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References

Afrika

Jesse 2004

Friederike Jesse, Stefan Kröpelin, Mathias Lange, Nadja Pöllath & Hubert Berke, *On the Periphery of Kerma, The Handessi Horizon in Wadi Hariq, Northwestern Sudan.* Journal of African Archaeology **2** (2004), 123–164.

Wadi Hariq is a complex valley system in the Northwest Sudan about 400 km west of the Nile. Stratigraphie investigations provide new data on the environmental and climatic history of the present-day hyperarid centre of the southeastern Sahara. Archaeological work there only started at the end of the 1990s , with a survey and excavations carried out as part of the multidisciplinary research project ACACIA of the University of Cologne. To date, 104 sites are known in the Wadi Hariq. Based on the pottery found at these sites, most can be attributed to the Handessi Horizon, the former Geometric Pottery Horizon, of the eastern Sahara. Geometric patterns, and also mat impressions, are characteristic of the Handessi Horizon (ca 2200 -1100 BC). The subsistence of these prehistoric inhabitants was based on the herding of cattle and small livestock. Transhumance cycles included areas further north (Laqiya region) and south (Wadi Howar), and perhaps even the Nile Valley has to be considered. Similar decorative patterns have been found in all these areas. Evidence of an even earlier human presence in the Wadi Hariq during the Holocene is provided by several sherds decorated with Dotted Wavy Line and Laqiya-type patterns as well as some fragments of rippled-ware pottery.

Keywords: Sahara | Northwestern Sudan | climate change | Holocene | Handessi Horizon | pottery | archaeozoology

Wright 2002

Marcia Wright, *Life and technology in everyday life, Reflections on the career of Mzee Stefano, master smelter in Ufipa, Tanzania.* Journal of African Cultural Studies **15** (2002), 17–34.

The life history and career of one master iron smelter, Mzee Stefano Malimbo of Ufipa in southwestern Tanzania, serves as the base for a retrieval of social history in the twentieth century. By paying special attention to the persistence of smelting, signaled by the reconstruction of his furnaces in 1936, this article explores the demand for the distinctive, large Fipa hoe in the light of economic activities at a time which, while still economically depressed in a global sense, was locally buoyant. The resulting perspective on everyday life calls for a fuller consideration of the ethnographic record of smelting as observed in its heyday and in subsequent demonstrations. A critical rereading of the documentation for smelting communities indicates that the prevailing culture and beliefs must be understood in the light of the dynamics of change in the social and economic context, the values of the community supporting smelting, and the ritual and performative aspects of the drama of transforming earth into iron. To restore smelting to everyday life is to accept multiple identities. The ethno-archaeologists spearheaded by Peter Schmidt must consequently be challenged on a number of scores, including their erasure of individuals whom they subsume into categories of craftsmen and ritualists rather than regard as men with choices and activities beyond iron-working. Mzee

Stefano belonged to the generation that saw Ufipa become overwhelmingly Catholic. Reaching the peak of his life in the 1930s, he was not only a smelter observing the traditional rituals of smelting, he was also an appointed sub-chief, blacksmith, farmer, and Catholic in good standing. The practice of Alltagsgeschichte must be rigorously critical of evidence and confront theoretical over-determination as need be if it is to reach its ultimate goal of conveying historically informed empathy.

Aktuell

Boddy 2016

Jessica Boddy, *Energy pulses reveal possible new state of memory.* science **354** (2016), 1089.

Transcranial magnetic stimulation brings latent working memories back to direct consciousness.

But neural activity for the uncued item quickly dropped to baseline, as if it had been forgotten, whereas the EEG signature of the cued item remained, a sign that it was still in working memory. Yet subjects could still quickly recall the uncued item when prompted to remember it a few seconds later.

The study doesn't address how synapses or other neuronal features can hold this second level of working memory, or how much information it can store. "It's a primitive early step in understanding how we bring things into mind," says UW cognitive neuroscientist Bradley Postle, a study co-author.

McLaughlin 2016

Kathleen McLaughlin, *Bringing Legends to Life.* science **354** (2016), 1094–1095.

Geneticist Li Hui believes a DNA database can authenticate mythical figures from before the dawn of China.

Maxmen 2016

Amy Maxmen, *The myth buster, Hans Rosling is on a mission to save the world from preconceived ideas.* nature **540** (2016), 330–333.

How could anyone hope to solve problems if they didn't understand the different challenges faced, for example, by Congolese subsistence farmers far from paved roads and Brazilian street vendors in urban favelas? "Scientists want to do good, but the problem is that they don't understand the world," Rosling says. "To me it was horrific to realize that business leaders had a more fact-based world view than activists and university professors."

Pinker says that Rosling made him think that "the decline in violence might be a part of an even bigger story about humans gradually making progress against other scourges of the human condition". Both have been criticized as being Polly annaish about the global situation in the face of tragedies such as the conflict in Syria. "People think that if you emphasize how things have gone well it is the same as saying no problems remain. That's not true," Pinker counters. "In fact, I strongly suspect that people are more motivated to reduce problems like poverty and violence if they think there is a good chance they can succeed."

"People like Hans Rosling face the criticism of being too superficial," explains Peter Hotez, a tropical-disease scientist at Baylor College of Medicine in Houston, Texas. "It's the dilemma of the public intellectual," he says, describing academics who bridge several disciplines rather than excel at one. Rosling says he never cared much about his academic reputation.

Roman 2016

Nancy Grace Roman, *Following my lucky star*. science **354** (2016), 1346.

About 30 years ago, while lunching with science faculty members during a campus visit, I was asked to what I attributed my success. My spur of the moment reply, "The ability to write and speak easily and well," surprised them. But I answered this way because many of the activities I engaged in during my 21-year career running NASA's astronomy program—justifying projects to my supervisors, Congress, and the Bureau of the Budget; meeting with the research community to spark interest in the possibilities of observations from space; speaking to lay audiences to excite them about basic science—required that I present my case clearly and concisely. I still believe that communication is important. But now that I've had more time to reflect, I realize that perseverance—or stubbornness—and a certain amount of luck were equally important.

Tuthill 2016

Matthew Tuthill, *Making a difference, differently*. science **354** (2016), 1194–1194.

Ten years ago, after 2 years as a postdoc, I found myself wondering whether I should take a different road. Up to that point, I had stuck to a pretty traditional path investigating cancer genetics, but the research grind had taken its toll and my interest was waning. At the same time, federal funding had flattened, and the scarcity of secure, long-term employment in academic research added to my dissatisfaction. So I decided to take the leap and leave the typical academic path to find a better match. Then came the hard part: identifying a new career that would nurture my passion for science and allow me to make an impact with my work. I found it in a place many would not expect: a 2-year community college.

Zellmer 2016

Amanda Zellmer, *Family-friendly science*. science **354** (2016), 1070.

A little more than a decade ago, as an aspiring scientist working toward my Ph.D., I spent an unfortunate number of hours debating with myself and discussing with my peers whether it was possible to have kids and be a successful scientist. As the media and, often, scientists themselves portrayed it, success in science meant spending all hours in the lab, neglecting family and skipping holiday dinners to attend to petri dishes. Despite my passion for nature, the prospect of those trade-offs made me question whether I was committed enough. This self-doubt only deepened when, near the completion of my graduate work, my announcement that I was pregnant prompted a warning to not let it affect my work.

Altpaläolithikum

Hawkes 2016

Kristen Hawkes, *Ethnoarchaeology and Plio-Pleistocene sites, Some lessons from the Hadza*. Journal of Anthropological Archaeology **44** (2016), 158–165.

Exploration and analyses of early archaeological sites and their faunal assemblages have grown increasingly sophisticated since the sites were first proposed to be home bases where ancestral hunters brought meat to share with their mates and offspring. Debates about that proposition motivated quantitative attention to hunting, scavenging, butchery and transport of big game among modern Hadza

and the faunal assemblage characteristics and archaeological sites they create. Findings prompted a hypothesis about competitive scavenging that might explain the character and ecological context of the early sites, a hypothesis since strengthened by consensus among archaeologists working at Olduvai that the sites are not home bases. Hadza carcass procurement rates calibrate estimates for ancestral populations without similar technology, underscoring the likelihood that other food resources were especially important in human evolution.

Keywords: Ethnoarchaeology | Hadza | Human evolution | Hominin diet

Melamed 2016

Yoel Melamed, Mordechai E. Kislev, Eli Geffen, Simcha Lev-Yadun & Naama Goren-Inbar, *The plant component of an Acheulian diet at Gesher Benot Ya'aqov, Israel.* PNAS **113** (2016), 14674–14679.

pnas113-14674-Supplement.xlsx

Diet is central for understanding hominin evolution, adaptation, and environmental exploitation, but Paleolithic plant remains are scarce. A uniquemacrobotanical assemblage of 55 food plant taxa from the Acheulian site of Gesher Benot Ya'aqov, Israel includes seeds, fruits, nuts, vegetables, and plants producing underground storage organs. The food plant remains were part of a diet that also included aquatic and terrestrial fauna. This diverse assemblage, 780,000 y old, reflects a varied plant diet, staple plant foods, environmental knowledge, seasonality, and the use of fire in food processing. It provides insight into the wide spectrum of the diet of mid-Pleistocene hominins, enhancing our understanding of their adaptation from the perspective of subsistence. Our results shed light on hominin abilities to adjust to new environments, facilitating population diffusion and colonization beyond Africa. We reconstruct the major vegetal foodstuffs, while considering the possibility of some detoxification by fire. The site, located in the Levantine Corridor through which several hominin waves dispersed out of Africa, provides a unique opportunity to study mid-Pleistocene vegetal diet and is crucial for understanding subsistence aspects of hominin dispersal and the transition from an African-based to a Eurasian diet.

Keywords: Acheulian | food plants | paleo diet | use of fire | seasonality

Significance: Our knowledge of the diet of early hominins derives mainly from animal skeletal remains found in archaeological sites, leading to a bias toward a protein-based diet. We report on the earliest known archive of food plants found in the superimposed Acheulian sites excavated at Gesher Benot Ya'aqov, Israel. These remains, some 780,000 y old, comprise 55 taxa, including nuts, fruits, seeds, vegetables, and plants producing underground storage organs. They reflect a varied plant diet, staple plant foods, seasonality, and hominins' environmental knowledge and use of fire in food processing. Our results change previous notions of paleo diet and shed light on hominin abilities to adjust to new environments and exploit different flora, facilitating population diffusion, survival, and colonization beyond Africa.

Anthropologie

Borel 2016

Antony Borel, Yohan Ajzenherc, Marie-Hélène Moncel, Michel Saint Jalme & Sabrina Krief, *Do Orangutans Share Early Human Interest in Odd Objects?* Current Anthropology **57** (2016), 828–837.

Archaeological discoveries suggest that human interest in odd objects emerged as early as the end of the Lower Paleolithic with Homo erectus, although it is still difficult to understand why early humans collected these objects. Several studies show that nonhuman primates are able to appreciate the physical characteristics of their tools, but their interest in the physical properties of nonutilitarian objects has, to our knowledge, never been tested. Here, objects of different brightness, color, and shape were proposed to five orangutans to test whether odd objects intrigue orangutans (Pongo pygmaeus) and whether they induce specific and noticeable behavior. This preliminary experiment shows that orangutans are responsive to the physical properties of nonutilitarian objects, particularly visually striking, bright, and colorful objects. Our experiment shows that these are the most manipulated pieces, regardless of their respective proportions. However, unlike (early) humans, orangutans did not show any tendency to preserve objects.

Collard 2016

Mark Collard, Lia Tarle, Dennis Sandgathe & Alexander Allan, *Faunal evidence for a difference in clothing use between Neanderthals and early modern humans in Europe*. Journal of Anthropological Archaeology **44** (2016), 235–246.

In this paper we report a study designed to shed light on the possibility that clothing differences played a role in the replacement of the Neanderthals by early modern humans. There is general agreement that early modern humans in Europe utilized specialized cold weather clothing, but the nature of the clothing used by Neanderthals is debated. Some researchers contend that they did not use clothes. Others argue that they were limited to cape-like clothing. Still others aver that their clothing was not substantively different in terms of thermal effectiveness from that of early modern humans. To test among these hypotheses, we employed a novel line of evidence—the bones of animals whose skins may have been made into clothing. We used an ethnographic database to identify mammalian families that were used to create cold weather clothing in the recent past. We then compared the frequency of occurrence of these families in European archaeological deposits associated with early modern humans and Neanderthals. We obtained two main results. One is that mammalian families used for cold weather clothing occur in both early modern human- and Neanderthal-associated strata. The other is that three of the families—leporids, canids, and mustelids—occur more frequently in early modern human strata than in Neanderthal strata. There is reason to believe that the greater frequency of canid and mustelid remains in early modern human strata reflects the use of garments with fur trim. Thus, these findings are most consistent with the hypothesis that Neanderthals employed only cape-like clothing while early modern humans used specialized cold weather clothing. We end by discussing the implications of this hypothesis for the debate about the replacement of the Neanderthals by early modern humans.

Keywords: Neanderthals | Early modern humans | Oxygen Isotope Stage 3 | Specialized cold weather clothing | Cape-like clothing | Mustelidae | Canidae | Mousterian | Aurignacian | Gravettian

Costopoulos 2016

Andre Costopoulos, *The Secret to Human Success Is Being Half-Smart and Half-Social*. Current Anthropology **57** (2016), 827.

This means that far from building on each other's work, we cannot all constantly be adopting and improving the most optimal solution we can observe around us at a given time. This would reduce the available diversity and reduce our probability of having a viable solution when faced with an unexpected challenge. We must be

quite convinced, under most circumstances, that our way is the right way, and we must be fairly tolerant of the ways of others as well as tolerant of the suboptimality of our own practices. We must think we are right and they are wrong, we must be interested enough in how wrong they are to be able to adopt their traits when faced with disaster, andwemust also let thembe. In otherwords,under most circumstances we must be fairly blind to optimality. At a certain threshold of catastrophe, wemust become highly plastic.

Lupo 2016

Karen D. Lupo & Dave N. Schmitt, *When bigger is not better, The economics of hunting megafauna and its implications for Plio-Pleistocene hunter-gatherers*. Journal of Anthropological Archaeology **44** (2016), 185–197.

JAnthArch44-185-Supplement.docx

Big game acquisition is viewed as pivotal in the evolution of early hominins and is often associated with the emergence of features that are hallmarks of Homo. We explore the energetic justification for the preference for big game under the premise that larger-sized prey is always more efficiently exploited than smaller-sized game. Using quantitative cost/benefit data derived from ethnographic, ethnoarchaeological and historic sources, we show that certain large-sized game (megafauna) are often more expensive to acquire than smaller-sized prey. Comparative analysis shows that African elephants (Loxodonta africana), the largest-sized terrestrial animal, are lower ranked and less efficient to acquire than many smaller-sized animals irrespective of their encounter rates. These data challenge the idea that prey body size can be used as a proxy for profitability and rank in zooarchaeological analyses. Prey profitability, especially for large-sized and costly taxa, is strongly influenced by prey characteristics relative to existing dispatch technology and the range of nonconsumptive benefits associated with hunting certain megafauna. Nonconsumptive rewards associated with these opportunities can only be gained by certain individuals and are not broadly available to everyone. We suggest that the idea of 'big game' specialization needs to be reframed in archaeology.

Keywords: Big game hunting | Prey-rank | Hunting technology | Foraging theory | Hunters and gatherers | Megafauna | Social niches

Mitteroecker 2016

Philipp Mitteroecker, Simon M. Huttegger, Barbara Fischer & Mihaela Pavlicev, *Cliff-edge model of obstetric selection in humans*. PNAS **113** (2016), 14680–14685.

The strikingly high incidence of obstructed labor due to the disproportion of fetal size and the mother's pelvic dimensions has puzzled evolutionary scientists for decades. Here we propose that these high rates are a direct consequence of the distinct characteristics of human obstetric selection. Neonatal size relative to the birth-relevant maternal dimensions is highly variable and positively associated with reproductive success until it reaches a critical value, beyond which natural delivery becomes impossible. As a consequence, the symmetric phenotype distribution cannot match the highly asymmetric, cliff-edged fitness distribution well: The optimal phenotype distribution that maximizes population mean fitness entails a fraction of individuals falling beyond the "fitness edge" (i.e., those with fetopelvic disproportion). Using a simple mathematical model, we show that weak directional selection for a large neonate, a narrow pelvic canal, or both is sufficient to account for the considerable incidence of fetopelvic disproportion. Based on this model, we predict that the regular use of Caesarean sections throughout the last decades has led to an evolutionary increase of fetopelvic disproportion rates by 10 to 20 %.

Keywords: cephalopelvic disproportion | human evolution | natural selection | obstructed labor | obstetric dilemma

Significance: Compared with other primates, human childbirth is difficult because the fetus is large relative to the maternal pelvic canal. It is a long-standing evolutionary puzzle why the pelvis has not evolved to be wider, thus reducing the risk of obstructed labor. We present a mathematical model that explains the high rates of fetopelvic disproportion by the discrepancy between a wide symmetric phenotype distribution and an asymmetric, "cliff-edged" fitness function. Only weak selection for a large newborn, a narrow pelvis, or both is necessary to account for the high incidence of fetopelvic disproportion. Because the regular use of Caesarean sections has reduced maternal mortality, the model predicts an evolutionary response of fetal or maternal dimensions, increasing the rates of fetopelvic disproportion.

Smith 2016

Richard J. Smith, *Darwin, Freud, and the Continuing Misrepresentation of the Primal Horde*. Current Anthropology **57** (2016), 838–843.

Sigmund Freud developed his evolutionary theory for the origin of the Oedipus complex in Totem and Taboo, published in 1913. This complex scenario, involving what Freud called "the primal crime" and its subsequent phylogenetic consequences, incorporated theories from a number of sources, including Charles Darwin. Freud claimed to have found in Darwin a proposal for the structure for early human social organization. Since then, "Darwin's primal horde" has endured in a variety of literatures that build on Freud's work. In this essay, "Darwin's primal horde" is reevaluated from the standpoint of Darwin's writing. Darwin's words were taken out of context and exaggerated. The primal horde is a concept that Darwin would not recognize, that he did not propose, and that misrepresents what he wrote. It is Freud's construction, not Darwin's. Modern authors should not cite Darwin when discussing "Darwin's primal horde."

Ubick 2014

Suzanne Ubick, *Grey cells or fat cells? A speculative hypothesis for the success of Homo sapiens*. Bachelor thesis, Berkeley (Berkeley 2014).

Explanations for the success of Homo sapiens in out-competing all other hominins have long been sought, especially our ability to displace and replace Homo neanderthalensis. Evidence is accumulating for the apparent close matching of these two species at the Upper Palaeolithic transition. Neither technology nor intellect seems to satisfactorily explain the puzzling success of a species apparently less well-fitted than Neanderthals to the European environment ≈45,000 years ago. One possible explanation lies in the realm of biology. Human females carry anomalous amounts of body fat compared to other primates and to nearly all other mammals, and female body fat percentage is correlated with fertility. I suggest that, while geographically confined to East Africa, Homo sapiens acquired the ability to accumulate large amounts of body fat under normal conditions, conferring an adaptive edge through increasing our species' lifetime reproductive success relative to that of Neanderthals.

Archäologie

Burmeister 2013

Stefan Burmeister, *Migration und Ethnizität, Zur Konzeptualisierung von Mobilität und Identität*. In: Manfred K. H. Eggert &

Ulrich Veit (Hrsg.), *Theorie in der Archäologie, Zur jüngeren Diskussion in Deutschland*. Tübinger Archäologische Taschenbücher 10 (Münster 2013), 229–267.

Both migration and ethnicity are archaeological key concepts which have decisively shaped German archaeological research. As a rule, neither migration nor ethnicity have been objects of analysis in their own right. Rather, they were axiomatic preconditions for explaining observed phenomena. As shown for the archaeology of the Early Middle Ages, both concepts are closely interwoven. Ethnic interpretation of archaeological evidence often provides the methodological basis for an archaeological proof of migration. Methodological and theoretical relections of both key concepts are only little pronounced. After all, in the last 15 years clear developments are noticeable. Against all expectations positive impulses are not directed by the Anglo-American debate but rather by the German, and above all, the Austrian historical science.

'Migration' und 'Ethnizität' sind archäologische Schlüsselkonzepte, die die deutschsprachige archäologische Forschung nachhaltig prägten. In der Regel ist weder Migration noch Ethnizität selbst Gegenstand der Untersuchung, vielmehr handelt es sich hierbei um axiomatische Voraussetzungen, um beobachtete Phänomene zu erklären. Wie am Beispiel der Frühmittelarchäologie dargestellt wird, sind beide Begriffe eng miteinander verwoben, liefert die ethnische Deutung archäologisch erschlossener Sachverhalte doch meist die methodische Grundlage des archäologischen Wanderungsnachweises. Die methodische und theoretische Relexion beider Schlüsselkonzepte ist wenig ausgeprägt, doch sind hier in den letzten 15 Jahren deutliche Entwicklungen zu erkennen. Positive Impulse gehen wider Erwarten weniger von der englischsprachigen Diskussion aus als vielmehr von der deutschsprachigen, vornehmlich österreichischen Geschichtswissenschaft.

Cunningham 2016

Jerimy J. Cunningham & Scott MacEachern, *Ethnoarchaeology as slow science*. World Archaeology (2016), preprint, 1–14. DOI:10.1080/00438243.2016.1260046.

In recent years, the purpose and objectives of ethnoarchaeology have been called into question. In this paper, we propose that ethnoarchaeology might best be considered a form of 'slow science' that works to counterbalance 'big science/fast science' approaches in archaeology. We consider the interpretative challenges facing archaeology and the risks posed by a shift to fast science approaches that emphasize large-scale, strategic and analytically focused 'big data' analyses. We draw on recent literatures that define 'désexcellence' and 'slow science' approaches, which forefront ethically driven and collaborative research, and suggest that ethnoarchaeology might be well positioned to redefine itself as a form of slow science. Doing so, however, requires redefining ethnoarchaeology's field objectives and its relations to research subjects.

Keywords: Ethnoarchaeology | slow science | Africa | analogy | big science

Eggert 2013

Manfred K. H. Eggert & Ulrich Veit (Hrsg.), *Theorie in der Archäologie, Zur jüngeren Diskussion in Deutschland*. Tübinger Archäologische Taschenbücher 10 (Münster 2013).

Gosselain 2016

Olivier P. Gosselain, *To hell with ethnoarchaeology!* Archaeological Dialogues **23** (2016), 215–228.

This paper is a charge against ethnoarchaeology. Deliberately provocative, it aims at highlighting the flaws and ideological pitfalls of a sub-discipline whose actual contribution to archaeology remains hardly decipherable. Beside a methodological deficiency and the frequent narrow-mindedness of the research agenda, ethnoarchaeology suffers from two major problems. First, it carries implicitly an old evolutionary – and racist – ideology that divides the world between modern Western societies (inappropriate for ethnoarchaeological research) and premodern exotic societies (well fitted for ethnoarchaeological research). Second, the quest for universal models of interpretation leads ethnoarchaeologists to play down historical contingency and cultural specificities, which not only deprive them of a good understanding of the ethnographical contexts, but also contribute to restricting ethnoarchaeological applications to a mere quest for similarities (or dissimilarities) in the material record. The problems are too profound to justify an umpteenth salvage of the sub-discipline. Rather, the proposition is to get rid of ethnoarchaeology once and for all, and join forces with other, more serious, disciplines.
Keywords: ethnoarchaeology | archaeological method and theory | ideology | history | material culture

Hofmann 2013
Kerstin P. Hofmann, *Gräber und Totenrituale, Zu aktuellen Theorien und Forschungsansätzen*. In: Manfred K. H. Eggert & Ulrich Veit (Hrsg.), *Theorie in der Archäologie, Zur jüngeren Diskussion in Deutschland*. Tübinger Archäologische Taschenbücher 10 (Münster 2013), 269–298.

Bibel

Brettler 1991
Marc Brettler, *The Structure of 1 Kings 1–11*. Journal for the Study of the Old Testament **16** (1991), 49, 87–97.
Through the use of formal markers, specifically the similarity between 1 Kgs 3.1–2 and 9.24–25, it is possible to divide the Solomon pericope into three sections. These are 1 Kgs 1–2, 'Solomon's accession to the throne', 3.3–9.23, 'Solomon serves YHWH and is blessed' and 9.26–11.49, 'Solomon violates Deuteronomy 17.14-17 and is punished'. The boundary proposed for the last unit suggests that the editor of 1 Kgs 9.26–11.10 recast pro-Solomonic material in a new framework and wrote or revised material concerning Solomon's foreign wives with conscious reference to the law of the king in Deuteronomy.

Compston 1919
H. F. B. Compston, *The Inscription on the Stele of Mesha Commonly Called The Moabite Stone, The text in Moabite and Hebrew with translation*. Texts for Students 9 (London 1919).

Elat 1975
M. Elat, *The Campaigns of Shalmaneser III against Aram and Israel*. Israel Exploration Journal **25** (1975), 25–35.
The dissolution of the alliance of 'the twelve kings of the seacoast' began with the murder of Ben-hadad at the hands of Hazael and the latter's ascent to the throne, events described in 2 Kings 8:12-15, and hinted at in Assyrian inscriptions cited here.

Not only the kingdom of Israel seceded from the alliance led by the kingdom of Aram-Damascus; all the other members also left. The inscriptions of Shalmaneser relating to the campaign of his eighteenth year no longer mention the alliance of 'the twelve kings of the seacoast', but only 'Hazael, son of nobody', king of Damascus.

At the battle of Qarqar the kingdoms of Hamath and Israel provided more than two thirds of the allied forces ranged against Shalmaneser, and Israel's chariot force alone was equal to that of the Assyrians. The army of Aram-Damascus alone, how ever, was smaller than the army of the Assyrians which, in the twentieth year of Shalmaneser's reign, included 2,001 chariots and 5,242 'cavalry horses'. Even if we assume that Aram's chariot and cavalry force increased after the battle of Qarqar and exceeded 1,200 chariots and 1,200 'cavalry horses', it cannot be thought that the twelve-year period that elapsed between the two engagements would have brought about an equalization between Aram's chariot and cavalry forces and those of the Assyrians.

The revealing figures relating to the size of the Syrian and Assyrian forces given in Shalmaneser III's inscriptions offer an explanation of Shalmaneser's failure at the battle of Qarqar in the sixth year of his reign and of the subsequent failure of campaigns conducted in his tenth, eleventh and fourteenth years, during which he pitted himself against the army of the Syrian-Israelite alliance; they also explain why he succeeded in campaigns fought in his eighteenth and twenty-first years,40 for by then the alliance had collapsed and it was only the army of Aram-Damascus which opposed him.

Finkelstein 2015

Israel Finkelstein, *History of Ancient Israel, Archaeology and the Biblical record – the view from 2015*. Rivista Biblica **63** (2015), 371–392.

In this study on the relationship between archaeology and the biblical text, the author explains a sort of "via media" which allows the reconstruction of the history of Israel without falling into either maximalism or minimalism. Combining modern archaeological techniques with the theories that come from the Annales school for the study of history, the author applies these principles to the dating of archaelogical sites; to the transmission of the traditions of Israel and Judah; to the a memory of the oral traditions connected with characters such as Saul or David and ancient sanctuaries; and, finally, to the theological re-elaboration of the Israelite traditions edited during the reign of Jeroboam II (750 B.C.) and brought to Jerusalem around 720 B.C. with the refugees of the Northern kingdom. Here, they would have been taken up into the pan-Israelite vision which arose during the reign of Hezekiah and which reached its highest form during that of Josiah. Finally, further development of this material would have taken place, not so much in the obscurity of the depressed Persian period but during the Hasmonean age.

The biblical description of the history of Ancient Israel includes old "memories" which go back as early as the terminal phase of the second millennium (in the case of Shiloh, for instance) and perhaps even earlier, if Exodus preserves a reference to the expulsion of Asiatics from the Nile Delta in the 16th century BCE. Most of these early memories come from the North. This should come as no surprise as Israel was more densely inhabited than Judah, more developed economically, better connected to trade routes and events in the lowlands and better incorporated in the geo-political scene of the Levant. As a result the North developed advanced writing abilities earlier than the South. But Judah, too, preserved early traditions, for instance in the story of David as a leader of an Apiru band which acted on the southern fringe of the kingdom.

From the ideological and theological perspectives, biblical history begins in 720 BCE, with the fall of Israel. Judah and Israel – kingdoms very different from each other in terms of the environmental conditions and nature of population – had some common characteristics in their culture, such as language, features of material culture and cult. With the fall of Israel and the migration of many Israelites to Jerusalem and Judah, the demographic make-up of the Southern Kingdom altered dramatically, in the sense that Israelites became a large portion of its population. Judah now conceived of itself as the inheritor and preserver of the shared tradition of the two Hebrew kingdoms and took the vacant name of the North – Israel – to describe the united nation under its rule. This is the time when the pan-Israelite ideology developed for the first time; it promoted two messages, that all Israelites must accept the rule of the Davidic dynasty and the dominance of Jerusalem with its Temple. For a century these ideas were advanced within Judah, among the mix Israelite-Judahite population – a sort of United Monarchy within. And as part of efforts to "make" a new Israel in Judah, Israelite traditions were incorporated into the Judahite texts, but were subjected to Judahite ideological goals. Only with the withdrawal of Assyria in the late 7th century – during the rule of Josiah – were these ideas "exported " to the ex-Israelite territories as an updated ideology, according to which all Hebrews who lived both in Judah and in the territory of the fallen Israel, "from Dan to Beer-sheba", were required to accept the Davidides and the Jerusalem Temple in order to be part of Beney Israel.

Keywords: History of Israel | Archaeology and Bible | Hezekiah | Josiah | Shiloh | Jeroboam II

Flusser 1964

David Flusser, *"Do Not Commit Adultery", "Do Not Murder"*. Textus **4** (1964), 220–224.

In the Massoretic and the Samaritan versions of the Pentateuch the order of the two commandments under review is: "do not murder", "do not commit adultery", whereas in the LXX and in other authorities, the order is: "do not commit adultery", "do not murder".

(Matthew 5: 21-30): "You have heard that it was said to the men of old: Do not murder... You have heard that it was said: Do not commit adultery..." I see no cause for doubting that Matthew here reflects the original sequel of Jesus' exposition of the Law. Thus there are strong reasons for believing that Jesus did follow the Massoretic order: "do not murder", "do not commit adultery", and not the reverse sequence which is reflected inter alia in the Nash Papyrus and the Old Greek.

Frisch 1991

Amos Frisch, *Structure and Its Significance, The Narrative of Solomon's Reign (1 Kings 1–12.24)*. Journal for the Study of the Old Testament **16** (1991), 51, 3–14.

After detailed observations on K.I. Parker's thesis ('Repetition as a Structuring Device in 1 Kings 1-11', JSOT 42 (1988], pp. 19-27), another theory about the structure of the narrative of Solomon's reign in Kings (NSR) is presented. In the light of literary-theological considerations, the scope of NSR is held to be 1 Kings 1.1-12.24. The narrative consists of 9 units arranged in a concentric structure, at the centre of which stands the description of the Temple (6.1-9.9). This structure not only emphasizes the Temple, but also suggests criticism of Solomon after the focal unit, at first implied and then (from 11.1) explicit. The contrast between the last units and their parallels gives weight to the concept of reward and punishment:

Solomon's s loyalty to God yields blessings, whereas disloyalty causes misfortunes climaxing with his son losing his rule over the tribes of Israel.

Tadmor 1961

H. Tadmor, *Que and Muṣri*. Israel Exploration Journal **11** (1961), 143–150.

Accordingly Miṣrayim mentioned in 1 Kings x, 28: **ומוצא הסוסים אשר לשלמה ממצרים ומקוה** and in 2 Kings vii, 6: **החתים ואת מלכי מצרים** was often taken to represent the northern Muṣri. It is the purpose of this paper to re-examine the evidence for equating Gua and Muṣri with Cilicia and the Cappadocian Muṣri.

Sidney Smith placed Muṣri in the area of Sulaimaniya, whereas Forrer identified it with šad Muṣri, the range of Jebel Maqlub, about 30 miles north-east of Nineveh. This Trans-Tigridian Muṣri was conquered by the Assyrians in the twelfth century B.C., revolted, and was reconquered by Ashurdan II. When it appears in the Sargonid period, it is already an integral part Assyria proper. This being so, every reference in the Assyrian records foreign country Muṣri/Muṣur from the tenth century B.C. onwards should taken as referring exclusively to Egypt.

Biologie

Griffin 2016

Christopher T. Griffin & Sterling J. Nesbitt, *Anomalously high variation in postnatal development is ancestral for dinosaurs but lost in birds*. PNAS **113** (2016), 14757–14762.

Compared with all other living reptiles, birds grow extremely fast and possess unusually low levels of intraspecific variation during postnatal development. It is nowclear that birds inherited their high rates of growth from their dinosaurian ancestors, but the origin of the avian condition of low variation during development is poorly constrained. The most well-understood growth trajectories of later Mesozoic theropods (e.g., Tyrannosaurus, Allosaurus) showsimilarly low variation to birds, contrasting with higher variation in extant crocodylians. Here, we show that deep within Dinosauria, among the earliest-diverging dinosaurs, anomalously high intraspecific variation is widespread but then is lost in more derived theropods. This style of development is ancestral for dinosaurs and their closest relatives, and, surprisingly, this level of variation is far higher than in living crocodylians. Among early dinosaurs, this variation is widespread across Pangaea in the Triassic and Early Jurassic, and among early-diverging theropods (ceratosaurs), this variation is maintained for 165 million years to the end of the Cretaceous. Because the Late Triassic environment across Pangaea was volatile and heterogeneous, this variation may have contributed to the rise of dinosaurian dominance through the end of the Triassic Period.

Keywords: ontogeny | variation | dinosaur | Triassic | extinction

Significance: Birds—the fastest growing terrestrial vertebrates—develop unlike all other living reptiles. As part of this postnatal developmental mode, birds possess a low amount of intraspecific variation, and the timing of the origin of this low variation is poorly constrained. By studying well-sampled growth series of nonavian dinosaurs and their closest relatives, we were able to identify this transition within Mesozoic theropod dinosaurs. Surprisingly, the earliest dinosaurs and their close relatives possessed an extremely high amount of variation, higher than either crocodylians or birds. This high variation is the ancestral dinosaurian scheme and was lost in more derived nonavian theropods, including Allosaurus and Tyrannosaurus. High variation could have contributed to the rise of dinosaurian dominance during the Triassic–Jurassic mass extinction.

Energie

Louwen 2016

Atse Louwen, Wilfried G. J. H. M. van Sark, André P. C. Faaij & Ruud E. I. Schropp, *Re-assessment of net energy production and greenhouse gas emissions avoidance after 40 years of photovoltaics development.* Nature Communications **7** (2016), 13728. DOI:10.1038/ncomms13728.

NatComm07-13728-Supplement.pdf

Since the 1970s, installed solar photovoltaic capacity has grown tremendously to 230 gigawatt worldwide in 2015, with a growth rate between 1975 and 2015 of 45 %. This rapid growth has led to concerns regarding the energy consumption and greenhouse gas emissions of photovoltaics production. We present a review of 40 years of photovoltaics development, analysing the development of energy demand and greenhouse gas emissions associated with photovoltaics production. Here we show strong downward trends of environmental impact of photovoltaics production, following the experience curve law. For every doubling of installed photovoltaic capacity, energy use decreases by 13 and 12 % and greenhouse gas footprints by 17 and 24 %, for poly- and monocrystalline based photovoltaic systems, respectively. As a result, we show a break-even between the cumulative disadvantages and benefits of photovoltaics, for both energy use and greenhouse gas emissions, occurs between 1997 and 2018, depending on photovoltaic performance and model uncertainties.

Isotope

Tsutaya 2016

Takumi Tsutaya, Akina Shimomi, Shiori Fujisawa, Kazumichi Katayama & Minoru Yoneda, *Isotopic evidence of breastfeeding and weaning practices in a hunter-gatherer population during the Late/Final Jomon period in eastern Japan.* Journal of Archaeological Science **76** (2016), 70–78.

JAS076-0070-Supplement1.docx, JAS076-0070-Supplement2.kml

Jomon hunteregatherers in Japan commonly show Neolithic characteristics, such as intensive utilization of potteries, grinding stones, and many plant food sources. In this study, breastfeeding and weaning practices in a Jomon hunteregatherer population are investigated to evaluate two hypotheses concerning the relations between utilization of potteries/plant foods and early weaning and children's diet around and after the weaning process. Stable carbon and nitrogen isotope ratios were investigated for 46 subadult and 47 adult human skeletons excavated from the Yoshigo site of the Late/Final Jomon period (approximately 4000–2300 years BP) in eastern Japan. A new analytical procedure was developed and residuals of nitrogen isotope ratios were calculated to cancel out the effect of positive correlation in the carbon and nitrogen isotope ratios. Age changes in the residuals showed that the age at the end of weaning in the Yoshigo population was 3.5 years (2.3–5.5 years in 95 % credible interval), which is not younger than that in typical non-industrialized populations and the other skeletal hunteregatherer populations. Furthermore, most infants were probably weaned using a combination of the same food sources as those eaten by adults. These results suggest that the utilization of pottery and plant food per se is not a sole determinant of the age at the end of weaning in past human populations, and a special diet was not always applied during and just after the weaning process.

Keywords: Breastfeeding | Carbon and nitrogen stable isotope analysis | Diet | Hunteregatherer | Subadult | Weaning | Yoshigo site

Klima

d'Alpoim Guedes 2016

Jade A. d'Alpoim Guedes, Stefani A. Crabtree, R. Kyle Bocinsky & Timothy A. Kohler, *Twenty-first century approaches to ancient problems, Climate and society*. PNAS **113** (2016), 14483–14491.

By documenting how humans adapted to changes in their environment that are often much greater than those experienced in the instrumental record, archaeology provides our only deep-time laboratory for highlighting the circumstances under which humans managed or failed to find to adaptive solutions to changing climate, not just over a few generations but over the longue dur ' ee. Patterning between climatemediated environmental change and change in human societies has, however, been murky because of low spatial and temporal resolution in available datasets, and because of failure to model the effects of climate change on local resources important to human societies. In this paper we review recent advances in computational modeling that, in conjunction with improving data, address these limitations. These advances include network analysis, niche and species distribution modeling, and agent-based modeling. These studies demonstrate the utility of deep-time modeling for calibrating our understanding of how climate is influencing societies today and may in the future.

Keywords: climate change | archaeology | computational modeling | agent-based modeling

Goudeau 2015

M.-L. S. Goudeau, G.-J. Reichart, J. C. Wit, L. J. de Nooijer, A.-L. Grauel, S. M. Bernasconi & G. J. de Lange, *Seasonality variations in the Central Mediterranean during climate change events in the Late Holocene*. Palaeo **418** (2012), 304–318.

Holocene rapid climate change (RCC) events, such as the Little Ice Age (LIA), are thought to have influenced average annual temperatures only marginally, but to have affected winter temperatures relatively strongly. With summer temperatures relatively unaffected, reconstructing climate change at a seasonal resolution is crucial to fully capture Holocene climate variability. Mediterranean climate is highly seasonal, being influenced by the subtropical high-pressure belt in summer and the mid-latitude westerlies combined with outbreaks of polar winds in winter. We identified events of high- and low-detrital input to the Gulf of Taranto (Central Mediterranean Sea), anticipated to be linked to humid and dry conditions, respectively and, thereby, potentially reflecting seasonal contrasts. These events represent the Bronze Age (BA), Roman Humid Period (RHP),Medieval Climate Anomaly (MCA), LIA and present-day, and were selected for the analysis of single specimen Globigerinoides ruber (white) carbonate chemistry (Mg/Ca, d18O and d13C). The dynamic range found for these parameters for the measured single individuals in the most recent interval reflects the present-day seasonal contrasts in temperature and precipitation, albeitwith a bias towards the summer season. These results are compared with high-resolution (b15 years/sample) Sea Surface Temperature (SST) and Bottom Water Temperature (BWT) reconstructions based on the d18O of G. ruber (white) and Mg/Ca of benthic foraminifer Hyalinea balthica. Although the seasonal temperature contrast remains relatively stable, significant winter cooling is observed during the BA and LIA. Connections between high-latitude

climate (winter conditions) and low-latitude climate (summer conditions) appear not straightforward during RCC events. This results in changes in the moisture balance, and in shifts in seasonal dominance between RCCs. During the LIA, winter-like conditions (cold and humid) prevail throughout the year. In contrast, winters are dry and cold during the BA, and are accompanied by dry and warm summers, suggesting year-round aridity and a relatively high seasonal temperature contrast. This could have had a profound impact on early agriculture in Southern Italy.

Keywords: Seasonality | Late Holocene | Central Mediterranean | Foraminiferal test chemistry

Ludwig 2016

Patrick Ludwig, Erik J. Schaffernicht, Yaping Shao & Joaquim G. Pinto, *Regional atmospheric circulation over Europe during the Last Glacial Maximum and its links to precipitation*. Journal of Geophysical Research: Atmospheres **121** (2016), 2130–2145. DOI:10.1002/2015JD024444.

The Last Glacial Maximum (LGM) exhibits different large-scale atmospheric conditions compared to present-day climate due to altered boundary conditions. The regional atmospheric circulation and associated precipitation patterns over Europe are characterized for the first timewithaweather typing approach (circulation weather types, CWT) for LGM paleoclimate simulations. The CWT approach is applied to four representative regions across Europe. While the CWTs over Western Europe are prevailing westerly for both present-day and LGM conditions, considerable differences are identified elsewhere: Southern Europe experienced more frequent westerly and cyclonic CWTs under LGM conditions, while Central and Eastern Europe was predominantly affected by southerly and easterly flow patterns. Under LGM conditions, rainfall is enhanced over Western Europe but is reduced over most of Central and Eastern Europe. These differences are explained by changing CWT frequencies and evaporation patterns over the North Atlantic Ocean. The regional differences of the CWTs and precipitation patterns are linked to the North Atlantic storm track, which was stronger over Europe in all considered models during the LGM, explaining the overall increase of the cyclonic CWT. Enhanced evaporation over the North Atlantic leads to higher moisture availability over the ocean. Despite the overall cooling during the LGM, this explains the enhanced precipitation over southwestern Europe, particularly Iberia. This study links large-scale atmospheric dynamics to the regional circulation and associated precipitation patterns and provides an improved regional assessment of the European climate under LGM conditions.

Zielhofer 2017

Christoph Zielhofer et al., *Atlantic forcing of Western Mediterranean winter rain minima during the last 12,000 years*. Quaternary Science Reviews **157** (2017), 29–51.

qsr157-0029-Supplement.pdf

Christoph Zielhofer, William J. Fletcher, Steffen Mischke, Marc De Batist, Jennifer F. E. Campbell, Sebastien Joannin, Rik Tjallingii, Najib El Hamouti, Annett Junginger, Andreas Stele, Jens Bussmann, Birgit Schneider, Tobias Lauer, Katrin Spitzer, Michael Strupler, Thomas Brachert & Abdeslam Mikdad

The limited availability of high-resolution continuous archives, insufficient chronological control, and complex hydro-climatic forcing mechanisms lead to many uncertainties in palaeo-hydrological reconstructions for the Western Mediterranean.

In this study we present a newly recovered 19.63 m long core from Lake Sidi Ali in the North African Middle Atlas, a transition zone of Atlantic, Western Mediterranean and Saharan air mass trajectories. With a multi-proxy approach based on magnetic susceptibility, carbonate and total organic C content, core-scanning and quantitative XRF, stable isotopes of ostracod shells, charcoal counts, Cedrus pollen abundance, and a first set of diatom data, we reconstruct Western Mediterranean hydro-climatic variability, seasonality and forcing mechanisms during the last 12,000 yr. A robust chronological model based on AMS 14C dated pollen concentrates supports our highresolution multi-proxy study. Long-term trends reveal low lake levels at the end of the Younger Dryas, during the mid-Holocene interval 6.6 to 5.4 cal ka BP, and during the last 3000 years. In contrast, lake levels are mostly high during the Early and Mid-Holocene. The record also shows sub-millennial- to centennial-scale decreases in Western Mediterranean winter rain at 11.4, 10.3, 9.2, 8.2, 7.2, 6.6, 6.0, 5.4, 5.0, 4.4, 3.5, 2.9, 2.2, 1.9, 1.7, 1.5, 1.0, 0.7, and 0.2 cal ka BP. Early Holocene winter rain minima are in phase with cooling events and millennial-scale meltwater discharges in the sub-polar North Atlantic. Our proxy parameters do not show so far a clear impact of Saharan air masses on Mediterranean hydro-climate in North Africa. However, a significant hydro-climatic shift at the end of the African Humid Period (≈5 ka) indicates a change in climate forcing mechanisms. The Late Holocene climate variability in the Middle Atlas features a multi-centennial-scale NAO-type pattern, with Atlantic cooling and Western Mediterranean winter rain maxima generally associated with solar minima.

Keywords: Holocene | Younger Dryas | Winter rain minima | Atlantic forcing | Western Mediterranean | North Atlantic Oscillation (NAO) | Seasonality | Solar forcing | Lake sediments | Middle Atlas | Morocco

Kultur

Hansen 2002

Svend Hansen, *"Überausstattungen" in Gräbern und Horten der Frühbronzezeit*. In: Johannes Müller (Hrsg.), *Vom Endneolithikum zur Frühbronzezeit: Muster sozialen Wandels? Tagung Bamberg 14.–16. Juni 2001*. (Bonn 2002), 151–173.

Faßt man, wie es hier versucht wurde, die "Überausstattung" mit Waffen als eine auf Kommunikation beruhende Verhaltensweise auf, ist für eine Beschreibung des sozialen Rangs der in Leubingen bestatteten Person wenig gewonnen. Möglicherweise lassen sich aber durch sie umrißhaft (soziale) Leitbilder der frühbronzezeitlichen Führungsschichten erkennen.

Hees 2001

Martin Hees, *Neue Experimente zur latènezeitlichen Salzgewinnung, Die Briquetage von Schwäbisch Hall*. Experimentelle Archäologie (2001), 27–32.

Hees 2002

Martin Hees, *Prähistorische Salzgewinnung, Der Beitrag der Ethnographie zu ihrer Erforschung*. Ethnographisch-Archäologische Zeitschrift **43** (2002), 227–244.

Hees 2006

Martin Hees, *Forschungen zur vorgeschichtlichen Salzgewinnung, Ethnographie Westafrikas und Archäologie Europas.* In: Hans-Peter Wotzka (Hrsg.), *Grundlegungen: Beiträge zur europäischen und afrikanischen Archäologie, Festschrift für Manfred K. H. Eggert.* (Tübingen 2006), 383–394.

Pilloud 2016

Marin A. Pilloud, Scott D. Haddow, Christopher J. Knüsel & Clark Spencer Larsen, *A bioarchaeological and forensic re-assessment of vulture defleshing and mortuary practices at Neolithic Çatalhöyük.* Journal of Archaeological Science: Reports **10** (2016), 735–743.

During the Neolithic, mortuary practices in the Near East sometimes involved intramural burial and often some type of removal or caching of the bony elements of the head. Reports of defleshing are described in the literature, but there is little published evidence for other surface modifications of human remains. In his 1960s publications on the Neolithic site of Çatalhöyük, James Mellaart proposed that individuals were defleshed by vultures prior to intramural interment. This hypothesis was predominantly based on the discovery of wall paintings of large raptorial birds hovering over headless bodies, coupled with the various states of disarticulation of many of the human remains excavated on site, including 'headless' bodies (those missing the cranium and mandible), as well as isolated crania and other skeletal elements. Despite these observations, subsequent osteological analysis has failed to show definitive taphonomic evidence of such practices.

However, current forensic work on human decomposition has shed new light on the effects of vulture defleshing on human remains. Initial results indicate that vultures are adept at soft tissue removal, defleshing a body in a matter of hours over the course of several visits. Moreover, the skeleton can be left largely articulated (at least initially) and display limited skeletalmarks fromthe defleshing process. In light of these recent taphonomic studies, the possibility of vulture defleshing at Çatalhöyük is re-visited here. In many subfloor burials, body position, skeletal articulation, and skeletal completeness are consistentwith a taphonomic signature of defleshing prior to interment. Furthermore, defleshing would have facilitated body part removal and may have been necessary for intramural interments. This re-assessment ofmortuary treatments at Çatalhöyük may provide a newway of evaluating the skeletal assemblage at the site and can serve as amodel for the interpretation of vulture iconography in the ancient Near East.

Keywords: Cephalic extremity | Taphonomy | Excarnation | Intramural burial | Çatalhöyük (Turkey) | Neolithic

Mathematik

Bauch 2016

Chris T. Bauch, Ram Sigdel, Joe Pharaon & Madhur Anand, *Early warning signals of regime shifts in coupled human–environment systems.* PNAS **113** (2016), 14560–14567.

In complex systems, a critical transition is a shift in a system's dynamical regime from its current state to a strongly contrasting state as external conditions move beyond a tipping point. These transitions are often preceded by characteristic early warning signals such as increased system variability. However, early

warning signals in complex, coupled human–environment systems (HESs) remain little studied. Here, we compare critical transitions and their early warning signals in a coupled HES model to an equivalent environment model uncoupled from the human system. We parameterize the HES model, using social and ecological data from old-growth forests in Oregon. We find that the coupled HES exhibits a richer variety of dynamics and regime shifts than the uncoupled environment system.Moreover, the early warning signals in the coupled HES can be ambiguous, heralding either an era of ecosystem conservationism or collapse of both forest ecosystems and conservationism. The presence of human feedback in the coupled HES can also mitigate the early warning signal, making it more difficult to detect the oncoming regime shift. We furthermore show how the coupled HES can be "doomed to criticality": Strategic human interactions cause the system to remain perpetually in the vicinity of a collapse threshold, as humans become complacent when the resource seems protected but respondrapidlywhenit isunderimmediatethreat. Weconclude that the opportunities, benefits,andchallenges ofmodelingregime shifts and early warning signals in coupled HESs merit further research.

Keywords: critical transitions | criticality | social–ecological systems | human-and-natural systems | early warning signal

Hastings 2016

Alan Hastings, *Timescales and the management of ecological systems.* PNAS **113** (2016), 14568–14573.

Human management of ecological systems, including issues like fisheries, invasive species, and restoration, as well as others, often must be undertaken with limited information. This means that developing general principles and heuristic approaches is important. Here, I focus on one aspect, the importance of an explicit consideration of time, which arises because of the inherent limitations in the response of ecological systems. I focus mainly on simple systems and models, beginning with systems without density dependence, which are therefore linear. Even for these systems, it is important to recognize the necessary delays in the response of the ecological system to management. Here, I also provide details for optimization that show how general results emerge and emphasize how delays due to demography and life histories can change the optimal management approach. A brief discussion of systems with density dependence and tipping points shows that the same themes emerge, namely, that when considering issues of restoration or management to change the state of an ecological system, that timescales need explicit consideration and may change the optimal approach in important ways.

Keywords: management | timescales | Spartina | grazers

Henderson 2016

Kirsten A. Henderson, Chris T. Bauch & Madhur Anand, *Alternative stable states and the sustainability of forests, grasslands, and agriculture.* PNAS **113** (2016), 14552–14559.

Endangered forest–grassland mosaics interspersed with expanding agriculture and silviculture occur across many parts of the world, including the southern Brazilian highlands. This natural mosaic ecosystem is thought to reflect alternative stable states driven by threshold responses of recruitment to fire and moisture regimes. The role of adaptive human behavior in such systems remains understudied, despite its pervasiveness and the fact that such ecosystems can exhibit complex dynamics. We develop a nonlinear mathematical model of coupled human–environment dynamics in mosaic systems and social processes regarding conservation and economic land valuation. Our objective is to better understand how

the coupled dynamics respond to changes in ecological and social conditions. The model is parameterized with southern Brazilian data on mosaic ecology, land-use profits, and questionnaire results concerning landowner preferences and conservation values. We find that the mosaic presently resides at a crucial juncture where relatively small changes in social conditions can generate a wide variety of possible outcomes, including complete loss of mosaics; large-amplitude, long-term oscillations between land states that preclude ecosystem stability; and conservation of the mosaic even to the exclusion of agriculture/silviculture. In general, increasing the time horizon used for conservation decision making is more likely to maintain mosaic stability. In contrast, increasing the inherent conservation value of either forests or grasslands is more likely to induce large oscillations—especially for forests—due to feedback from rarity-based conservation decisions. Given the potential for complex dynamics, empirically grounded nonlinear dynamical models should play a larger role in policy formulation for human– environment mosaic ecosystems.

Keywords: Human–environment coupling | forest–grassland mosaics | ecosystem services valuation | southern Brazil

Methoden

Robb 2016

John Robb, *What can we really say about skeletal part representation, MNI and funerary ritual? A simulation approach.* Journal of Archaeological Science: Reports **10** (2016), 684–692.

Two cornerstones of conventionalwisdomin interpreting commingled assemblages are (a) theMNI provides reliable information about how many individuals were deposited there, and (b) the distribution of skeletal parts provides information about ritual processes such as primary vs. secondary deposition. Both of these involve assumptions about the taphonomic processes linking the original depositions and the assemblage which archaeologists recover. Yet, it is almost impossible to investigate these processes directly in ethnoarchaeological, forensic or experimental settings, particularly observing the effects of the passage of long time spans and repeated disturbance events. This paper reports an attempt to understand these relationships and processes through simulation of a hypothetical prehistoric collective tomb. The key results are (a) there is no linear or proportionate relationship between the number of bodies originally deposited in a tomb and theMNI excavated there; indeed, inmany situations, for taphonomic reasons, the MNI quickly reaches a low ceiling and levels off regardless of how many individualswere actually placed in the tomb, and (b) lack of small and fragile bones provides a very poor criterion for differentiating between burial within a tomb and secondary deposition there following primary burial elsewhere. However, skeletal part representation can prove informative about other processes such as selective curation of crania and removal of bones from tombs for funerary use elsewhere.

Keywords: MNI | Skeletal part representation | Collective tombs | Funerary taphonomy | Simulation | Equifinality