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References

Afrika

Jesse 2010

Friederike Jesse, *Early Pottery in Northern Africa, An Overview.* Journal of African Archaeology **8** (2010), 219–238.

The emergence of pottery is a compelling issue for archaeologists. In Africa , pottery appeared in what now the southern part of the Sahara and the Sahel different localities and in different contexts in the 10th millennium bp. This paper aims to give an overview the available data concerning early pottery in Northern Africa. The radiocarbon evidence is considered as well as technological features of the pottery ; the decoration and the site context. The areas of the earliest appearance of pottery in Northern Africa were uninhabited during hyperarid phase at the end of the Pleistocene. Intriguing questions are therefore the origin of the Early Holocene occupants and of their knowledge of potting and of course the role of early pottery in the prehistoric groups.

Keywords: Northern Africa | pottery | Early Holocene | Wavy Line

Aktuell

Carter 2019

Alison K. Carter, Miriam T. Stark, Seth Quintus, Yijie Zhuang, Hong Wang, Piphal Heng & Rachna Chhay, *Temple occupation and the tempo of collapse at Angkor Wat, Cambodia.* PNAS **116** (2019), 12226–12231.

pnas116-12226-Supplement.pdf

The 9th–15th century Angkorian state was Southeast Asia's greatest premodern empire and Angkor Wat in the World Heritage site of Angkor is one of its largest religious monuments. Here we use excavation and chronometric data from three field seasons at Angkor Wat to understand the decline and reorganization of the Angkorian Empire, which was a more protracted and complex process than historians imagined. Excavation data and Bayesian modeling on a corpus of 16 radiocarbon dates in particular demand a revised chronology for the Angkor Wat landscape. It was initially in use from the 11th century CE with subsequent habitation until the 13th century CE. Following this period, there is a gap in our dates, which we hypothesize signifies a change in the use of the occupation mounds during this period. However, Angkor Wat was never completely abandoned, as the dates suggest that the mounds were in use again in the late 14th–early 15th centuries until the 17th or 18th centuries CE. This break in dates points toward a reorganization of Angkor Wat's enclosure space, but not during the historically recorded 15th century collapse. Our excavation data are consistent with multiple lines of evidence demonstrating the region's continued ideological importance and residential use, even after the collapse and shift southward of the polity's capital. We argue that finegrained chronological analysis is critical to building local historical sequences and illustrate how such granularity adds nuance to how we interpret the tempo of organizational change before, during, and after the decline of Angkor.

Keywords: archaeology | collapse | Angkor | Cambodia | Angkor Wat

Significance: The Angkorian Empire was Southeast Asia's largest premodern polity. Its ancient temple of Angkor Wat has been a religious center since its construction in the 12th century CE and remains a contemporary icon for the wider Angkor polity, even appearing on Cambodia's flag. Our paper draws from intensive excavations in the Angkor Wat enclosure to present a fine-grained chronological analysis of the temple's use history. We focus on where people lived in the temple complex rather than on the temple itself, and identify a chronometric gap that does not fully correlate with documented historical events. This granular study of Angkor Wat's historical sequence contributes to understanding the tempo of organizational change taking place during Angkor's collapse.

Kantner 2019

John Kantner, David McKinney, Michele Pierson & Shaza Wester, *Reconstructing sexual divisions of labor from fingerprints on Ancestral Puebloan pottery*. PNAS **116** (2019), 12220–12225.

pnas116-12220-Supplement1.pdf, pnas116-12220-Supplement2.xlsx

An understanding of the division of labor in different societies, and especially how it evolved in the human species, is fundamental to most analyses of social, political, and economic systems. The ability to reconstruct how labor was organized, however, especially in ancient societies that left behind few material remains, is challenged by the paucity of direct evidence demonstrating who was involved in production. This is particularly true for identifying divisions of labor along lines of age, sex, and gender, for which archaeological interpretations mostly rely upon inferences derived from modern examples with uncertain applicability to ancient societies. Drawing upon biometric studies of human fingerprints showing statistically distinct ridge breadth measurements for juveniles, males, and females, this study reports a method for collecting fingerprint impressions left on ancient material culture and using them to distinguish the sex of the artifacts' producers. The method is applied to a sample of 985 ceramic sherds from a 1,000-y-old Ancestral Puebloan community in the US Southwest, a period characterized by the rapid emergence of a highly influential religious and political center at Chaco Canyon. The fingerprint evidence demonstrates that both males and females were significantly involved in pottery production and further suggests that the contributions of each sex varied over time and even among different social groups in the same community. The results indicate that despite long-standing assumptions that pottery production in Ancient Puebloan societies was primarily a female activity, labor was not strictly divided and instead was likely quite dynamic.

Keywords: archaeology | division of labor | human fingerprints | US Southwest | Chaco Canyon

Significance: The evolution of the sexual division of labor within human societies is difficult to reconstruct because of the scarcity of direct evidence recovered from archaeological contexts, and yet many disciplines make assumptions regarding how labor first became specialized in our species. We propose an innovative method for identifying the sex of potters through the analysis of fingerprint impressions recovered from material culture. An application of the method to ancient pottery demonstrates that males and females were both significantly involved in producing vessels. The study further suggests that the exact proportion of each sex involved in pottery making was quite fluid, and may have varied among different groups in the same community, as well as changed from generation to generation.

Nordhaus 2019

William Nordhaus, *Economics of the disintegration of the Greenland ice sheet*. PNAS **116** (2019), 12261–12269.

pnas116-12261-Supplement.pdf

Concerns about the impact on large-scale earth systems have taken center stage in the scientific and economic analysis of climate change. The present study analyzes the economic impact of a potential disintegration of the Greenland ice sheet (GIS). The study introduces an approach that combines long-run economic growth models, climate models, and reduced-form GIS models. The study demonstrates that social cost–benefit analysis and damage-limiting strategies can be usefully extended to illuminate issues with major long-term consequences, as well as concerns such as potential tipping points, irreversibility, and hysteresis. A key finding is that, under a wide range of assumptions, the risk of GIS disintegration makes a small contribution to the optimal stringency of current policy or to the overall social cost of climate change. It finds that the cost of GIS disintegration adds less than 5 % to the social cost of carbon (SCC) under alternative discount rates and estimates of the GIS dynamics.

Keywords: climate change | Greenland ice sheet | economics | DICE model | optimization

Significance: This study integrates an economic model of climate change with a small structural model of the Greenland ice sheet (GIS). As such, it provides a methodology for incorporating large earth system changes into standard economic cost–benefit or damage-limiting analyses. It finds that adding the GIS has only a small effect on the social cost of carbon (SCC) because melting is slow and damages are far in the future.

Pizer 2019

William A. Pizer, *Valuing the Greenland ice sheet and other complex geophysical phenomena*. PNAS **116** (2019), 12134–12135.

Ramos 2019

Miguel R. Ramos, Matthew R. Bennett, Douglas S. Massey & Miles Hewstone, *Humans adapt to social diversity over time*. PNAS **116** (2019), 12244–12249.

pnas116-12244-Supplement.pdf

Humans have evolved cognitive processes favoring homogeneity, stability, and structure. These processes are, however, incompatible with a socially diverse world, raising wide academic and political concern about the future of modern societies. With data comprising 22 y of religious diversity worldwide, we show across multiple surveys that humans are inclined to react negatively to threats to homogeneity (i.e., changes in diversity are associated with lower self-reported quality of life, explained by a decrease in trust in others) in the short term. However, these negative outcomes are compensated in the long term by the beneficial influence of intergroup contact, which alleviates initial negative influences. This research advances knowledge that can foster peaceful coexistence in a new era defined by globalization and a socially diverse future.

Keywords: social diversity | trust | intergroup contact | well-being | health

Significance: Changes in social diversity constitute a key factor shaping today's world, yet scholarly work about the consequences of diversity has been marked by a critical lack of consensus. To address this concern, we propose a multidisciplinary approach where psychological, sociological, and evolutionary perspectives are integrated to provide an account of how individuals adapt to changes in social diversity. With an analysis of 22 y of worldwide data, our results suggest that humans are initially inclined to react negatively to threats to homogeneity, but that these negative effects are compensated in the long term by the beneficial

effects of intergroup contact. Our findings advance knowledge and inform political debate about one of the defining challenges of modern societies.

Bibel

Boertien 2007

Jeannette H. Boertien, *Asherah and textiles*. Biblische Notizen **134** (2007), 63–77.

Texts and textile finds from Iron Age Deir ʻAlla in the Jordan Valley and Kuntillet ʻAjrud in the North-Eastern Sinai shed some light on a female goddess. Both sites are dated about 800 BC, and revealed unique inscriptions and drawings on plastered walls and on both sites a special kind of textile was produced. In Kuntillet ʻAjrud a collection of about a hundred textile fragments was discovered, amongst these pieces of textile was a fabric made of a mixture of wool and linen: the so called: sha'atnez (Lev. 19, 19. and Ex. 28, 4 –8). In Deir ʻAlla too a special textile has been excavated, in the complex in which the Balaam plaster text was found. Here a very fine hemp cloth was made. The benched (cult) room in Deir ʻAlla and Kuntillet ʻAjrud and the production of a special cloth could point to a similarity in the function of both sites. The production of special fabrics may be interpreted in the light of the religious function of the sites because at least part of the fabrics are thought to be produced for the shrine. The names used in the texts from Deir ʻAlla and Kuntillet ʻAjrud point to a female goddess. Textile production is often related to the goddess Asherah /Ishtar and weaving for Asherah is a usual ritual in the Levant during this period. Whether the production of textile in Deir ʻAlla and Kuntillet ʻAjrud can be related to the goddess Asherah is debated.

Texte und Textilfunde von Deir ʻAlla im Jordantal und von Kuntillet ʻAjrud im nordöstlichen Sinai werfen neues Licht auf eine altbekannte weibliche Gottheit. Beide Stätten datieren in die Eisenzeit, näherhin in die Zeit um 800 v. Chr. An beiden Stätten konnten einzigartige Inschriften und Zeichnungen an verputzen Mauern entdeckt werden. Und an beiden Stätten wurde nachweislich eine spezielle Art von Textilien produziert. In Kuntillet ʻAjrud wurden über einhundert Textilfragmente entdeckt, darunter auch Stücke, die aus einem Mischgewebe aus Wolle und Leinen gefertigt waren, so genannte sha'atnez (Lev 19,19 und Ex 28,4 –8). Auch in Deir ʻAlla konnten spezielle Textilien entdeckt werden, und zwar in jenem Komplex, in dem auch der Balaam-Text entdeckt wurde. Hier wurde feiner Stoff aus Hanffaser hergestellt. Die Kulträume mit Bänken sowie die Produktion spezieller Stoffe sowohl in Deir ʻAlla als auch in Kuntillet ʻAjrud könnte auf eine ähnliche Funktion beider Stätten hinweisen. Die Produktion spezieller Gewebe könnte im Licht der religiösen Bedeutung der beiden Stätten interpretiert werden, da zumindest Teile der Gewebe für die Kultstätten produziert wurden. Die Namen in den Inschriften von Deir ʻAlla und Kuntillet ʻAjrud weisen auf eine weibliche Gottheit hin. Textilproduktion st oftmals mit der Göttin Asherah/Ishtar verbunden und das Weben für Asherah ist ein übliches Ritual in der Levante in dieser Zeit. Ob die Textilproduktion in Deir ʻAlla und in Kuntillet ʻAjrud mit der Göttin Asherah in Verbindung gebracht werden kann, ist Gegenstand der Diskussion.

Biologie

Keller 2019

Marcel Keller, Maria A. Spyrou, Michael McCormick & Alexander Herbig et al., *Ancient Yersinia pestis genomes from across Western*

Europe reveal early diversification during the First Pandemic (541–750). PNAS **116** (2019), 12363–12372.

pnas116-12363-Supplement.pdf

Marcel Keller, Maria A. Spyrou, Christiana L. Scheib, Gunnar U. Neumann, Andreas Kröpelin, Brigitte Haas-Gebhard, Bernd Päffgen, Jochen Haberstroh, Albert Ribera i Lacomba, Claude Raynaud, Craig Cessford, Raphaël Durand, Peter Stadler, Kathrin Nägele, Jessica S. Bates, Bernd Trautmann, Sarah A. Inskip, Joris Peters, John E. Robb, Toomas Kivisild, Dominique Castex, Michael McCormick, Kirsten I. Bos, Michaela Harbeck, Alexander Herbig & Johannes Krause

The first historically documented pandemic caused by Yersinia pestis began as the Justinianic Plague in 541 within the Roman Empire and continued as the so-called First Pandemic until 750. Although paleogenomic studies have previously identified the causative agent as Y. pestis, little is known about the bacterium's spread, diversity, and genetic history over the course of the pandemic. To elucidate the microevolution of the bacterium during this time period, we screened human remains from 21 sites in Austria, Britain, Germany, France, and Spain for Y. pestis DNA and reconstructed eight genomes. We present a methodological approach assessing single-nucleotide polymorphisms (SNPs) in ancient bacterial genomes, facilitating qualitative analyses of low coverage genomes from a metagenomic background. Phylogenetic analysis on the eight reconstructed genomes reveals the existence of previously undocumented Y. pestis diversity during the sixth to eighth centuries, and provides evidence for the presence of multiple distinct Y. pestis strains in Europe. We offer genetic evidence for the presence of the Justinianic Plague in the British Isles, previously only hypothesized from ambiguous documentary accounts, as well as the parallel occurrence of multiple derived strains in central and southern France, Spain, and southern Germany. Four of the reported strains form a polytomy similar to others seen across the Y. pestis phylogeny, associated with the Second and Third Pandemics. We identified a deletion of a 45-kb genomic region in the most recent First Pandemic strains affecting two virulence factors, intriguingly overlapping with a deletion found in 17th- to 18th-century genomes of the Second Pandemic.

Keywords: Justinianic Plague | ancient DNA | bacterial evolution | Anglo-Saxons | Merovingians

Significance: The first historically reported pandemic attributed to Yersinia pestis started with the Justinianic Plague (541–544) and continued for around 200 y as the so-called First Pandemic. To date, only one Y. pestis strain from this pandemic has been reconstructed using ancient DNA. In this study, we present eight genomes from Britain, France, Germany, and Spain, demonstrating the geographic range of plague during the First Pandemic and showing microdiversity in the Early Medieval Period. Moreover, we detect similar genome decay during the First and Second Pandemics (14th to 18th century) that includes the same two virulence factors, thus providing an example of potential convergent evolution of Y. pestis during large-scale epidemics.

Judentum

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Frowald Gil Hüttenmeister, *Abkürzungsverzeichnis hebräischer Grabinschriften, (AHebG)*. (Tübingen ^{2}2010).

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C. P. Snow, *The two cultures*. (Cambridge 1998).

Neolithikum

Lüning 2005
Jens Lüning (Hrsg.), *Die Bandkeramiker – Erste Steinzeitbauern in Deutschland, Bilder einer Ausstellung beim Hessentag in Heppenheim, Bergstraße im Juni 2004*. (Rahden ^{2}2012).

Physik

Fröhner 1998
F. H. Fröhner, *Missing Link Between Probability Theory and Quantum Mechanics, The Riesz-Fejér Theorem*. Zeitschrift für Naturforschung A **53** (1998), 637–654.

Quantum mechanics is spectacularly successful on the technical level but the meaning of its rules remains shrouded in mystery even more than seventy years after its inception. Quantum-mechanical probabilities are often considered as fundamentally different from classical probabilities, in disregard of the work of Cox (1946) – and of Schrödinger (1947) – on the foundations of probability theory. One central question concerns the superposition principle, i. e. the need to work with interfering wave functions, the absolute squares of which are probabilities. Other questions concern the relationship between spin and statistics or the collapse of the wave function when new data become available. These questions are reconsidered from the Bayesian point of view. The superposition principle is found to be a consequence of an apparently little-loiown mathematical theorem for non-negative Fourier polynomials published by Fejer in 1915 that implies wave-mechanical interference already for classical probabilities. Combined with the classical Hamiltonian equations for free and accelerated motion, gauge invariance and particle indistinguishability, it yields all basic quantum features – wave-particle duality, operator calculus, uncertainty relations, Schrödinger equation, CPT invariance and even the spin-statistics relationship – which demystifies quantum mechanics to quite some extent.

Keywords: Superposition Principle | Wave Packets | Logical Inference | Wave-Particle Duality | Quantum Mechanics.

Story or Book

Turney 2019
Chris Turney, *Radiocarbon revolution*. nature **570** (2019), 304–305.

Chris Turney applauds a book on carbon-14 and its key applications.

Hot Carbon: Carbon-14 and a Revolution in Science. John F. Marra. Columbia University Press (2019)

In February 1940, Kamen was trying to produce a new isotope of carbon at the Berkeley Radiation Laboratory at the University of California. Originally expected to have a half-life of just minutes or hours, this heavy form of carbon was

considered a low research priority. But Kamen and Ruben's efforts proved that it would be stable over millennia, opening up a breathtaking number of research avenues. Kamen never received the credit he deserved, becoming a victim of the US anti-communist fervour of the 1940s and 1950s. Those who applied his insight, such as chemists Willard Libby and Melvin Calvin, reaped the scientific reward.

Hot Carbon offers a timely perspective on how mind-bogglingly connected our planet is — and how 14C will continue to be important in helping us to understand what lies ahead.