

References

Aktuell

BAILEY 2020

Shara E. Bailey, Kornelius Kupczik, Jean-Jacques Hublin & Susan C. Antón, *A closer look at the 3-rooted lower second molar of an archaic human from Xiahe, Reply to Scott et al.* [PNAS 117 \(2020\), 39–40.](#)

In conclusion, while the slightly different morphological expression of the 3RLM of Xiahe may suggest some caution in our interpretation, we believe it is highly unlikely that these features are nonhomologous; and we find it an improbable coincidence that the nearly exclusively Asian 3RLM is also found (albeit in slightly different form) in Asian fossil hominins. A small difference in developmental timing can lead to slightly different expression of a genetically homologous trait. The answer to the questions of whether the 3RLM in Xiahe is homologous with the archetypal 3RLM and whether or not its occurrence in recent Asian groups is the result of introgression will ultimately lie in identifying the genetic mutation responsible (e.g., ref. 8).

BERENBAUM 2020

May R. Berenbaum, *On a subject no one wants to read about (about which no one wants to read?).* [PNAS 117 \(2020\), 4–6.](#)

BLASIUS 2020

Bernd Blasius, Lars Rudolf, Guntram Weithoff, Ursula Gaedke & Gregor F. Fussmann, *Long-term cyclic persistence in an experimental predator–prey system.* [nature 577 \(2020\), 226–230.](#)

Predator–prey cycles rank among the most fundamental concepts in ecology, are predicted by the simplest ecological models and enable, theoretically, the indefinite persistence of predator and prey^{1–4}. However, it remains an open question for how long cyclic dynamics can be self-sustained in real communities. Field observations have been restricted to a few cycle periods^{5–8} and experimental studies indicate that oscillations may be short-lived without external stabilizing factors^{9–19}. Here we performed microcosm experiments with a planktonic predator–prey system and repeatedly observed oscillatory time series of unprecedented length that persisted for up to around 50 cycles or approximately 300 predator generations. The dominant type of dynamics was characterized by regular, coherent oscillations with a nearly constant predator–prey phase difference. Despite constant experimental conditions, we also observed shorter episodes of irregular, non-coherent oscillations without any significant phase relationship. However, the predator–prey system showed a strong tendency to return to the dominant dynamical regime with a defined phase relationship. A mathematical model suggests that stochasticity is probably responsible for the reversible shift from coherent to non-coherent oscillations, a notion that was supported by experiments with external forcing by pulsed nutrient supply. Our findings empirically demonstrate the potential for infinite persistence of predator and prey populations in a cyclic dynamic regime that shows resilience in the presence of stochastic events.

BONN 2020

Daniel Bonn, *The physics of ice skating*. [nature 577 \(2020\), 173–174](#).

The slipperiness of ice is poorly understood at a microscopic level. Experiments that probe how the surface of ice melts and flows in response to wear help to explain the exceptionally low friction that underpins winter sports.

GOLDBOGEN 2019

J. A. Goldbogen & N. D. Pyenson et al., *Why whales are big but not bigger, Physiological drivers and ecological limits in the age of ocean giants*. [science 366 \(2019\), 1367–1372](#).

s366-1367-Supplement.pdf

The largest animals are marine filter feeders, but the underlying mechanism of their large size remains unexplained. We measured feeding performance and prey quality to demonstrate how whale gigantism is driven by the interplay of prey abundance and harvesting mechanisms that increase prey capture rates and energy intake. The foraging efficiency of toothed whales that feed on single prey is constrained by the abundance of large prey, whereas filter-feeding baleen whales seasonally exploit vast swarms of small prey at high efficiencies. Given temporally and spatially aggregated prey, filter feeding provides an evolutionary pathway to extremes in body size that are not available to lineages that must feed on one prey at a time. Maximum size in filter feeders is likely constrained by prey availability across space and time.

J. A. Goldbogen, D. E. Cade, D. M. Wisniewska, J. Potvin, P. S. Segre, M. S. Savoca, E. L. Hazen, M. F. Czapanskiy, S. R. Kahane-Rapport, S. L. DeRuiter, S. Gero, P. Tønnesen, W. T. Gough, M. B. Hanson, M. M. Holt, F. H. Jensen, M. Simon, A. K. Stimpert, P. Arranz, D. W. Johnston, D. P. Nowacek, S. E. Parks, F. Visser, A. S. Friedlaender, P. L. Tyack, P. T. Madsen & N. D. Pyenson

HASTINGS 2020

Alan Hastings, *Predator–prey cycles achieved at last*. [nature 577 \(2020\), 172–173](#).

A combination of laboratory experiments and mathematical and statistical analysis provides an affirmative answer to a decades-old question — can a predator and its prey coexist indefinitely?

KHAN 2020

Firdous A. Khan, *Learning to teach*. [science 366 \(2020\), 1574](#).

While preparing to teach my first lecture as a new faculty member, I told myself: “You have many research presentations under your belt; you’ll nail this!” It didn’t take long for me to realize that I was way off base. A few minutes in, the students looked tired, distracted, and in no mood to listen—a stark contrast to my research talk audiences, which seemed attentive at least. At one point, I noticed a few students giggling. “Do I look or talk funny?” I wondered. When I saw that the giggling students were on Facebook, I was relieved. But later I realized that, too, was a sign that I had failed to command their attention.

KINNEBREW 2019

Eva Kinnebrew, *Turning a blind eye*. [science 366 \(2019\), 1410](#).

This summer, I killed a bird while on a research trip. The project leader and I were sitting under a tree, protected from the hot sun, while we placed leg bands on birds we had just caught. I hadn’t handled a bird in a year, and I was nervous that it would escape. I held the bird tightly as it struggled in my hand. Then, as

I readjusted my grip, I saw it was lying limp. “Is he OK?” I asked the project leader in a shaky voice. I handed her the bird and she looked down uncomfortably, setting it on the ground. We both stared at it, wishing the wind blowing its chest feathers was actually its heartbeat returning.

Conventionally farmed bananas shipped thousands of kilometers to Vermont are often the easiest and cheapest snack option I can find, even though eating them while I research sustainable agriculture feels enormously hypocritical. The life of a scientist comes with ethical trade-offs, including ones that aren’t easy to stomach—or avoid. Some scientists, such as myself, may debate the ethics of Methods that could harm or kill animals. Others may struggle with whether it’s the right choice to fly around the world to meetings about climate change.

KOSIK 2020

Kenneth S. Kosik & Sarah Bohndiek, *A biologist talks to a physicist, A physicist talks to a biologist*. *nature* **577** (2020), 281–284.

Working alongside people from different fields can help in improving communication skills and identifying gaps in knowledge. The fastest way to understand a new discipline is to embed yourself in it.

Avoid equations during presentations. It’s not just biologists who would prefer not to see them. Illustrate equations with graphs and visuals as much as possible. If you do have to include equations, write them on a board in real time so your audience can follow your guided explanation — don’t just flash them up on the screen.

SCOTT 2020

G. Richard Scott, Joel D. Irish & María Martínón-Torres, *A more comprehensive view of the Denisovan 3-rooted lower second molar from Xiahe*. *PNAS* **117** (2020), 37–38.

Furthermore, the phenotypic signature of hybridization is still unclear. It is often assumed human hybrids should display intermediate morphologies or a “mosaic” of features inherited from each parental population (e.g., ref. 6). However, recent studies reveal that genetic admixture frequently leads to evolutionary innovation (e.g., ref. 7). Thus, the higher expression of a potentially primitive feature may not necessarily indicate introgression, but simply the retention of an archaic trait. We urge caution about overinterpreting isolated dental features.

SONG 2020

Xi Song, Catherine G. Massey, Karen A. Rolf, Joseph P. Ferrie, Jonathan L. Rothbaum & Yu Xie, *Long-term decline in intergenerational mobility in the United States since the 1850s*. *PNAS* **117** (2020), 251–258.

[pnas117-00251-Supplement.pdf](#)

We make use of newly available data that include roughly 5 million linked household and population records from 1850 to 2015 to document long-term trends in intergenerational social mobility in the United States. Intergenerational mobility declined substantially over the past 150 y, but more slowly than previously thought. Intergenerational occupational rank–rank correlations increased from less than 0.17 to as high as 0.32, but most of this change occurred to Americans born before 1900. After controlling for the relatively high mobility of persons from farm origins, we find that intergenerational social mobility has been remarkably stable. In contrast with relative stability in rank-based measures of mobility, absolute mobility for the nonfarm population—the fraction of offspring whose occupational

ranks are higher than those of their parents—increased for birth cohorts born prior to 1900 and has fallen for those born after 1940.

Keywords: intergenerational mobility | US history | inequality | occupation | US Census

Significance: We document long-term trends in intergenerational occupational mobility for US native-born men using population registers and survey data from 1850 to 2015. We find substantial declines in social mobility over the past 165 y. However, contrary to public perception, most of the decline happened to Americans born prior to 1900, rather than more recently, and was largely driven by the movement of children from farm to manufacturing sectors during industrialization. The proportion of sons who experienced absolute upward mobility increased for birth cohorts born prior to 1900 and has fallen for those born after 1940. One implication is that recent birth cohorts experienced less upward mobility than their parents or grandparents.

WILLIAMS 2019

Terrie M. Williams, *The biology of big*. [science](#) **366** (2019), 1316–1317.

Whales became the world’s largest animals thanks to giant gulps of “bite-size” prey.

Ultimately, “calories in” must equal or exceed “calories out.” For carnivorous mammals, this balance involves decisions on whether to invest the energy required for nibbling on many small prey over time or killing and gorging on a single, large prey item.

When viewed together, the relationship between preferred prey size and mammalian body mass approaches a bell-shaped distribution spanning mammalian predators from weasels to whales (see the figure). At the extremes are the smallest and largest hunting mammals, which subsist on diminutive vertebrates and invertebrates. This leaves mid-sized to large marine and terrestrial mammals, weighing from 25 to 10,000 kg, to hunt big vertebrate prey that might exceed their own size.

Anthropologie

HAMMOND 2020

Ashley S. Hammond, Lorenzo Rook, Elisabetta Cioppi, Loïc Costeur, Salvador Moy-Solà & Sergio Almécija et al., *Insights into the lower torso in late Miocene hominoid *Oreopithecus bambolii**. [PNAS](#) **117** (2020), 278–284.

[pnas117-00278-Supplement.pdf](#)

Oreopithecus bambolii (8.3–6.7 million years old) is the latest known hominoid from Europe, dating to approximately the divergence time of the Pan-hominin lineages. Despite being the most complete nonhominin hominoid in the fossil record, the *O. bambolii* skeleton IGF 11778 has been, for decades, at the center of intense debate regarding the species’ locomotor behavior, phylogenetic position, insular paleoenvironment, and utility as a model for early hominin anatomy. Here we investigate features of the IGF 11778 pelvis and lumbar region based on torso preparations and supplemented by other *O. bambolii* material. We correct several crucial interpretations relating to the IGF 11778 anterior inferior iliac spine and lumbar vertebrae structure and identifications. We find that features of the early hominin *Ardipithecus ramidus* torso that are argued to have permitted both lordosis and pelvic stabilization during upright walking are not present in *O. bambolii*. However, *O. bambolii* also lacks the complete reorganization for torso stiffness seen in extant great apes (i.e., living members of the Hominidae), and is

more similar to large hylobatids in certain aspects of torso form. We discuss the major implications of the *O. bambolii* lower torso anatomy and how *O. bambolii* informs scenarios of hominoid evolution.

Keywords: ape and human evolution | pelvis | lumbar vertebrae | locomotion

Ashley S. Hammond, Lorenzo Rook, Alisha D. Anaya, Elisabetta Cioppi, Loïc Costeur, Salvador Moy-Solà & Sergio Almécija

Significance: Details of the lower torso anatomy of late Miocene *Oreopithecus bambolii* show that this hominoid differed from both extant great apes (chimpanzees, gorillas, and orangutans) and early hominins (e.g., *Ardipithecus*, *Australopithecus*) in key ways. *O. bambolii* lacked the extreme adaptations for pelvic and lumbar rigidity of extant great apes, but also lacked a hominin-like protruding anterior inferior iliac spine (AIIS), short lower ilium, and abductor mechanism of the hip. The revised understanding of the *O. bambolii* lower torso clarifies the phylogenetic and evolutionary scenarios for this peculiar hominoid.

PRICE 2019

Michael Price, *Cave painting suggests ancient origin of modern mind. science* **366** (2019), 1299.

Half-human, half-animal hunters in mythical scene show early artists in Indonesia had sophisticated imaginations.

By analyzing the ratio of uranium to thorium in the mineral layer directly on top of the pigment, the researchers calculated the painting's minimum age: 44,000 years old, they report this week in *Nature*.

"We think of the ability for humans to make a story, a narrative scene, as one of the last steps of human cognition," says the study's lead author, Maxime Aubert, an archaeologist at Griffith University in Nathan, Australia. "This is the oldest rock art in the world and all of the key aspects of modern cognition are there."

Bibel

BAS 2020

Searching for the Temple of King Solomon. BHS **2020**, Jan. 4.

It is the date of the 'Ain Dara temple, however, that offers the most compelling evidence for the authenticity of the Biblical Temple of King Solomon. The 'Ain Dara temple was originally built around 1300 B.C. and remained in use for more than 550 years, until 740 B.C. The plan and decoration of such majestic temples no doubt inspired the Phoenician engineers and craftsmen who built Solomon's grand edifice in the tenth century B.C. As noted by Lawrence Stager of Harvard University, the existence of the 'Ain Dara temple proves that the Biblical description of Solomon's Temple was "neither an anachronistic account based on later temple archetypes nor a literary creation. The plan, size, date and architectural details fit squarely into the tradition of sacred architecture from north Syria (and probably Phoenicia) from the tenth to eighth centuries B.C."

GREENSTEIN 2012

Edward L. Greenstein, *Wisdom in Ugaritic*. In: REBECCA HASSELBACH & NA'AMA PAT-EL (Hrsg.), *Language and Nature, Papers presented to John Huehnergard on the occasion of his 60th birthday. Studies in Ancient Oriental Civilization* **67** (Chicago 2012), 69–89.

Despite the clear existence in second-millennium b.c.e. Syro-Palestine of literary works similar in type and content to biblical wisdom, some biblicalists adhere to the old notion that wisdom literature must be a late development in the formation

of the Hebrew Bible (e.g., Toy 1916, pp. xx–xxxi; Scott 1965, pp. xxxv–xxxix). It is assumed that such a development — cosmopolitan in character — could only have taken place through the influence of foreign wisdom in the mid-first millennium b.c.e. (cf., e.g., Westermann 1995, p. 5).⁷ Works of wisdom among the Syro-Canaanite scribes of the mid- to late second millennium b.c.e. could well have passed from their largely Mesopotamian sources — or, in some cases, like the poem of the pious sufferer (the Ras Shamra Ludlul text), sources of inspiration — to the Canaanite cultural-literary heritage (cf. Gray 1970; Wiseman 1977, pp. 86–87; Mattingly 1990, p. 325; Perdue 2008, p. 39). Scribes who were trained in the Mesopotamian cuneiform tradition and who produced the Akkadian wisdom texts at Ugarit wrote — and transmitted texts — in the local Ugaritic language as well (see, e.g., Saadé 1988; van Soldt 1995a; Márquez Rowe 2008; cf., e.g., Horwitz 1979; Mack-Fisher 1990b, p. 115; Hawley 2008, esp. pp. 60–61).⁸ The wisdom literary traditions — both written and oral (see, e.g., Carr 2005, pp. 27–29 and passim) — represented in the Akkadian texts from Ugarit could well have been conveyed through some form of Canaanite intermediation to the early Hebrew scribes.

MONSON 2000

John Monson, *The New ‘Ain Dara Temple, Closest Solomonic Parallel*. *Biblical Archaeology Review* **26** (2000), iii, 20–35.

A stunning parallel to Solomon’s Temple has been discovered in northern Syria.¹ The temple at ‘Ain Dara has far more in common with the Jerusalem Temple described in the Book of Kings than any other known building. Yet the newly excavated temple has received almost no attention in this country, at least partially because the impressive excavation report, published a decade ago, was written in German by a Syrian scholar and archaeologist.

Islam

HARTWIG 2008

DIRK HARTWIG, WALTER HOMOLKA, MICHAEL J. MARX & ANGELIKA NEUWIRTH (Hrsg.), „Im vollen Licht der Geschichte“, *Die Wissenschaft des Judentums und die Anfänge der kritischen Koranforschung*. Ex Oriente Lux 8 (Würzburg 2008).

MARACCI 1698

Ludovico Maracci, *Refutatio Alcorani*. (Padua 1698).

MARACCI 1698

Ludovico Maracci, *Prodromus Alcorani textus universus*. (Padua 1698).

PARISOT 1894

D. Ioannes Parisot, *Aphraatis sapientis persae demonstrationes*. Patrologia Syriaca (Paris 1894).

SPEYER 1931

Heinrich Speyer, *Die biblischen Erzählungen im Qoran*. (Darmstadt ²1961).

Klima

IRVALY 2020

Nil Irvaly, Eirik V. Galaasen, Ulysses S. Ninnemann, Yair Rosenthal, Andreas Born & Helga F. Kleiven, *A low climate threshold for south Greenland Ice Sheet demise during the Late Pleistocene*. [PNAS 117 \(2020\), 190–195](#).

[pnas117-00190-Supplement.pdf](#), [pnas117-00190-Supplement.xlsx](#)

The Greenland Ice Sheet (GIS) has been losing mass at an accelerating rate over the recent decades. Models suggest a possible temperature threshold between 0.8 and 3.2 °C, beyond which GIS decline becomes irreversible. The duration of warmth above a given threshold is also a critical determinant for GIS survival, underlining the role of ocean warming, as its inertia prolongs warmth and triggers longer-term feedbacks. The exact point at which these feedbacks are triggered remains equivocal. Late Pleistocene interglacials provide potential case examples for constraining the past response of the GIS to a range of climate states, including conditions warmer than present. However, little is known about the magnitude and duration of warming near Greenland during these periods. Using high-resolution multiproxy surface ocean climate records off southern Greenland, we show that the previous 4 interglacials over the last ≈ 450 ka all reached warmer than present climate conditions and exceeded the modeled temperature threshold for GIS collapse but by different magnitudes and durations. Complete deglaciation of the southern GIS in Marine Isotope Stage 11c (MIS 11c; 394.7 to 424.2 ka) occurred under climates only slightly warmer than present (≈ 0.5 – 1.6 °C), placing the temperature threshold for major GIS retreat in the lower end of model estimates and within projections for this century.

Keywords: Greenland Ice Sheet | Late Pleistocene interglacials | climate change | thresholds

Significance: Understanding how warmer climates affected Greenland in the past helps in determining how future warming will impact it. The Greenland Ice Sheet (GIS) has retreated during recent interglacials, suggesting a critical survival threshold within a few degrees of modern temperatures. Defining this temperature threshold requires records of the past climates responsible for GIS demise. Using microfossil temperature reconstructions, we show that the current interglacial is unusually moderate and that all 4 previous interglacials were warmer than present near Greenland. Both magnitude and duration of past warmth were important influences on the ice sheet. Notably, the critical temperature threshold for past GIS decay will likely be surpassed this century. The duration for which this threshold is exceeded will determine Greenland's fate.

VAKS 2020

A. Vaks et al., *Palaeoclimate evidence of vulnerable permafrost during times of low sea ice*. [nature 577 \(2020\), 221–225](#).

[n577-0221-Supplement1.xlsx](#), [n577-0221-Supplement2.xlsx](#)

Climate change in the Arctic is occurring rapidly, and projections suggest the complete loss of summer sea ice by the middle of this century¹. The sensitivity of permanently frozen ground (permafrost) in the Northern Hemisphere to warming is less clear, and its long-term trends are harder to monitor than those of sea ice. Here we use palaeoclimate data to show that Siberian permafrost is robust to warming when Arctic sea ice is present, but vulnerable when it is absent. Uranium–lead chronology of carbonate deposits (speleothems) in a Siberian cave located at the southern edge of continuous permafrost reveals periods in which the overlying ground was not permanently frozen. The speleothem record starts 1.5

million years ago (Ma), a time when greater equator-to-pole heat transport led to a warmer Northern Hemisphere². The growth of the speleothems indicates that permafrost at the cave site was absent at that time, becoming more frequent from about 1.35 Ma, as the Northern Hemisphere cooled, and permanent after about 0.4 Ma. This history mirrors that of year-round sea ice in the Arctic Ocean, which was largely absent before about 0.4 Ma (ref. 3), but continuously present since that date. The robustness of permafrost when sea ice is present, as well as the increased permafrost vulnerability when sea ice is absent, can be explained by changes in both heat and moisture transport. Reduced sea ice may contribute to warming of Arctic air^{4–6}, which can lead to warming far inland⁷. Open Arctic waters also increase the source of moisture and increase autumn snowfall over Siberia, insulating the ground from low winter temperatures^{8–10}. These processes explain the relationship between an ice-free Arctic and permafrost thawing before 0.4 Ma. If these processes continue during modern climate change, future loss of summer Arctic sea ice will accelerate the thawing of Siberian permafrost.

A. Vaks, A. J. Mason, S. F. M. Breitenbach, A. M. Kononov, A. V. Osinzev, M. Rosensaft, A. Borshevsky, O. S. Gutareva & G. M. Henderson

Methoden

BERGER 2020

F. Axel Berger, *Fakes and Falsifications*. (2020). <<http://berger-odenthal.de/random/C-200106.htm>> (2020-01-10).

Do not and never trust a machine that tries to be more clever than you are especially not if and when it is! Or, as I keep saying in spite of continuously being ridiculed for it: Never ever use any technology, that you do not fully understand!

Politik

GILLEY 2017

Bruce Gilley, *The Case for Colonialism*. *Academic Questions* **31** (2018), 167–185.

Editor’s Note: NAS member Bruce Gilley’s article, “The Case for Colonialism,” went through double blind peer review and was published in *Third World Quarterly* in 2017. It provoked enormous controversy [...] serious threats of violence against the editor led the journal to withdraw the article, both in print and online. Gilley was also personally and professionally attacked and received death threats. [...] We publish it here in its entirety, conformed to US English and our style.

Suppose that the government of Guinea-Bissau were to lease back to Portugal the small uninhabited island of Galinhas that lies ten miles off the mainland and where the former colonial governor’s mansion lies in ruins. The annual lease would be \$1 so that the Portuguese spend their money on the island and the Guinea-Bissau government is not dependent on a lease fee. Suppose, then, that the \$10 to \$20 million in foreign aid wasted annually on the country were redirected to this new offshore colony to create basic infrastructure.

A preposterous idea? Perhaps. But not so preposterous as the anti-colonial ideology that for the past hundred years has been haunting the lives of hundreds of millions of people in the Third World. A hundred years of disaster is enough. It is time to make the case for colonialism again.