Liste erstellt am 2020-08-02

References

Aktuell

Bartik 2020

Alexander W. Bartik, Marianne Bertrand, Zoe Cullen, Edward L. Glaeser, Michael Luca & Christopher Stanton, *The impact of COVID-19 on small business outcomes and expectations*. PNAS **117** (2020), 17656–17666. DOI:10.1073/pnas.2006991117.

pnas117-17656-Supplement.pdf

To explore the impact of coronavirus disease 2019 (COVID-19) on small businesses, we conducted a survey of more than 5,800 small businesses between March 28 and April 4, 2020. Several themes emerged. First, mass layoffs and closures had already occurred—just a few weeks into the crisis. Second, the risk of closure was negatively associated with the expected length of the crisis. Moreover, businesses had widely varying beliefs about the likely duration of COVID-related disruptions. Third, many small businesses are financially fragile: The median business with more than $10,000 in monthly expenses had only about 2 wk of cash on hand at the time of the survey. Fourth, the majority of businesses planned to seek funding through the Coronavirus Aid, Relief, and Economic Security (CARES) Act. However, many anticipated problems with accessing the program, such as bureaucratic hassles and difficulties establishing eligibility. Using experimental variation, we also assess take-up rates and business resilience effects for loans relative to grants-based programs.

Keywords: COVID-19 | small businesses | CARES Act

Significance: Drawing on a survey of more than 5,800 small businesses, this paper provides insight into the economic impact of coronavirus 2019 (COVID-19) on small businesses. The results shed light on both the financial fragility of many small businesses, and the significant impact COVID-19 had on these businesses in the weeks after the COVID-19–related disruptions began. The results also provide evidence on businesses' expectations about the longer-term impact of COVID-19, as well as their perceptions of relief programs offered by the government.

Moghadas 2020

Seyed M. Moghadas et al., *The implications of silent transmission for the control of COVID-19 outbreaks*. PNAS **117** (2020), 17513–17515. DOI:10.1073/pnas.2008373117.

Since the emergence of coronavirus disease 2019 (COVID-19), unprecedented movement restrictions and social distancing measures have been implemented worldwide. The socioeconomic repercussions have fueled calls to lift these measures. In the absence of population-wide restrictions, isolation of infected individuals is key to curtailing transmission. However, the effectiveness of symptom-based isolation in preventing a resurgence depends on the extent of presymptomatic and asymptomatic transmission. We evaluate the contribution of presymptomatic and asymptomatic transmission based on recent individuallevel data regarding infectiousness prior to symptom onset and the asymptomatic proportion among all infections. We found that the majority of incidences may be attributable to silent transmission from a combination of the presymptomatic stage and asymptomatic

infections. Consequently, even if all symptomatic cases are isolated, a vast outbreak may nonetheless unfold. We further quantified the effect of isolating silent infections in addition to symptomatic cases, finding that over one-third of silent infections must be isolated to suppress a future outbreak below 1 % of the population. Our results indicate that symptom-based isolation must be supplemented by rapid contact tracing and testing that identifies asymptomatic and presymptomatic cases, in order to safely lift current restrictions and minimize the risk of resurgence.

Keywords: COVID-19 | contact tracing | case isolation

Seyed M. Moghadas, Meagan C. Fitzpatrick, Pratha Sah, Abhishek Pandey, Affan Shoukat, Burton H. Singer & Alison P. Galvani

Nigra 2020

Anne E. Nigra, *Environmental racism and the need for private well protections*. PNAS **117** (2020), 17476–17478.

MacDonald Gibson et al. estimated that average blood lead concentrations were 20 % higher (95 % CI, 15 %, 25 %; P trend < 0.001) among children using private wells compared to those using regulated public water systems. The odds of exceeding the CDC's action limit for lead exposure were also higher for children using private wells (odds ratio, 1.25; 95 %CI, 1.06, 1.48).

Xie 2020

Weizhen Xie, Stephen Campbell & Weiwei Zhang, *Working memory capacity predicts individual differences in social-distancing compliance during the COVID-19 pandemic in the United States*. PNAS **117** (2020), 17667–17674. DOI:10.1073/pnas.2008868117.

pnas117-17667-Supplement.pdf

Noncompliance with social distancing during the early stage of the coronavirus disease 2019 (COVID-19) pandemic poses a great challenge to the public health system. These noncompliance behaviors partly reflect people's concerns for the inherent costs of social distancing while discounting its public health benefits. We propose that this oversight may be associated with the limitation in one's mental capacity to simultaneously retain multiple pieces of information in working memory (WM) for rational decision making that leads to social-distancing compliance. We tested this hypothesis in 850 United States residents during the first 2 wk following the presidential declaration of national emergency because of the COVID-19 pandemic. We found that participants' social-distancing compliance at this initial stage could be predicted by individual differences in WM capacity, partly due to increased awareness of benefits over costs of social distancing among higher WM capacity individuals. Critically, the unique contribution of WM capacity to the individual differences in social-distancing compliance could not be explained by other psychological and socioeconomic factors (e.g., moods, personality, education, and income levels). Furthermore, the critical role of WM capacity in social-distancing compliance can be generalized to the compliance with another set of rules for social interactions, namely the fairness norm, in Western cultures. Collectively, our data reveal contributions of a core cognitive process underlying social-distancing compliance during the early stage of the COVID-19 pandemic, highlighting a potential cognitive venue for developing strategies to mitigate a public health crisis.

Keywords: working memory | social distancing | social norm | individual differences | COVID-19

Significance: Before vaccination and other intervention measures become available, successful containment of an unknown infectious disease critically relies on

people's voluntary compliance with the recommended social-distancing guidelines. This involves a decision process of prioritizing the merits of social distancing over its costs, which may depend on one's ability to compare multiple pieces of potentially conflicting information regarding social distancing in working memory. Our data support this hypothesis, highlighting the critical role of one's working memory capacity in social-distancing compliance during the early stage of the coronavirus disease 2019 pandemic. This observation reveals a core cognitive limitation in one's response to a public health crisis and suggests a possible cognitive venue for the development of strategies to mitigate this challenge.

Amerika

Barras 2020

Colin Barras, *When Did People Reach The Americas? Cave Tools Stoke Debate*. nature **583** (2020), 670–671.

Stone artefacts point to occupation more than 30,000 years ago — but not everyone is convinced.

Bibel

Moulis 2020

David Rafael Moulis, *Hezekiah's Religious Reform – In the Bible and Archaeology*, *What was King Hezekiah's reform like on the ground?* Bible History Daily **2020**, July 24.

Despite what the Bible says in 2 Kings 23, cultic changes during Hezekiah's reign were absolute and left nothing to be centralized by King Josiah at the end of the seventh century. Indeed, only one phase of Judahite religious reform is visible in archaeological record, and that one is Hezekiah's.

Müller-Kessler 2020

Christa Müller-Kessler, *A Palimpsest Fragment with Unattested Passages of Job 3:11c–4:3b in Christian Palestinian Aramaic under Sinai, Greek NF MG 14*. Collectanea Christiana Orientalia **17** (2020), 183–196.

This palimpsest fragment with unattested passages of Job 3:11c4:3b in the Christian Palestinian Aramaic translation with Lucian readings has been preserved in a Greek codex registered as Sinai, Greek NF MG 14 in the Monastery of St Catherine. The biblical text is one of more than 160 palimpsests, which could be identified among the New Finds that were discovered in 1975 in a blocked-up chamber. With the help of the new technology of multispectral digital imaging it was possible to bring out the reading of the lower script for this Bible section. The unpublished text is edited here in transliteration and translation with commentaries on the variant witnesses.

Keywords: Christian Palestinian Aramaic | Greek | Job | Lucian | Palimpsest | Peshitta | St Catherine's Monastery | Septuagint | Syrohexapla.

Shochat 2018

Harel Shochat & Ayelet Gilboa, *Elusive destructions*, *Reconsidering the Hazor Iron Age II sequence and its chronological and historical implications*. Levant **50** (2018), 363–386.

Hazor, a key Iron Age II site in the southern Levant, was excavated by Yigael Yadin in the 1950s and subsequently by Amnon Ben-Tor. The Iron Age II stratigraphic sequence established proved very influential and nearly canonical; it was interpreted as representing periodic building-and-destruction cycles. The three superimposed 'cities' thus reconstructed were inter-alia understood to reflect alternating Israelite/Aramean domination in this conflict-prone border area before the final Assyrian destruction in the late 8th century BCE. Here we offer an alternative reconstruction for Hazor's stratigraphic/architectural development, with repercussions for several chronological and political-historic aspects of the Kingdom of Israel and the greater Levant.

Keywords: Hazor | Kingdom of Israel | Iron Age chronology | Aram-Damascus

Biologie

Gibbons 2020

Ann Gibbons, *How an ancient microbial arms race remodeled human cells*. science **369** (2020), 491–492.

Study traces genetic responses to pathogens back to ancestor of Neanderthals and modern humans.

Krajcarz 2020

Magdalena Krajcarz & Maciej T. Krajcarz et al., *Ancestors of domestic cats in Neolithic Central Europe: Isotopic evidence of a synanthropic diet*. PNAS **117** (2020), 17710–17719.

pnas117-17710-Supplement.pdf

Cat remains from Poland dated to 4,200 to 2,300 y BCE are currently the earliest evidence for the migration of the Near Eastern cat (NE cat), the ancestor of domestic cats, into Central Europe. This early immigration preceded the known establishment of housecat populations in the region by around 3,000 y. One hypothesis assumed that NE cats followed the migration of early farmers as synanthropes. In this study, we analyze the stable isotopes in six samples of Late Neolithic NE cat bones and further 34 of the associated fauna, including the European wildcat. We approximate the diet and trophic ecology of Late Neolithic felids in a broad context of contemporary wild and domestic animals and humans. In addition, we compared the ecology of Late Neolithic NE cats with the earliest domestic cats known from the territory of Poland, dating to the Roman Period. Our results reveal that human agricultural activity during the Late Neolithic had already impacted the isotopic signature of rodents in the ecosystem. These synanthropic pests constituted a significant proportion of the NE cat's diet. Our interpretation is that Late Neolithic NE cats were opportunistic synanthropes, most probably free-living individuals (i.e., not directly relying on a human food supply). We explore niche partitioning between studied NE cats and the contemporary native European wildcats. We find only minor differences between the isotopic ecology of both these taxa. We conclude that, after the appearance of the NE cat, both felid taxa shared the ecological niches.

Keywords: wildcat | synanthropic species | stable isotopes | paleoecology | trophic niche

Magdalena Krajcarz, Maciej T. Krajcarz, Mateusz Baca, Chris Baumann, Wim Van Neer, Danijela Popović, Magdalena Sudo-Procyk, Bartosz Wach, Jarosaw Wilczyński, Micha Wojenka & Hervé Bocherens

Significance: Most of today's domesticates began as farm animals, but cat domestication took a different path. Cats became commensal of humans somewhere

in the Fertile Crescent, attracted to early farmers' settlements by rodent pests. Cat remains from Poland dated to 4,200 to 2,300 y BCE are currently the earliest evidence for the migration of the Near Eastern wildcat to Central Europe. Tracking the possible synanthropic origin of that migration, we used stable isotopes to investigate the paleodiet. We found that the ecological balance was already changed due to the expansion of Neolithic farmlands. We conclude that among the Late Neolithic Near Eastern wildcats from Poland were free-living individuals, who preyed on rodent pests and shared ecological niches with native European wildcats.

Lidsky 2020

Peter V. Lidsky & Raul Andino, *Epidemics as an adaptive driving force determining lifespan setpoints*. PNAS **117** (2020), 17937–17948.

pnas117-17937-Supplement0.pdf, pnas117-17937-Supplement1.mp4, pnas117-17937-Supplement2.mp4, pnas117-17937-Supplement3.mp4, pnas117-17937-Supplement4.mp4, pnas117-17937-Supplement5.avi, pnas117-17937-Supplement6.mp4, pnas117-17937-Supplement7.mp4, pnas117-17937-Supplement8.mp4, pnas117-17937-Supplement9.mp4

Species-specific limits to lifespan (lifespan setpoint) determine the life expectancy of any given organism. Whether limiting lifespan provides an evolutionary benefit or is the result of an inevitable decline in fitness remains controversial. The identification of mutations extending lifespan suggests that aging is under genetic control, but the evolutionary driving forces limiting lifespan have not been defined. By examining the impact of lifespan on pathogen spread in a population, we propose that epidemics drive lifespan setpoints' evolution. Shorter lifespan limits infection spread and accelerates pathogen clearance when compared to populations with longer-lived individuals. Limiting longevity is particularly beneficial in the context of zoonotic transmissions, where pathogens must undergo adaptation to a new host. Strikingly, in populations exposed to pathogens, shorter-living variants outcompete individuals with longer lifespans. We submit that infection outbreaks can contribute to control the evolution of species' lifespan setpoints.

Keywords: aging | epidemics | evolution | lifespan

Significance: Aging is an evolutionary paradox. Traditionally, it is assumed as a maladaptive and nonprogrammed process of physical deterioration. Hypotheses of programmed aging are currently regarded as unfeasible since the evolutionary benefits of senescence are unclear. Here, we develop a model indicating that limiting lifespan is beneficial to control epidemics, providing a possible explanation for species lifespan setpoint selection and the absence of biologically immortal mutants. Our study suggests a unifying hypothesis in which lifespan is selected to prevent and limit outbreaks of chronic infectious diseases.

Datierung

Fairbairn 2020

Andrew Fairbairn, Piotr Jacobsson, Douglas Baird, Geraldine Jacobsen & Elizabeth Stroud, *Settlement change on the western Konya Plain, Refining Neolithic and Chalcolithic chronologies at Canhasan, Turkey*. Antiquity **94** (2020), 342–360.

Antiquity094-0342-Supplement.pdf

The Konya Plain in western Turkey hosted some of the earliest known farming communities beyond the Fertile Crescent. While robust radiocarbon chronologies have elucidated the development of local Neolithic settlement patterns, particularly

for Çatalhöyük, the history of occupation at Canhasan sites III and I to the south-east is less clear. Here, the authors present new radiocarbon dates for these sites, demonstrating that these settlements align closely with the occupation sequence to the north. Aceramic Neolithic occupation at Canhasan III further emphasises Çatalhöyük East's isolation for most of the Ceramic Neolithic, while Canhasan I was reoccupied during a phase of dispersed settlement.

Keywords: Anatolia | Konya Plain | Neolithic | Chalcolithic | settlement history

LINDNER 2020

Stephan Lindner, *Chariots in the Eurasian Steppe, A Bayesian approach to the emergence of horse-drawn transport in the early second millennium BC*. Antiquity **94** (2020), 361–380.

Antiquity094-0361-Supplement.pdf

In Eastern Europe, the use of light vehicles with spoked wheels and harnessed horse teams is first evidenced in the early second-millennium BC SintashtaPetrovka Culture in the South-eastern Ural Mountains. Using Bayesian modelling of radiocarbon dates from the kurgan cemetery of Kamennyj Ambar-5, combined with artefactual and stratigraphic analyses, this article demonstrates that these early European chariots date to no later than the first proto-chariots of the ancient Near East. This result suggests the earlier emergence of chariots on the Eurasian Steppe than previously thought and contributes to wider debates on the geography and chronology of technological innovations.

Keywords: Eurasian Steppe | Bronze Age | Sintashta Culture | chariots | Bayesian modelling | horse tack | technological innovation

VERVUST 2020

Soetkin Vervust, Tim Kinnaird, Peter Herring & Sam Turner, *Optically stimulated luminescence profiling and dating of earthworks, The creation and development of prehistoric field boundaries at Bosigran, Cornwall*. Antiquity **94** (2020), 420–436.

Antiquity094-0420-Supplement.pdf

Accurately dating the creation and development of earthwork features is a long-standing problem for archaeologists. This article presents results from Bosigran (Cornwall, UK), where boundary banks believed to be prehistoric in origin are assessed using optically stimulated luminescence profiling and dating (OSLPD). The results provide secure construction dates for different boundaries in the Bronze and Iron Ages, as well as chronologies for their early medieval and later development. The research demonstrates not only the prehistoric origins of these distinctive Cornish field systems, but also a practical and costeffective methodology suitable for dating earthworks around the world.

Keywords: Britain | Cornwall | Bronze Age | Iron Age | landscape archaeology | OSL-PD | field systems

Jungpaläolithikum

PRYOR 2020

Alexander J. E. Pryor et al., *The chronology and function of a new circular mammoth-bone structure at Kostenki 11*. Antiquity **94** (2020), 323–341.

Antiquity094-0323-Supplement.pdf

Circular features made from mammoth bone are known from across Upper Palaeolithic Eastern Europe, and are widely identified as dwellings. The first systematic flotation programme of samples from a recently discovered feature at Kostenki 11 in Russia has yielded assemblages of charcoal, burnt bone and microlithic debitage. New radiocarbon dates provide the first coherent chronology for the site, revealing it to be one of the oldest such features on the Russian Plain. The authors discuss the implications for understanding the function of circular mammoth-bone features during the onset of the Last Glacial Maximum.

Alexander J. E. Pryor, David G. Beresford-Jones, Alexander E. Dudin, Ekaterina M. Ikonnikova, John F. Hoffecker & Clive Gamble

Keywords: Russian Plain | Kostenki | Palaeolithic | mammoth bone | dwelling | flotation | debitage

Klima

Malhotra 2020

Avni Malhotra, Deanne J. Brice, Joanne Childs, Jake D. Graham, Erik A. Hobbie, Holly Vander Stel, Sarah C. Feron, Paul J. *Peatland warming strongly increases fine-root growth.* PNAS **117** (2020), 17627–17634.

pnas117-17627-Supplement.pdf

Belowground climate change responses remain a key unknown in the Earth system. Plant fine-root response is especially important to understand because fine roots respond quickly to environmental change, are responsible for nutrient and water uptake, and influence carbon cycling. However, fine-root responses to climate change are poorly constrained, especially in northern peatlands, which contain up to two-thirds of the world's soil carbon. We present fine-root responses to warming between +2 °C and 9 °C above ambient conditions in a whole-ecosystem peatland experiment. Warming strongly increased fine-root growth by over an order of magnitude in the warmest treatment, with stronger responses in shrubs than in trees or graminoids. In the first year of treatment, the control (+0 °C) shrub fine-root growth of 0.9 km m-2 y-1 increased linearly by 1.2 km m-2 y-1 (130 %) for every degree increase in soil temperature. An extended belowground growing season accounted for 20 % of this dramatic increase. In the second growing season of treatment, the shrub warming response rate increased to 2.54 km m-2 °C-1. Soil moisture was negatively correlated with fine-root growth, highlighting that drying of these typically water-saturated ecosystems can fuel a surprising burst in shrub belowground productivity, one possible mechanism explaining the "shrubification" of northern peatlands in response to global change. This previously unrecognized mechanism sheds light on how peatland fine-root response to warming and drying could be strong and rapid, with consequences for the belowground growing season duration, microtopography, vegetation composition, and ultimately, carbon function of these globally relevant carbon sinks.

Keywords: peatland | belowground plant response | experimental warming | elevated carbon dioxide | fine roots

Avni Malhotra, Deanne J. Brice, Joanne Childs, Jake D. Graham, Erik A. Hobbie, Holly Vander Stel, Sarah C. Feron, Paul J. Hanson & Colleen M. Iversen

Significance: Peatlands store up to two-thirds of the world's soil carbon, but this carbon may be released under warmer conditions, creating an important climate feedback. The belowground warming response of peatlands is particularly uncertain even though factors such as plant root growth regulate ecosystem water, carbon, and nutrient cycles. We studied how peatland fine roots respond to warm-

ing in a whole-ecosystem experiment. Fine-root growth increased dramatically, +130 % for a degree of warming, primarily driven by soil drying. This warming response is 20 times stronger than in other ecosystem experiments, highlighting peatland vulnerability to warming. Our study elucidates large and rapid belowground changes that will affect peatlands of a warmer world and their ability to store carbon into the future.

Oppenheimer 2020

Clive Oppenheimer, *The sun of Rome is set! Volcanic dust veils and their political fallout*. PNAS **117** (2020), 17470–17472.

At a time where civil preparedness for low-probability/ high-consequence global risks is thrown into the spotlight, it is worth remembering there are other kinds of threat that, too, might one day wreak worldwide havoc. Interdisciplinary research such as the study of McConnell et al. is not only fascinating for its insights into human history, it carries a message for our future.

Smith 2020

D. M. Smith et al., *North Atlantic climate far more predictable than models imply*. nature **583** (2020), 796–800.

Quantifying signals and uncertainties in climate models is essential for the detection, attribution, prediction and projection of climate change1–3. Although intermodel agreement is high for large-scale temperature signals, dynamical changes in atmospheric circulation are very uncertain4. This leads to low confidence in regional projections, especially for precipitation, over the coming decades5,6. The chaotic nature of the climate system7–9 may also mean that signal uncertainties are largely irreducible. However, climate projections are difficult to verify until further observations become available. Here we assess retrospective climate model predictions of the past six decades and show that decadal variations in North Atlantic winter climate are highly predictable, despite a lack of agreement between individual model simulations and the poor predictive ability of raw model outputs. Crucially, current models underestimate the predictable signal (the predictable fraction of the total variability) of the North Atlantic Oscillation (the leading mode of variability in North Atlantic atmospheric circulation) by an order of magnitude. Consequently, compared to perfect models, 100 times as many ensemble members are needed in current models to extract this signal, and its effects on the climate are underestimated relative to other factors. To address these limitations, we implement a two-stage postprocessing technique. We first adjust the variance of the ensemble-mean North Atlantic Oscillation forecast to match the observed variance of the predictable signal. We then select and use only the ensemble members with a North Atlantic Oscillation sufficiently close to the variance-adjusted ensemble-mean forecast North Atlantic Oscillation. This approach greatly improves decadal predictions of winter climate for Europe and eastern North America. Predictions of Atlantic multidecadal variability are also improved, suggesting that the North Atlantic Oscillation is not driven solely by Atlantic multidecadal variability. Our results highlight the need to understand why the signal-to-noise ratio is too small in current climate models10, and the extent to which correcting this model error would reduce uncertainties in regional climate change projections on timescales beyond a decade.

D. M. Smith, A. A. Scaife, R. Eade, P. Athanasiadis, A. Bellucci, I. Bethke, R. Bilbao, L. F. Borchert, L.-P. Caron, F. Counillon, G. Danabasoglu, T. Delworth, F. J. Doblas-Reyes, N. J. Dunstone, V. Estella-Perez, S. Flavoni, L. Hermanson, N. Keenlyside, V. Kharin, M. Kimoto, W. J. Merryfield, J. Mignot, T. Mochizuki, K. Modali, P.-A. Monerie, W. A. Müller, D. Nicolí, P. Ortega, K. Pankatz, H.

Pohlmann, J. Robson, P. Ruggieri, R. Sospedra-Alfonso, D. Swingedouw, Y. Wang, S. Wild, S. Yeager, X. Yang & L. Zhang

Voosen 2020

Paul Voosen, *Hidden predictability in winds could improve climate forecasts*. science **369** (2020), 490–491.

Study finds climate models are missing wind patterns, casting doubt on long-term forecasts of rain and storms.

It also means efforts to attribute specific weather events to global warming, now much in vogue, are rife with errors.

Kirtman thinks something fundamental is wrong with the models' code. For the time being, he says, "You're probably making pretty profound mistakes in your climate change assessment" by relying on regional forecasts.

The missing predictability also undermines so-called event attribution, which attempts to link extreme weather to climate change by using models to predict how sea surface warming is altering wind patterns. The changes in winds, in turn, affect the odds of extreme weather events, like hurricanes or floods. But the new work suggests "the probabilities they derive will probably not be correct," Smith says.

But until modelers figure out how to confidently forecast changes in the winds, Smith says, "We can't take the models at face value."

Kultur

Elgart-Sharon 2020

Yelena Elgart-Sharon, Naomi Porat & Yuval Gadot, *Land Management and the Construction of Terraces for Dry Farming, The Case of the Soreq Catchment, Israel*. Oxford Journal of Archaeology **39** (2020), 274–289.

OxJArch39-274-Supplement.pdf

The construction of terrace walls for dry farming in the highlands of the Levant was traditionally associated with demographic growth that caused pressure on available land for cultivation. In this paper we suggest an alternative model and claim that terraces were adopted as a subsistence strategy at periods when land ownership was centralized in the hands of either powerful landowners or managed through complex family-based cooperation like the Musha system of the Late Antiquity period. This claim is based both on the study of land use and settlement patterns within the Upper Nahal Soreq, north-west of Jerusalem, where close to 350 excavated or surveyed sites of all kinds were catalogued and mapped, and on the results of an OSL dating project that directly dated the construction of terrace walls for dry farming in the highlands of Jerusalem in general and at the Upper Nahal Soreq catchment in particular.

Hermann 2020

Raphael Hermann, Judith Steinhoff, Philipp Schlotzhauer & Philipp Vana, *Breaking News! Making and testing Bronze Age balance scales*. Journal of Archaeological Science: Reports **32** (2020), 102444.

JASRep032-102444-Supplement.pdf

This interdisciplinary paper (archaeology, macromolecular chemistry and material science) investigates the production and load-bearing capacities of Bronze Age balance scales.

The existence of weighing equipment and practices in Late Bronze Age Europe has been proven beyond doubt. Although hundreds of balance weights from Central and Western Europe have recently been identified in the archaeological record, balance scales are still extremely rare. Consisting of balance beams, suspension cords, scale pans and sometimes metal suspension loops, the only evidence found to date are 18 complete and fragmented balance beams. Made of bone or antler, these balance beams are often perceived as extremely fragile and only able to weigh-out minute loads. This, however, had never been tested. In order to understand exactly how Bronze Age balances were made, of what materials and how much load they could bear, a number of replica balance beams, suspension cords and metal loops were created. The load-bearing capacity was then tested with two standard material sciences testing methods: three-point bending tests and uniaxial tensile testing.

Keywords: European Bronze Age | Balance scales | Weight metrology | Experimental archaeology | Bone carving | Fibre making | Bronze wire