why very early cultivators should have used those husbandry methods which, we suggest, led unconsciously to the domestication of wild wheats and barley; and (g) considers whether these events are likely to leave archaeologically recognizable traces.

Keywords: domestication rate; agricultural origins; einkorn wheat; emmer wheat; selection pressures.

YERKES 2013

Richard W. Yerkes & Ran Barkai, *Tree-Felling, Woodworking, and Changing Perceptions of the Landscape during the Neolithic and Chalcolithic Periods in the Southern Levant*. [Current Anthropology 54 \(2013\), 222–231](#).

Examination of 206 Neolithic and Chalcolithic bifaces from the southern Levant revealed that changes in form during the emergence of agropastoralism correlated with evolving land use practices, but new biface types also expressed altered social identities and perceptions of the environment. Nonfunctional groundstone pre-pottery Neolithic A (PPNA) bifaces seem to have served as social and status symbols, while flaked flint PPNA tranchet axes and chisels were used for carpentry rather than tree-felling. This pattern continued during the following early pre-pottery Neolithic B (EPPNB) period, but a new sharpening method, polishing, was used on a unique flint tranchet ax to strengthen its edge. By the MPPNB and LPPNB, heavier polished flint axes were used to clear forests for fields, grazing lands, wood fuel, and lumber. Sustainable forest management continued until the cumulative effects of tree-felling may have led to landscape degradation at the end of the PPNC. Adzes replace axes as heavy woodworking tools during the pottery Neolithic A (PNA) period, but by the PNB period, once again there are more carpentry tools than tree-felling bifaces. The trend is reversed again during the Chalcolithic, when the demand for fire wood, lumber, and cleared land seems to have increased during a time of emerging socioeconomic complexity.

Physik

DAVIS 2013

Tamara M. Davis, *Hydrogen wisps reveal dark energy*. [nature 498 \(2013\), 179–180](#).

Traces of hydrogen gas, detected over vast regions of space, have for the first time been used as a standard ruler to measure dark energy — the unknown cosmic energy that is causing the Universe’s expansion to speed up.

This spectacular result supports the idea that the simplest model of dark energy — that it is constant — really is the best one. It leaves astronomers in an interesting position. Just as particle physicists found the Higgs boson exactly where they expected to find it, cosmologists have found dark energy exactly where the simplest theory predicts it to be.

Meanwhile, I continue to be awed by the fact that humans are able to measure the distribution of hydrogen as it was more than 6 billion years before Earth formed, and to relate it to sound waves in the infant Universe by applying only simple

physical concepts, such as pressure and gravity, which also govern every day life on Earth. That fact further increases my confidence in the overall picture that cosmology has revealed, and is inspiration enough to continue efforts to figure out the remaining mysteries.

Religion

EGGERT 2003

Manfred K. H. Eggert, *Über das Sakrale in der Archäologie*. [Anzeiger des Germanischen Nationalmuseums 2003, 12–16](#).

Dieses sogenannte “naturvölkische Denken” – Kossack spricht auch von “magisch-animistischem” beziehungsweise “magisch-sympathetischem Denken” – ist nicht ethnographischer Erfahrung entsprossen, sondern selbst ein Relikt anthropologisch-evolutionistischer Stadientheorien des ausgehenden 19. Jahrhunderts. Wie üblich handelt es sich wiederum um eine Nachbarwissenschaft – in diesem Falle die Archäologie –, in der solche Konzepte und Theorien noch 75 Jahre später, überdies in einer recht ungewöhnlichen Mischung, vertreten werden.

Nicht allein die Religionsarchäologie, sondern die Archäologie insgesamt wird nur dann weiter in historisch und kulturanthropologisch relevante Bereiche vorstoßen, wenn sie ihre bisherige, in erheblichem Maße selbstgenügsame methodologische Orientierung aufbricht. Der Grund dafür liegt auf der Hand: In einem noch stärkeren Maße als andere Kulturwissenschaften ist die Archäologie in Fragen der Theoriebildung und Interpretation nicht “autark” und wird es auch niemals sein können. Für sie ist die Rezeption von Konzepten und Theorien aus anderen Disziplinen vielmehr von existentieller Bedeutung. Will sie die Grenzen des Materiellen ihres Sachgutes und ihrer Befunde überschreiten und – wie es ihrem Potential angemessen wäre – einen wichtigen Pfeiler im Gebäude der historisch-anthropologischen Wissenschaften bilden, dann muss sie sich diesen Wissenschaften weit stärker als bisher öffnen.

NATIONALMUSEUM 2003

Germanisches Nationalmuseum, *Tagungsbericht: Goldenes Sakralgerät der Bronzezeit*. [Anzeiger des Germanischen Nationalmuseums 2003](#).

Tobias Springer

Einführung in das Tagungsthema und Resümee der Beiträge

Manfred K. H. Eggert

Über das Sakrale in der Archäologie

Gabriele Zipf

Religion und Rituale in der Archäologie

Kocku von Stuckrad

Religion und Kalender: Systematische Überlegungen zur qualitativen Bestimmung von Zeit