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References

Aktuell

Klompas 2020

Michael Klompas, Charles A. Morris, Julia Sinclair, Madelyn Pearson & Erica S. Shenoy, *Universal Masking in Hospitals in the Covid-19 Era*. New England Journal of Medicine **382** (2020), e63. DOI:10.1056/NEJMp2006372.

We know that wearing a mask outside health care facilities offers little, if any, protection from infection. The calculus may be different, however, in health care settings. First and foremost, a mask is a core component of the personal protective equipment (PPE) clinicians need when caring for symptomatic patients with respiratory viral infections, in conjunction with gown, gloves, and eye protection.

In our hospitals, we have already seen a number of instances in which staff members either came to work well but developed symptoms of Covid-19 partway through their shifts or worked with mild and ambiguous symptoms that were subsequently diagnosed as Covid-19.

What is clear, however, is that universal masking alone is not a panacea.

MacIntyre 2015

C. Raina MacIntyre et al., *A cluster randomised trial of cloth masks compared with medical masks in healthcare workers*. BMJ Open **5** (2015), e6577. DOI:10.1136/bmjopen-2014-006577.

Strengths and limitations of this study

- The use of cloth masks is widespread around the world, particularly in countries at high-risk for emerging infections, but there have been no efficacy studies to underpin their use.
- This study is large, a prospective randomised clinical trial (RCT) and the first RCT ever conducted of cloth masks.
- The use of cloth masks are not addressed in most guidelines for health care workers—this study provides data to update guidelines.
- The control arm was 'estandard practice', which comprised mask use in a high proportion of participants. As such (without a no-mask control), the finding of a much higher rate of infection in the cloth mask arm could be interpreted as harm caused by cloth masks, efficacy of medical masks, or most likely a combination of both.

Objective: The aim of this study was to compare the efficacy of cloth masks to medical masks in hospital healthcare workers (HCWs). The null hypothesis is that there is no difference between medical masks and cloth masks.

Setting: 14 secondary-level/tertiary-level hospitals in Hanoi, Vietnam.

Participants: 1607 hospital HCWs aged ≥18 years working full-time in selected high-risk wards.

Intervention: Hospital wards were randomised to: medical masks, cloth masks or a control group (usual practice, which included mask wearing). Participants used the mask on every shift for 4 consecutive weeks.

Main outcome measure: Clinical respiratory illness (CRI), influenza-like illness (ILI) and laboratoryconfirmed respiratory virus infection.

Results: The rates of all infection outcomes were highest in the cloth mask arm, with the rate of ILI statistically significantly higher in the cloth mask arm (relative risk (RR)=13.00, 95 % CI 1.69 to 100.07) compared with the medical mask arm. Cloth masks also had significantly higher rates of ILI compared with the control arm. An analysis by mask use showed ILI (RR=6.64, 95 % CI 1.45 to 28.65) and laboratoryconfirmed virus (RR=1.72, 95 % CI 1.01 to 2.94) were significantly higher in the cloth masks group compared with the medical masks group. Penetration of cloth masks by particles was almost 97 % and medical masks 44 %.
Conclusions: This study is the first RCT of cloth masks, and the results caution against the use of cloth masks. This is an important finding to inform occupational health and safety. Moisture retention, reuse of cloth masks and poor filtration may result in increased risk of infection. Further research is needed to inform the widespread use of cloth masks globally. However, as a precautionary measure, cloth masks should not be recommended for HCWs, particularly in high-risk situations, and guidelines need to be updated.

C. Raina MacIntyre, Holly Seale, Tham Chi Dung, Nguyen Tran Hien, Phan Thi Nga, Abrar Ahmad Chughtai, Bayzidur Rahman, Dominic E. Dwyer & Quanyi Wang

Manning 2020

Sturt W. Manning, *Complications and challenges for securing Mediterranean timelines*. PNAS **117** (2020), 18157–18158.

Mbow 2020

Moustapha Mbow et al., *COVID-19 in Africa*, *Dampening the storm?* science **369** (2020), 624–626. DOI:10.1126/science.abd3902.

s369-0624-Supplement.pdf

The dampened course of COVID-19 in Africa might reveal innovative solutions.

Moustapha Mbow, Bertrand Lell, Simon P. Jochems, Badara Cisse, Souleymane Mboup, Benjamin G. Dewals, Assan Jaye, Alioune Dieye & Maria Yazdanbakhsh

Pearson 2020

Charlotte Pearson, Matthew Salzer, Lukas Wacker, Peter Brewer, Adam Sookdeo & Peter Kuniholm, *Dating of Gordion tree-ring sequence still stands within a year of 745 BC*, *Reply to Manning*. PNAS **117** (2020), 18159–18160.

We thank Manning for his detailed consideration of our published work but point out that none of the objections raised affects, undermines, or alters our core scientific conclusions.

Finally, we did not attempt to connect a 14C effect ca. 1548 BC with our reported calcium anomaly as Manning posits; rather, we simply noted the feature as worthy of further exploration.

Altpaläolithikum

Sano 2020

Katsuhiro Sano, Yonas Beyene, Shigehiro Katoh, Daisuke Koyabu, Hideki Endo, Tomohiko Sasaki, Berhane Asfaw & Gen Suwa, *A 1.4-million-year-old bone handaxe from Konso, Ethiopia, shows advanced tool technology in the early Acheulean*. PNAS **117** (2020), 18393–18400.

pnas117-18393-Supplement.pdf

In the past decade, the early Acheulean before 1 Mya has been a focus of active research. Acheulean lithic assemblages have been shown to extend back to ≈1.75 Mya, and considerable advances in core reduction technologies are seen by 1.5 to 1.4 Mya. Here we report a bifacially flaked bone fragment (maximum dimension ≈13 cm) of a hippopotamus femur from the ≈1.4 Mya sediments of the Konso Formation in southern Ethiopia. The large number of flake scars and their distribution pattern, together with the high frequency of cone fractures, indicate anthropogenic flaking into handaxe-like form. Use-wear analyses show quasi-continuous alternate microflake scars, wear polish, edge rounding, and striae patches along an ≈5-cm-long edge toward the handaxe tip. The striae run predominantly oblique to the edge, with some perpendicular, on both the cortical and inner faces. The combined evidence is consistent with the use of this bone artifact in longitudinal motions, such as in cutting and/or sawing. This bone handaxe is the oldest known extensively flaked example from the Early Pleistocene. Despite scarcity of well-shaped bone tools, its presence at Konso shows that sophisticated flaking was practiced by ≈1.4 Mya, not only on a range of lithic materials, but also occasionally on bone, thus expanding the documented technological repertoire of African Early Pleistocene Homo.

Keywords: Acheulean technology | bone handaxe | use-wear | core preparation | Early Pleistocene

Significance: We report a rare example of a 1.4-million-y-old large bone fragment shaped into handaxe-like form. This bone tool derives from the Konso Formation in southern Ethiopia, where abundant early Acheulean stone artifacts show considerable technological progression between ≈1.75 and <1.0 Mya. Technological analysis of the bone tool indicates intensive anthropogenic shaping. Edge damage, polish, and striae patterns are consistent with use in longitudinal motions, such as in butchering. The discovery of this bone handaxe shows that advanced flaking technology, practiced at Konso on a variety of lithic materials, was also applied to bone, thus expanding the known technological repertoire of African Early Pleistocene Homo.

Amerika

Ardelean 2020

Ciprian F. Ardelean et al., *Evidence of human occupation in Mexico around the Last Glacial Maximum*. nature **584** (2020), 87–92.

n584-0087-Supplement.pdf

The initial colonization of the Americas remains a highly debated topic1, and the exact timing of the first arrivals is unknown. The earliest archaeological record of Mexico—which holds a key geographical position in the Americas—is poorly known and understudied. Historically, the region has remained on the periphery of research focused on the first American populations2. However, recent investigations provide reliable evidence of a human presence in the northwest region of Mexico3,4, the Chiapas Highlands5, Central Mexico6 and the Caribbean coast7–9 during the Late Pleistocene and Early Holocene epochs. Here we present results of recent excavations at Chiquihuite Cave—a high-altitude site in central-northern Mexico—that corroborate previous findings in the Americas10–17of cultural evidence that dates to the Last Glacial Maximum (26,500–19,000 years ago)18, and which push back dates for human dispersal to the region possibly as early as 33,000–31,000 years ago. The site yielded about 1,900 stone artefacts within a 3-m-deep stratified sequence, revealing a previously unknown lithic industry that underwent only minor changes over millennia. More than 50 radiocarbon and luminescence dates

provide chronological control, and genetic, palaeoenvironmental and chemical data document the changing environments in which the occupants lived. Our results provide new evidence for the antiquity of humans in the Americas, illustrate the cultural diversity of the earliest dispersal groups (which predate those of the Clovis culture) and open new directions of research.

Ciprian F. Ardelean, Lorena Becerra-Valdivia, Mikkel Winther Pedersen, Jean-Luc Schwenninger, Charles G. Oviatt, Juan I. Macías-Quintero, Joaquin Arroyo-Cabrales, Martin Sikora, Yam Zul E. Ocampo-Díaz, Igor I. Rubio-Cisneros, Jennifer G. Watling, Vanda B. de Medeiros, Paulo E. De Oliveira, Luis Barba-Pingarón, Agustín Ortiz-Butrón, Jorge Blancas-Vázquez, Irán Rivera-González, Corina Solís-Rosales, María Rodríguez-Ceja, Devlin A. Gandy, Zamara Navarro-Gutierrez, Jesús J. De La Rosa-Díaz, Vladimir Huerta-Arellano, Marco B. Marroquín-Fernández, L. Martin Martínez-Riojas, Alejandro López-Jiménez, Thomas Higham & Eske Willerslev

Becerra-Valdivia 2020

Lorena Becerra-Valdivia & Thomas Higham, *The timing and effect of the earliest human arrivals in North America*. nature **584** (2020), 93–97.

n584-0093-Supplement.pdf

The peopling of the Americas marks a major expansion of humans across the planet. However, questions regarding the timing and mechanisms of this dispersal remain, and the previously accepted model (termed 'Clovis-first')—suggesting that the first inhabitants of the Americas were linked with the Clovis tradition, a complex marked by distinctive fluted lithic points1—has been effectively refuted. Here we analyse chronometric data from 42 North American and Beringian archaeological sites using a Bayesian age modelling approach, and use the resulting chronological framework to elucidate spatiotemporal patterns of human dispersal. We then integrate these patterns with the available genetic and climatic evidence. The data obtained show that humans were probably present before, during and immediately after the Last Glacial Maximum (about 26.5–19 thousand years ago)2,3 but that more widespread occupation began during a period of abrupt warming, Greenland Interstadial 1 (about 14.7–12.9 thousand years before ad 2000)4. We also identify the near-synchronous commencement of Beringian, Clovis and Western Stemmed cultural traditions, and an overlap of each with the last dates for the appearance of 18 now-extinct faunal genera. Our analysis suggests that the widespread expansion of humans through North America was a key factor in the extinction of large terrestrial mammals.

Gruhn 2020

Ruth Gruhn, *Evidence grows for early peopling of the Americas*. nature **584** (2020), 47–48.

The long-debated timing of the peopling of the Americas comes into focus, thanks to some archaeological findings. What are the implications of a revised timeline for our understanding of these earliest inhabitants?

Biologie

Marshall 2020

Fiona Marshall, *Cats as predators and early domesticates in ancient human landscapes*. PNAS **117** (2020), 18154–18156.

Spinney 2020

Laura Spinney, *The Hidden History of Ancient Plagues*. nature **584** (2020), 30–32.

A finding that Vikings carried smallpox virus shows how genetics is changing our knowledge of past diseases.

Datierung

Aston 2012

David Aston, *Radiocarbon, Wine Jars and New Kingdom Chronology*. Ägypten und Levante **22** (2012), 289–315.

In every case, however, the conventional low chronology is at the extreme earliest edge of the 2010 two sigma range, slightly less so in the 2013 result. If, however, the arguments presented in this paper are followed, then in the first (high) scenario, Tuthmosis III coming to the throne in 1493 BC and Ramesses II in 1290 BC, then both, and also Amenophis II, fit into the 'expected' one sigma range as indicated by the Carbon 14 results of Bronk Ramsey et al, whilst in the second (ultrahigh), with Tuthmosis III coming to the throne in 1504 BC only Ramesses II falls into the 'correct' range. With a 1493 – 1290 BC correlation, however, it can be seen that the radiocarbon dates, lunar dates (even though 1504 is astronomically preferable), wine dockets and the archaeological analysis given above are remarkably in accord with one another which might, therefore, suggest that the 1493 – 1290 BC correlation for the first years of Tuthmosis III and Ramesses II is probably 'correct,' or at least 'more correct,' than other synchronisms.

Klima

Liu 2020

Yu Liu, Huiming Song, Zhisheng An, Changfeng Sun, Valerie Trouet, Qiufang Cai & Steven W. Leavitt et al., *Recent anthropogenic curtailing of Yellow River runoff and sediment load is unprecedented over the past 500 y*. PNAS **117** (2020), 18251–18257.

pnas117-18251-Supplement.pdf

The Yellow River (YR) is the fifth-longest and the most sedimentladen river in the world. Frequent historical YR flooding events, however, have resulted in tremendous loss of life and property, whereas in recent decades YR runoff and sediment load have fallen sharply. To put these recent changes in a longer-term context, we reconstructed natural runoff for the middle reach of the YR back to 1492 CE using a network of 31 moisture-sensitive treering width chronologies. Prior to anthropogenic interference that started in the 1960s, the lowest natural runoff over the past 500 y occurred during 1926 to 1932 CE, a drought period that can serve as a benchmark for future planning of YR water allocation. Since the late 1980s, the low observed YR runoff has exceeded the natural range of runoff variability, a consequence of the combination of decreasing precipitation and increasing water consumption by direct and indirect human activities, particularly agricultural irrigation. This reduced runoff has resulted in an estimated 58 % reduction of the sediment load in the upper reach of the YR and 29 % reduction in the middle reach.

Keywords: tree rings | Yellow River | runoff reconstruction | sediment load | water consumption

Yu Liu, Huiming Song, Zhisheng An, Changfeng Sun, Valerie Trouet, Qiufang Cai, Ruoshi Liu, Steven W. Leavitt, Yi Song, Qiang Li, Congxi Fang, Weijian Zhou, Yinke Yang, Zhao Jin, Yunqiang Wang, Junyan Sun, Xingmin Mu, Ying Lei, Lu Wang, Xuxiang Li, Meng Ren, Linlin Cui & Xueli Zeng

Significance: The Yellow River (YR) is the cradle of Chinese civilization. It supports agriculture, social prosperity, and human survival. YR runoff and sediment load have sharply fallen since the late 1980s. We reconstructed natural runoff history for the middle reach of the YR from 1492 to 2013 CE. We found that the recent low observed YR runoff is unprecedented over the past five centuries, mainly due to the combination of decreasing precipitation and increasing water consumption by human activities, particularly agricultural irrigation. Our results provide a valuable historical dataset for YR water management, as well as an important model for how to distinguish and quantify anthropogenic influence from natural variability in global change studies.

Safaierad 2020

Reza Safaierad, Mahyar Mohtadi, Bernd Zolitschka, Yusuke Yokoyama, Christoph Vogt & Enno Schefuß, *Elevated dust depositions in West Asia linked to ocean-atmosphere shifts during North Atlantic cold events*. PNAS **117** (2020), 18272–18277.

pnas117-18272-Supplement1.pdf, pnas117-18272-Supplement2.xlsx

Rapid North Atlantic cooling events during the last deglaciation caused atmospheric reorganizations on global and regional scales. Their impact on Asian climate has been investigated for monsoonal domains, but remains largely unknown in westerly winddominated semiarid regions. Here we generate a dust record from southeastern Iran spanning the period 19 to 7 cal. ka B.P. We find a direct link between frequent occurrences of dust plumes originating from the Arabian Peninsula and North Africa and rapid southward shifts of the westerlies associated with changes of the winter stationary waves during Heinrich Stadial 1, the Younger Dryas, the Preboreal Oscillation, and the 8.2-ka event. Dust input rises and falls abruptly at the transitions into and out of these cooling events, which we attribute to changes in the ocean circulation strength that are modulated by the North Atlantic winter sea-ice cover. Our findings reveal that waxing and waning of North American ice sheets have a stronger influence than those of European ice sheets on the winter climate over West Asia.

Keywords: atmospheric dust | North Atlantic cooling | Northern Hemisphere westerlies | sea ice | West Asia

Significance: North Atlantic cold events in the past have been shown to cause large-scale atmospheric reorganizations. Results of our dust record from southeastern Iran, which is highly susceptible to capture dust storms from North Africa and the Arabian Peninsula—the largest dust source on Earth—show a direct link between North Atlantic cooling and enhanced eastward dust transport from the Arabian Peninsula and North Africa. This finding suggests that climate conditions over western Asia during these cold events were controlled by a southward shift in the winter position of the Northern Hemisphere westerlies and more susceptible to variations in the North American winter ice cover.

Kultur

Crassard 2020

Rémy Crassard, Vincent Charpentier, Joy McCorriston, Jérémie Vosges, Sofiane Bouzid & Michael D. Petraglia, *Fluted-point technology*

in Neolithic Arabia, An independent invention far from the Americas. PLoS ONE **15** (2020), e236314. DOI:10.1371/journal.pone.0236314.

New World archaeologists have amply demonstrated that fluted point technology is specific to Terminal Pleistocene American cultures. Base-fluted, and rarer tip-fluted, projectile points from the Americas have been well-documented by archaeologists for nearly a century. Fluting is an iconic stone tool manufacturing method and a specific action that involves the extraction of a channel flake along the longitudinal axis of a bifacial piece. Here we report and synthesize information from Neolithic sites in southern Arabia, demonstrating the presence of fluting on a variety of stone tool types including projectile points. Fluted projectile points are known from both surface sites and stratified contexts in southern Arabia. Fluting technology has been clearly identified at the Manayzah site (Yemen) dating to 8000–7700 cal. BP. Examination of fluted points and channel flakes from southern Arabia enable a reconstruction of stone tool manufacturing techniques and reduction sequences (chaines ope' ratoires). To illustrate the technological similarities and contrasts of fluting methods in Arabia and the Americas, comparative studies and experiments were conducted. Similarities in manufacturing approaches were observed on the fluting scars of bifacial pieces, whereas technological differences are apparent in the nature and localization of the flute and, most probably, the functional objective of fluting in economic, social and cultural contexts. Arabian and American fluted point technologies provide an excellent example of convergence of highly specialized stone tool production methods. Our description of Arabian and American fluting technology demonstrates that similar innovations and inventions were developed under different circumstances, and that highly-skilled and convergent production Methods can have different anthropological implications.

Mathematik

West 2020

B. J. West, G. F. Massari, G. Culbreth, R. Failla, M. Bologna, R. I. M. Dunbar & P. Grigolini, *Relating size and functionality in human social networks through complexity*. PNAS **117** (2020), 18355–18358.

pnas117-18355-Supplement.pdf

Extensive empirical evidence suggests that there is a maximal number of people with whom an individual can maintain stable social relationships (the Dunbar number). We argue that this arises as a consequence of a natural phase transition in the dynamic self-organization among N individuals within a social system. We present the calculated size dependence of the scaling properties of complex social network models to argue that this collective behavior is an enhanced form of collective intelligence. Direct calculation establishes that the complexity of social networks as measured by their scaling behavior is nonmonotonic, peaking around 150, thereby providing a theoretical basis for the value of the Dunbar number. Thus, we establish a theory-based bridge spanning the gap between sociology and psychology.

Keywords: Dunbar number | allometry relation | network calculations | complexity | functionality/size

Significance: Dunbar hypothesized, on the basis of empirical evidence, that a typical individual can have a stable relation with at most 150 other people. We establish that this number results from the internal dynamics of a complex network. Two network models having phase transitions are used to determine the optimal size for the most efficient information exchange. Such criticality generates inter-

mittent events, with time intervals between successive events being independent (renewal) and scaling. The scaling index depends nonmonotonically on network size and direct calculations show that the index is maximum for networks the size of the Dunbar number and provides maximal information exchange efficiency. This result provides a theory-based bridge to span the conceptual gap between psychology and sociology.

Story or Book

Wagenmakers 2020

Eric-Jan Wagenmakers, *Statistical dark arts imperil democracy — and life*. nature **584** (2020), 36.

Two scourges of the infodemic show how to spot quantitative chicanery.

Calling Bullshit: The Art of Scepticism in a Data-Driven World. Carl T. Bergstrom & Jevin D. West. Allen Lane (2020)

Their target is statistical shenanigans: "language, statistical figures, data graphics, and other forms of presentation intended to persuade or impress an audience by distracting, overwhelming, or intimidating them with a blatant disregard for truth, logical coherence, or what information is actually being conveyed."

When researchers claim an association between two variables, it is good practice to show the scatter plot of data points. Otherwise, it is almost impossible to assess whether the claimed relation might be nonlinear, or the result of outliers, or due to unexpected clusters. To paraphrase statistician Frederick Mosteller: although it is easy to lie with data visualization, it is even easier to lie without it.