

## CONTENTS

<b>NOTICES</b> .....	<b>2</b>
PUBLICATION ALERTS.....	2
ACADEMIA.EDU –Pleistocene hominin site with an “Acheulo-Levalloiso-Mousteroid” assemblage.....	2
M.J. WALKER et al – Cueva Negra del Estrecho del Río Quípar (Murcia, Spain): A late Early Pleistocene hominin site with an “Acheulo-Levalloiso-Mousteroid” Palaeolithic assemblage.....	2
OTHER PUBLICATIONS – On the Evolution of Compositional Language.....	3
JEFFREY A. BARRETT, CALVIN COCHRAN & BRIAN SKYRMS – On the Evolution of Compositional Language.....	3
<b>NEWS</b> .....	<b>3</b>
BREAKING SCIENCE – Forest-Living East African Chimpanzees are Digging Wells for Cleaner Water: Study.....	3
BREAKING SCIENCE – Australopithecus Fossils from Sterkfontein Caves are Much Older Than Thought.....	3
BREAKING SCIENCE – Study: Same ‘Jumping Genes’ are Active in Octopus and Human Brains.....	3
BREAKING SCIENCE – Dogs were Domesticated in Eastern Eurasia, Ancient DNA Study Suggests.....	3
FRONTIERS NEWS – This illusion, new to science, is strong enough to trick our reflexes.....	4
NATURE BRIEFING – Ice Age wolf genomes point to dog origins.....	4
NATURE BRIEFING – War throws palaeontology into turmoil.....	4
SCIENCE DAILY – Fossils in 'Cradle of Humankind' may be a million years older than previously thought.....	4
SCIENCE DAILY – Ice Age wolf DNA reveals dogs trace ancestry to two separate wolf populations.....	4
SCIENCE NEWS – Ancient wolves give clues to origins of dogs.....	4
SCIENCE NEWS – Does warfare make societies more complex? Controversial study says yes.....	4
SCIENCE NEWS – Female lineages anchored Pacific islands for 2000 years.....	4
SOCIETY FOR SCIENCE – Britons' tools from 560,000 years ago have emerged from gravel pits.....	5
<b>PUBLICATIONS</b> .....	<b>5</b>
American Journal of Biological Anthropology.....	5
<b>PAPERS</b> .....	5
ANGELINE B. LEECE et al – New hominin dental remains from the Drimolen Main Quarry, South Africa (1999–2008).....	5
PIANPIAN WEI et al – A structural reassessment of the Late Pleistocene femur from Maludong, southwestern China.....	5
PHILIPPA HAMMOND et al with SUSANA CARVALHO – Risk perception and terrestriality in primates: A quasi-experiment through habituation of chacma baboons ( <i>Papio ursinus</i> ) in Gorongosa National Park, Mozambique.....	5
Biology Letters.....	6
<b>PAPERS</b> .....	6
MARYBELLE E. CAMERON-PACK et al – A personal cost of cheating can stabilize reproductive altruism during the early evolution of clonal multicellularity.....	6
International Journal of Anthropology & Ethnology.....	6
<b>PAPERS</b> .....	6
ZHUO WANG – The development, paradigm and academic values of enterprise anthropology—the “fourth revolution” of anthropology.....	6
Nature.....	6
<b>NEWS</b> .....	6
Russia’s war in Ukraine is disrupting studies of ancient life.....	6
<b>ARTICLES</b> .....	6
NIC FLEMING – My work digging up the shelters of our ancestors.....	6
ANDERS BERGSTRÖM AND PONTUS SKOGLUND – Ice Age wolf genomes home in on dog origins.....	7
<b>PAPERS</b> .....	7
ANDERS BERGSTRÖM et mul with JOHANNES KRAUSE & PONTUS SKOGLUND – Grey wolf genomic history reveals a dual ancestry of dogs.....	7
Nature Human Behaviour.....	7
<b>ARTICLES</b> .....	7
DARYA TSYMBALYUK – Academia must recentre embodied and uncomfortable knowledge.....	7
<b>PAPERS</b> .....	7
CONNY E. WOLLBRANT, MIKAEL KNUTSSON & PETER MARTINSSON – Extrinsic rewards and crowding-out of prosocial behaviour.....	7
Nature Humanities & Social Sciences Communications.....	7
<b>PAPERS</b> .....	7
TAMAMI NAKANO & TAKUTO YAMAMOTO – You trust a face like yours.....	7
Nature Reviews Psychology.....	8

PAPERS.....	8
TENELLE PORTER et al – Predictors and consequences of intellectual humility.....	8
Nature Scientific Reports.....	8
PAPERS.....	8
ALEX R. DECASIEN et al – Equivocal evidence for a link between megalencephaly-related genes and primate brain size evolution.....	8
ULF LIEBE, NICOLE SCHWITTER & ANDREAS TUTIĆ – Individuals of high socioeconomic status are altruistic in sharing money but egoistic in sharing time.....	8
LUCA PEDRUZZI et al – Familiarity modulates both intra- and interspecific yawn contagion in red-capped mangabeys.....	8
PHILIP D. GINGERICH – Pattern and rate in the Plio-Pleistocene evolution of modern human brain size.....	9
New Scientist.....	9
NEWS.....	9
Was warfare responsible for the origin of complex civilisation?.....	9
UK’s earliest hand axes were made by ancient humans 560,000 years ago.....	9
Proceedings of the Royal Society B.....	9
PAPERS.....	9
TYLER R. BONNELL, S. PETER HENZI & LOUISE BARRETT – Using network synchrony to identify drivers of social dynamics.....	9
LUCAS MOLLEMAN, SIMON CIRANKA & WOUTER VAN DEN BOS – Social influence in adolescence as a double-edged sword.....	9
ALBERTO J. C. MICHELETTI et al – Religious celibacy brings inclusive fitness benefits.....	10
SABINE NÖBEL et al – The importance of population heterogeneities in detecting social learning as the foundation of animal cultural transmission.....	10
LUCAS R. HEARN, OLIVIA K. DAVIES & MICHAEL P. SCHWARZ – Extreme reproductive skew at the dawn of sociality is consistent with inclusive fitness theory but problematic for routes to eusociality.....	10
JUSTIN A. LEDOGAR et al – Mechanical compensation in the evolution of the early hominin feeding apparatus.....	10
Royal Society Open Science.....	11
PAPERS.....	11
DENIS TVERSKOI, SUDARSANAM BABU & SERGEY GAVRILETS – The spread of technological innovations: effects of psychology, culture and policy interventions.....	11
MARIO GALLEGRO-ABENZA, PALMYRE H. BOUCHERIE & THOMAS BUGNYAR – Early social environment affects attention to social cues in juvenile common ravens, <i>Corvus corax</i> .....	11
JOAQUIN NAVAJAS et al – Diversity of opinions promotes herding in uncertain crowds.....	11
GERALD J. HAEFFEL – Psychology needs to get tired of winning.....	11
BENEDETTA CEVOLI, CHRIS WATKINS & KATHLEEN RASTLE – Prediction as a basis for skilled reading: insights from modern language models.....	12
ALASTAIR KEY et al – On the earliest Acheulean in Britain: first dates and in-situ artefacts from the MIS 15 site of Fordwich (Kent, UK).....	12
Science.....	12
PAPERS.....	12
YUE-CHEN LIU et mul with DAVID REICH – Ancient DNA reveals five streams of migration into Micronesia and matrilocality in early Pacific seafarers.....	12
<b>SUBSCRIBE to the EAORC Bulletin .....</b>	<b>12</b>
<b>UNSUBSCRIBE from the EAORC Bulletin .....</b>	<b>12</b>
<b>PRODUCED BY AND FOR THE EAORC EMAIL GROUP.....</b>	<b>13</b>

---

## NOTICES

### PUBLICATION ALERTS

If you have had a paper or book published, or you see something which would be of interest to the group, please send me a publication alert so that I can include it in the newsletter. Many thanks to those who have already sent in alerts.

If there is a journal you feel I should be tracking on a regular basis, let me know.

And if you have any other ideas for extending the “EAORC experience”, please contact me.

---

### ACADEMIA.EDU –Pleistocene hominin site with an “Acheulo-Levalloiso-Mousteroid” assemblage

*In Quaternary International 294, 135-159 (2013).*

#### **M.J. WALKER et al – Cueva Negra del Estrecho del Río Quípar (Murcia, Spain): A late Early Pleistocene hominin site with an “Acheulo-Levalloiso-Mousteroid” Palaeolithic assemblage**

At Cueva Negra del Estrecho del Río Quípar biostratigraphy and palaeomagnetism indicate a time in the late Early Pleistocene (i.e. somewhat before the Matuyama-Brunhes boundary of 780,000 a, 0.78 Ma), for the entire 5 m thick sedimentary fill excavated in the rock-shelter, from which there are hominin teeth (cf. *Homo heidelbergensis*), a rich palaeontological and palaeopalynological record demonstrating warm moist environmental conditions (possibly MIS 21), a fundamentally homogeneous artifact assemblage throughout the sedimentary deposit, and evidence of fire at over 4 m depth. A brief introduction to the site and the assemblage is offered. Palaeolithic artifacts were produced by three different reduction sequences, because: (a) an “Acheulian” hand-axe was flaked bifacially on a flat limestone cobble; (b) several excavated chert

flakes had been struck off small cores by recurrent flaking, with one flake showing a faceted striking platform, whilst two surface finds of small discoidal cores bear the broad central concave scar that in a “Levalloisian” prepared-core reduction sequence would correspond to centripetal removal of the final flake; and (c) abundant small artifacts (25–60 mm), mainly of chert, reflect expedient removal of small flakes or fragments from cores, by both unipolar and bipolar reduction techniques, including many keeled pieces that could be residual cores which have notches, slender spurs or beaks (“becs”), or a planoconvex (“slug”-like or “limace”) shape, all of which may be remnants of cores subjected to bipolar knapping, in addition to very small pointed and “awl”-like pieces, and several fragments and flakes with steep abrupt (“Mousteroid”) edge-retouch, and abundant knapping spalls and waste. Although the site had been interpreted conservatively in earlier publications as early Middle Pleistocene, recent palaeomagnetic findings show that the entire sedimentary fill corresponds to the late Early Pleistocene, somewhat over 780,000 a (0.78 Ma), an age which is acceptable from the standpoint of the biostratigraphical data. Among the aims of this paper are: (1) a consideration of the Palaeolithic assemblage in relation to local availability of raw materials of appropriate shapes and petrology for knapping in a palaeoenvironmental context far different from that of today; (2) consideration of the implications for human cognitive and technological evolution in the European late Early Pleistocene; and (3) a proposal that those considerations highlight practical, methodological, and theoretical drawbacks to the classical European interpretation of earlier Palaeolithic chronologies from a perspective of typological sequences.

[https://www.academia.edu/2044028/Cueva Negra del Estrecho del R%C3%ADo\\_Qu%C3%ADpar Murcia Spain A late E arly Pleistocene hominin site with an Acheulo Levalloiso Mousteroid Palaeolithic assemblage](https://www.academia.edu/2044028/Cueva_Negra_del_Estrecho_del_R%C3%ADo_Qu%C3%ADpar_Murcia_Spain_A_late_Early_Pleistocene_hominin_site_with_an_Acheulo_Levalloiso_Mousteroid_Palaeolithic_assemblage)

---

## OTHER PUBLICATIONS – On the Evolution of Compositional Language

*In Philosophy of Science 87, 910–920 (2020).*

### JEFFREY A. BARRETT, CALVIN COCHRAN & BRIAN SKYRMS – On the Evolution of Compositional Language

We present here a hierarchical model for the evolution of compositional language. The model has the structure of a two-sender/one-receiver Lewis signaling game augmented with executive agents who may learn to influence the behavior of the basic senders and receiver. The model shows how functional agents might coevolve representational roles even as they evolve a reliable compositional language in the context of costly signaling. When successful, the evolved language captures both the compositional structure of properties in the world and the compositional structure of successful actions involving those properties.

<https://cpb-us-e2.wpmucdn.com/faculty.sites.uci.edu/dist/f/396/files/2021/02/14853.pdf>

---

## NEWS

### BREAKING SCIENCE – Forest-Living East African Chimpanzees are Digging Wells for Cleaner Water: Study

Digging wells to access or filter drinking water is a relatively rare behavior in the animal kingdom — only a handful of species have been documented to do so. Researchers from the United Kingdom, Switzerland and Uganda provide the first report of habitual well-digging in a rainforest-living group of East African chimpanzees (*Pan troglodytes schweinfurthii*); they suggest that this behavior may have been imported into the community’s behavioral repertoire by an immigrant female chimpanzee.

<http://www.sci-news.com/biology/well-digging-chimpanzees-10947.html>

---

### BREAKING SCIENCE – Australopithecus Fossils from Sterkfontein Caves are Much Older Than Thought

The chronology and taxonomy of the ancient hominin genus *Australopithecus* in South Africa have long been controversial, with the Sterkfontein cave system central to the debate. A novel dating method just pushed the age of some of Sterkfontein fossils back more than a million years; this would make them older than Dinkinesh, also called Lucy, the world’s most famous *Australopithecus* fossil.

<http://www.sci-news.com/archaeology/sterkfontein-australopithecus-fossils-10944.html>

---

### BREAKING SCIENCE – Study: Same ‘Jumping Genes’ are Active in Octopus and Human Brains

‘Jumping genes,’ also known as transposons or transposable elements, widely contribute to the evolution of genomes allowing genomic innovations. These features have been associated to the evolution, functioning, and complexity of the nervous system. New research shows that the same jumping genes are active both in the human brain and in the brain of two species: the common octopus (*Octopus vulgaris*) and the Californian octopus (*Octopus bimaculoides*).

<http://www.sci-news.com/genetics/octopus-human-brain-transposable-elements-10943.html>

---

### BREAKING SCIENCE – Dogs were Domesticated in Eastern Eurasia, Ancient DNA Study Suggests

The gray wolf (*Canis lupus*) was the first species to give rise to a domestic population, and they remained widespread throughout the latest Ice Age when many other large mammal species went extinct. Little is known, however, about the history and possible extinction of past wolf populations or when and where the wolf progenitors of the present-day dog lineage (*Canis familiaris*) lived.

<http://www.sci-news.com/biology/gray-wolf-genomic-history-10950.html>

---

## FRONTIERS NEWS – This illusion, new to science, is strong enough to trick our reflexes

An illusion new to science shows that the pupillary light reflex, which controls the width of the pupil in anticipation of expected changes in light, depends on the perceived environment rather than the physical reality.

<https://blog.frontiersin.org/2022/06/01/frontiers-human-neuroscience-expanding-hole-illusion/>

---

## NATURE BRIEFING – Ice Age wolf genomes point to dog origins

Modern dogs probably evolved in eastern Eurasia — and might have been domesticated more than once. Researchers analysed 72 ancient wolf (*Canis lupus*) genomes spanning the last 100,000 years. They found that early dogs from northeastern Europe, Siberia and North America are closely related to ancient wolves from eastern Asia. However, some dogs from western Europe and Africa seem to have a genetic link to ancient wolves that lived farther west. “Dogs in the west thus seem to have some ancestry from a second wolf source,” write the authors. “This must reflect either an independent domestication of some western Eurasian wolf population, or gene flow from wild western wolves into dogs arriving from the east.”

<https://nature.us17.list-manage.com/track/click?u=2c6057c528fdc6f73fa196d9d&id=17ab932ec4&e=1db4b9a19b>

---

## NATURE BRIEFING – War throws palaeontology into turmoil

Russia has been at the centre of some of the century’s biggest archaeological and palaeontological finds — including the discovery of Denisovans, an ancient-human species found in a Siberian cave and described in 2010. As well as devastating lives and livelihoods, its war against Ukraine has prompted sanctions, collapsed collaborations and cancelled fieldwork, disrupting studies of ancient life. “We will know less about the past because of this war,” says evolutionary geneticist Love Dalén, who works in Sweden and often does fieldwork in Russia.

<https://nature.us17.list-manage.com/track/click?u=2c6057c528fdc6f73fa196d9d&id=fe1074b367&e=1db4b9a19b>

---

## SCIENCE DAILY – Fossils in 'Cradle of Humankind' may be a million years older than previously thought

For decades, scientists have studied these fossils of early human ancestors and their long-lost relatives. Now, a dating method developed by geologists just pushed the age of some of these fossils found at the site of Sterkfontein Caves back more than a million years. This would make them older than Dinkinesh, also called Lucy, the world's most famous *Australopithecus* fossil.

<https://www.sciencedaily.com/releases/2022/06/220627165947.htm>

---

## SCIENCE DAILY – Ice Age wolf DNA reveals dogs trace ancestry to two separate wolf populations

An international group of geneticists and archaeologists have found that the ancestry of dogs can be traced to at least two populations of ancient wolves. The work moves us a step closer to uncovering the mystery of where dogs underwent domestication, one of the biggest unanswered questions about human prehistory.

<https://www.sciencedaily.com/releases/2022/06/220629121135.htm>

---

## SCIENCE NEWS – Ancient wolves give clues to origins of dogs

Where and when dogs arose is one of the biggest mysteries of domestication. To solve it, researchers have tried everything from analyzing ancient dog bones to sequencing modern dog DNA—all with inconclusive results. Now, researchers have tried a new tack: figuring out where the ancient wolves that gave rise to dogs lived. The new study doesn’t close the case, but it does point to a broad geographic region—eastern Eurasia—while also suggesting our canine pals may have been domesticated more than once.

<https://www.science.org/content/article/ancient-wolves-give-clues-origins-dogs>

---

## SCIENCE NEWS – Does warfare make societies more complex? Controversial study says yes

War is hell. It breaks apart families, destroys natural resources, and drives humans to commit unspeakable acts of violence. Yet according to a new analysis of human history, war may also prod the evolution of certain kinds of complex societies. The twin developments of agriculture and military technology—especially cavalries and iron weapons—have predicted the rise of empires.

<https://www.science.org/content/article/does-warfare-make-societies-more-complex-controversial-study-says-yes>

---

## SCIENCE NEWS – Female lineages anchored Pacific islands for 2000 years

Some 3000 years ago, people sailed toward the sunrise—and the last swatch of our planet uninhabited by humans: remote islands of the Pacific. By 1200 C.E. societies flourished from the Marianas to Rapa Nui, more than 12,000 kilometers apart. How the Pacific gradually became home to these groups—and just where they came from—has long been a mystery.

<https://www.science.org/content/article/female-lineages-anchored-pacific-islands-2000-years>

---

## SOCIETY FOR SCIENCE – Britons' tools from 560,000 years ago have emerged from gravel pits

A new study confirms that an archaeological site in southeastern England called Fordwich is one of the oldest hominid sites in the country.

<http://click.societyforscience->

[email.com/?qs=6f362bb7fc37f5aec189d3e6755a0e1baaafb16bc8e430504594c607fa1869e79c4aab40575c362dd378f8510afe39f732017567cf2cf48d279457c6e38735fb](mailto:email.com/?qs=6f362bb7fc37f5aec189d3e6755a0e1baaafb16bc8e430504594c607fa1869e79c4aab40575c362dd378f8510afe39f732017567cf2cf48d279457c6e38735fb)

---

## PUBLICATIONS

---

### American Journal of Biological Anthropology

#### PAPERS

#### **ANGELINE B. LEECE et al – New hominin dental remains from the Drimolen Main Quarry, South Africa (1999–2008)**

Twenty-four dental specimens from the Drimolen Main Quarry (DMQ) are described. This increases the number of DMQ *Paranthropus robustus* specimens from 48 to 63 and DMQ *Homo* specimens from 8 to 12. This allows reassessment of the proposed differences between the DMQ *P. robustus* assemblage and that of Swartkrans. Analysis conducted assesses intraspecific and inter-locality variation.

We examined the *P. robustus* and early *Homo* assemblages from South Africa. Morphology was observed using a hand lens and a binocular microscope. Mesiodistal and buccolingual measurements were taken using plastic-tipped calipers. Summary statistics were generated and patterns of variability in *P. robustus* were assessed through box plots and Mann–Whitney U tests.

Comparison between the expanded DMQ and Swartkrans *P. robustus* assemblages demonstrates overlap in size. Ten dental variables show statistically significant differences.

The expanded *P. robustus* sample allowed us to re-examine previous analyses of differences in tooth size between the samples. While analyses presented here show a high degree of overlap in the MD and BL dimensions of the two assemblages, significant differences were found in the mean values of these variables in the postcanine maxillary teeth—consistent with previous analyses. Two current hypotheses may explain this pattern: 1) dental size increase through the *P. robustus* lineage or 2) different sample composition between the two sites. Small sample sizes for all permanent dental classes in the DMQ assemblage represents a limitation on this analysis and interpretations thereof. Any addition to the DMQ or the Swartkrans samples may alter these results.

<https://onlinelibrary.wiley.com/doi/full/10.1002/ajpa.24570>

#### **PIANPIAN WEI et al – A structural reassessment of the Late Pleistocene femur from Maludong, southwestern China**

The Late Pleistocene partial right femur from Maludong in southwestern China has been attributed characteristics of early *Homo*, especially from the Early Pleistocene, putatively representing a late surviving archaic population in the region.

Assessment of additional traits is warranted given newly described postcrania from the Late Pleistocene of southwestern China and characterized by relatively modern features.

We used micro computed tomography ( $\mu$ CT) to extract and evaluate cross-sectional diaphyseal structure. New predictions of Maludong femoral length were generated from a regression analysis of Holocene modern humans. Robusticity and shape at multiple, standard diaphyseal regions of interest (ROI) were compared to those of Pleistocene and Holocene humans from East Asia and beyond.

Standardized torsional rigidities at mid-proximal and subtrochanteric Maludong ROIs fell within ranges of variation exhibited by multiple comparative groups, and closest to medians of Early and Middle Upper Paleolithic modern humans (E/MUP). For  $I_x/I_y$  diaphyseal ratios, Maludong was higher than comparative groups at both ROIs, falling closest to the upper end of the E/MUP range. For  $I_{max}/I_{min}$  shape ratios, Maludong fell well above group medians at the mid-proximal ROI and nearest E/MUP and Middle Pleistocene group medians at the subtrochanteric ROI.

In diaphyseal robusticity and rigidity ratios, Maludong fits within variation exhibited by other Late Pleistocene modern humans. While we did not re-analyze external features described as archaic-like, internal structure of the Maludong femur contradicts this characterization and instead supports expanding intrapopulation variability expressed by Late Pleistocene modern humans in East Asia.

<https://onlinelibrary.wiley.com/doi/abs/10.1002/ajpa.24569>

#### **PHILIPPA HAMMOND et al with SUSANA CARVALHO – Risk perception and terrestriality in primates: A quasi-experiment through habituation of chacma baboons (*Papio ursinus*) in Gorongosa National Park, Mozambique**

Habituation is a common pre-requisite for studying noncaptive primates. Details and quantitative reporting on this process are often overlooked but are useful for measuring human impact on animal behavior, especially when comparing studies across time or sites. During habituation, perceived risk of a stimulus—human observers—is assumed to decline with repeated exposure to that stimulus. We use habituation as a quasi-experiment to study the landscape of fear, exploring relationships between actual risk, perceived risk, mediating environmental variables, and behavioral correlates.

We recorded vocalizations and observer-directed vigilance as indicators of perceived risk during habituation of two troops of chacma baboons (*Papio ursinus*) in Gorongosa National Park, Mozambique. Here, we model changes in these variables as a



function of habituation time, troop, time of day, and habitat features. We also model the relationship between each of the anti-predator behaviors and ground-use, exploring whether they predict greater terrestriality in the baboons. In both troops, vocalization rates and observer-directed vigilance declined with cumulative exposure to observers, but were heightened later in the day and in denser habitat types. We found that terrestrial activity was negatively related to levels of both vocalizations and observer-directed vigilance.

This study provides a quantitative assessment of the impact of human observation on primate behavior and highlights environmental variables that influence anti-predator behaviors, perhaps indicating heightened perception of risk. The relationship between perceived risk and terrestriality is significant for understanding the evolution of this rare trait in primates.

<https://onlinelibrary.wiley.com/doi/full/10.1002/ajpa.24567>

---

## Biology Letters

### PAPERS

#### **MARYBELLE E. CAMERON-PACK et al – A personal cost of cheating can stabilize reproductive altruism during the early evolution of clonal multicellularity**

Understanding how cooperation evolved and is maintained remains an important and often controversial topic because cheaters that reap the benefits of cooperation without paying the costs can threaten the evolutionary stability of cooperative traits. Cooperation—and especially reproductive altruism—is particularly relevant to the evolution of multicellularity, as somatic cells give up their reproductive potential in order to contribute to the fitness of the newly emerged multicellular individual. Here, we investigated cheating in a simple multicellular species—the green alga *Volvox carteri*, in the context of the mechanisms that can stabilize reproductive altruism during the early evolution of clonal multicellularity. We found that the benefits cheater mutants can gain in terms of their own reproduction are pre-empted by a cost in survival due to increased sensitivity to stress. This personal cost of cheating reflects the antagonistic pleiotropic effects that the gene coding for reproductive altruism—*regA*—has at the cell level. Specifically, the expression of *regA* in somatic cells results in the suppression of their reproduction potential but also confers them with increased resistance to stress. Since *regA* evolved from a life-history trade-off gene, we suggest that co-opting trade-off genes into cooperative traits can provide a built-in safety system against cheaters in other clonal multicellular lineages.

<https://royalsocietypublishing.org/doi/epdf/10.1098/rsbl.2022.0059>

---

## International Journal of Anthropology & Ethnology

### PAPERS

#### **ZHUO WANG – The development, paradigm and academic values of enterprise anthropology—the “fourth revolution” of anthropology**

As an emerging interdisciplinary field in anthropology, enterprise anthropology (EA) has experienced five historical stages of development since its inception in the 1930s. 2008 marked the first year of internationalized enterprise anthropology, thus prompting the “fourth revolution” of anthropology. Since then, the sub-discipline of enterprise anthropology has entered its fifth stage of development. This stage of enterprise anthropology has witnessed new research subjects, concepts, and theories. Breakthroughs have been made in theoretical research and methodological innovation, and a unique paradigm has been established. In terms of discipline and era, the fifth stage is characterized by: innovative transformation and creative development, integration of Chinese and Western channels for anthropology research, building of international academic networks, and the practice of “people-centered” research. As a result, this stage of enterprise anthropology holds profound theoretical and practical significance for interdisciplinary and academic equity, new ideas and methods for studying the transformation of Chinese society, and establishment of an internationalized research paradigm for the Chinese academic community.

*{I'm not convinced that this is truly a new field for anthropology to explore, it seems to be a subset of Business Anthropology with a particular slant toward the socialist market economy model. But it's here because someone may find it useful.}*

<https://ijae.springeropen.com/articles/10.1186/s41257-022-00068-7>

---

## Nature

### NEWS

#### **Russia's war in Ukraine is disrupting studies of ancient life**

Russia has been at the centre of major palaeontological finds including the Denisovans, but its brutal war is threatening the research that uncovers the past.

<https://www.nature.com/articles/d41586-022-01790-0>

---

### ARTICLES

#### **NIC FLEMING – My work digging up the shelters of our ancestors**

Ludovic Slimak, a cultural anthropologist at the CNRS and the University of Toulouse — Jean Jaurès, describes his research and the changing face of archaeology in France.

<https://www.nature.com/articles/d41586-022-01593-3>

## **ANDERS BERGSTRÖM AND PONTUS SKOGLUND – Ice Age wolf genomes home in on dog origins**

We charted the genetic history of the grey wolf over the past 100,000 years by analysing 72 ancient genomes. Placing dogs into this history, we found that they derive ancestry from at least two separate wolf populations.

<https://www.nature.com/articles/d41586-022-01551-z>

### **PAPERS**

## **ANDERS BERGSTRÖM et mul with JOHANNES KRAUSE & PONTUS SKOGLUND – Grey wolf genomic history reveals a dual ancestry of dogs**

The grey wolf (*Canis lupus*) was the first species to give rise to a domestic population, and they remained widespread throughout the last Ice Age when many other large mammal species went extinct. Little is known, however, about the history and possible extinction of past wolf populations or when and where the wolf progenitors of the present-day dog lineage (*Canis familiaris*) lived. Here we analysed 72 ancient wolf genomes spanning the last 100,000 years from Europe, Siberia and North America. We found that wolf populations were highly connected throughout the Late Pleistocene, with levels of differentiation an order of magnitude lower than they are today. This population connectivity allowed us to detect natural selection across the time series, including rapid fixation of mutations in the gene IFT88 40,000–30,000 years ago. We show that dogs are overall more closely related to ancient wolves from eastern Eurasia than to those from western Eurasia, suggesting a domestication process in the east. However, we also found that dogs in the Near East and Africa derive up to half of their ancestry from a distinct population related to modern southwest Eurasian wolves, reflecting either an independent domestication process or admixture from local wolves. None of the analysed ancient wolf genomes is a direct match for either of these dog ancestries, meaning that the exact progenitor populations remain to be located.

<https://www.nature.com/articles/s41586-022-04824-9>

---

## **Nature Human Behaviour**

### **ARTICLES**

## **DARYA TSYMBALYUK – Academia must recentre embodied and uncomfortable knowledge**

When academics ‘westplain’ Russia’s war against Ukraine, they reinforce a culture of detachment. We must not ignore the embodied knowledge of war.

*{Included because it reminds us that anthropology is right there in front of us if we look; and an academic response is sometimes insufficient.}*

<https://www.nature.com/articles/s41562-022-01369-9>

### **PAPERS**

## **CONNIE E. WOLLBRANT, MIKAEL KNUTSSON & PETER MARTINSSON – Extrinsic rewards and crowding-out of prosocial behaviour**

The law of supply is a fundamental principle of economics and states that any increase in price will increase the quantity supplied. In the case of prosocial behaviour, however, increasing rewards have reduced supply, posing a challenge to standard economic theory. Attempts to study such ‘crowding-out’ have been limited by their small scale and the inherent difficulties posed by calibration of experimental tests. We analyse a large-scale natural experiment in the environmental domain consisting of 20,370 independent observations derived from aggregation of approximately 27 million individual decisions. We find that aggregate supply of prosocial behaviour is ‘s-shaped’, demonstrating how attempts to increase prosocial behaviour using monetary rewards can be counter-productive. Our study shows that results derived from a small set of data points collected from an underlying s-shaped data-generating process are vulnerable to misinterpretation, and that proxy measures of intrinsic motivation ought to be collected to ensure theoretical advance.

<https://www.nature.com/articles/s41562-022-01293-y>

---

## **Nature Humanities & Social Sciences Communications**

### **PAPERS**

## **TAMAMI NAKANO & TAKUTO YAMAMOTO – You trust a face like yours**

The appraisal of trustworthiness from facial appearance of a stranger is critical for successful social interaction. Although self-resemblance is considered a significant factor affecting the perception of trustworthiness, research is yet to be conducted on whether this theory is applicable to natural unfamiliar faces in real life. We examined this aspect by using a state-of-the-art deep convolutional neural network for face recognition to measure the facial similarity of a large sample of people with the evaluators. We found that the more they resembled the rater, the more trustworthy they were evaluated if they were of the same sex as the rater. Contrarily, when the stranger was of the opposite sex, self-resemblance did not affect trustworthiness ratings. These results demonstrate that self-resemblance is an important factor affecting our social judgments of especially same-sex people in real life.

<https://www.nature.com/articles/s41599-022-01248-8>

#### **TENELLE PORTER et al – Predictors and consequences of intellectual humility**

In a time of societal acrimony, psychological scientists have turned to a possible antidote — intellectual humility. Interest in intellectual humility comes from diverse research areas, including researchers studying leadership and organizational behaviour, personality science, positive psychology, judgement and decision-making, education, culture, and intergroup and interpersonal relationships. In this Review, we synthesize empirical approaches to the study of intellectual humility. We critically examine diverse approaches to defining and measuring intellectual humility and identify the common element: a meta-cognitive ability to recognize the limitations of one's beliefs and knowledge. After reviewing the validity of different measurement approaches, we highlight factors that influence intellectual humility, from relationship security to social coordination. Furthermore, we review empirical evidence concerning the benefits and drawbacks of intellectual humility for personal decision-making, interpersonal relationships, scientific enterprise and society writ large. We conclude by outlining initial attempts to boost intellectual humility, foreshadowing possible scalable interventions that can turn intellectual humility into a core interpersonal, institutional and cultural value.

<https://www.nature.com/articles/s44159-022-00081-9>

#### **ALEX R. DECASIEN et al – Equivocal evidence for a link between megalencephaly-related genes and primate brain size evolution**

A large brain is a defining feature of modern humans, and much work has been dedicated to exploring the molecular underpinnings of this trait. Although numerous studies have focused on genes associated with human microcephaly, no studies have explicitly focused on genes associated with megalencephaly. Here, we investigate 16 candidate genes that have been linked to megalencephaly to determine if: (1) megalencephaly-associated genes evolved under positive selection across primates; and (2) selection pressure on megalencephaly-associated genes is linked to primate brain size. We found evidence for positive selection for only one gene, OFD1, with 1.8% of the sites estimated to have dN/dS values greater than 1; however, we did not detect a relationship between selection pressure on this gene and brain size across species, suggesting that selection for changes to non-brain size traits drove evolutionary changes to this gene. In fact, our primary analyses did not identify significant associations between selection pressure and brain size for any candidate genes. While we did detect positive associations for two genes (GPC3 and TBC1D7) when two phyletic dwarfs (i.e., species that underwent recent evolutionary decreases in brain size) were excluded, these associations did not withstand FDR correction. Overall, these results suggest that sequence alterations to megalencephaly-associated genes may have played little to no role in primate brain size evolution, possibly due to the highly pleiotropic effects of these genes. Future comparative studies of gene expression levels may provide further insights. This study enhances our understanding of the genetic underpinnings of brain size evolution in primates and identifies candidate genes that merit further exploration.

<https://www.nature.com/articles/s41598-022-12953-4>

#### **ULF LIEBE, NICOLE SCHWITTER & ANDREAS TUTIĆ – Individuals of high socioeconomic status are altruistic in sharing money but egoistic in sharing time**

The questions of whether and how socioeconomic status (SES) predicts prosocial behavior have sparked an interest from different disciplines, yet experimental evidence is inconclusive. We embedded two types of dictator games in a web survey with 7772 participants from Germany, Poland, Sweden, and the US. Each participant was asked to split a sum of money and a fixed amount of time between themselves and a recipient. While higher-SES individuals are more generous than lower-SES individuals in the money game, they are more egoistic in the time game. In addition, the SES of the recipient matters more in the money game than in the time game. These results point towards the relevancy of a situationally contingent social norm of redistribution in studying the relationship between SES and prosocial behavior.

<https://www.nature.com/articles/s41598-022-14800-y>

#### **LUCA PEDRUZZI et al – Familiarity modulates both intra- and interspecific yawn contagion in red-capped mangabeys**

Yawn contagion (YC) is, compared to spontaneous yawning, an evolutionary recent phenomenon probably linked to behavioral synchronization in highly social species that is more likely when it involves familiar subjects. Here, we investigate for the first time in monkeys which factors modulate intra- and interspecific YC. Through an experimental approach, we exposed 17 red-capped mangabeys to video stimuli (Yawn vs Control) depicting familiar/unfamiliar red-capped mangabeys and humans, and unfamiliar hamadryas. We found that mangabeys yawned more often in response to Yawn than Control videos independently from the species depicted, demonstrating both intra- and interspecific YC in the tested species. Moreover, both mangabey and human familiar yawning stimuli evoked a stronger yawning response in the subjects compared to the unfamiliar counterparts. Neither the amount of time spent looking frontally at the screen (probability of stimulus perception) nor the levels of self-directed behaviors (a proxy of anxiety) accounted for the results. In conclusion, we provide the first evidence that in non-human primate familiarity modulates both intra- and inter-specific YC. Stimuli emitted



by familiar faces somehow ease the mechanisms underlying YC, and this modulation can also apply to heterospecific subjects when previous shared experiences provide the prerequisites for the development of social bonds.

<https://www.nature.com/articles/s41598-022-15395-0>

### **PHILIP D. GINGERICH – Pattern and rate in the Plio-Pleistocene evolution of modern human brain size**

Fourteen studies of brain size evolution in Plio-Pleistocene hominins published over the past fifty years show substantial long-term increase in endocranial volume (ECV) for the broad lineage leading to modern humans. The median generation-to-generation step rate for a consensus time series of ECV values,  $h_0 = 0.15$  standard deviations per generation, is almost identical to the median step rate observed in modern biological field studies. When specimens are aggregated in a series of 100 k.y. time bins to reflect the precision of their geological ages, temporal scaling identifies four successive phases of stasis and change that are significantly different from random. Phase I from about 3.2 to 2.0 million years before present is an initial phase of relative stasis. Phase II from 2.0 to 1.5 m.y. is a phase of directional brain size increase. Phase III from 1.5 to 0.7 m.y. is a second phase of stasis. Finally, Phase IV from about 0.7 m.y. to 10 k.y. is a second phase of directional increase. The tempo (rate) and the mode (stasis, random, or directional change) of an evolutionary time series are related to each other, and both are related to the time scale appropriate for analysis.

<https://www.nature.com/articles/s41598-022-15481-3>

---

## New Scientist

### NEWS

#### **Was warfare responsible for the origin of complex civilisation?**

An effort to track global changes in human society over the past 10,000 years concludes that warfare drove an increase in social complexity – but others are unconvinced by the work.

<https://www.newscientist.com/article/2325950-was-warfare-responsible-for-the-origin-of-complex-civilisation/>

#### **UK's earliest hand axes were made by ancient humans 560,000 years ago**

Stone tools found in Fordwich in Canterbury may have been made by an early human called *Homo heidelbergensis*

<https://www.newscientist.com/article/2325462-uks-earliest-hand-axes-were-made-by-ancient-humans-560000-years-ago/>

---

## Proceedings of the Royal Society B

### PAPERS

#### **TYLER R. BONNELL, S. PETER HENZI & LOUISE BARRETT – Using network synchrony to identify drivers of social dynamics**

Social animals frequently show dynamic social network patterns, the consequences of which are felt at the individual and group level. It is often difficult, however, to identify what drivers are responsible for changes in these networks. We suggest that patterns of network synchronization across multiple social groups can be used to better understand the relative contributions of extrinsic and intrinsic drivers. When groups are socially separated, but share similar physical environments, the extent to which network measures across multiple groups covary (i.e. network synchrony) can provide an estimate of the relative roles of extrinsic and intrinsic drivers. As a case example, we use allogrooming data from three adjacent vervet monkey groups to generate dynamic social networks. We found that network strength was strongly synchronized across the three groups, pointing to shared extrinsic environmental conditions as the driver. We also found low to moderate levels of synchrony in network modularity, suggesting that intrinsic social processes may be more important in driving changes in subgroup formation in this population. We conclude that patterns of network synchronization can help guide future research in identifying the proximate mechanisms behind observed social dynamics in animal groups.

<https://royalsocietypublishing.org/doi/abs/10.1098/rspb.2022.0537>

#### **LUCAS MOLLEMAN, SIMON CIRANKA & WOUTER VAN DEN BOS – Social influence in adolescence as a double-edged sword**

Social learning is fundamental to human development, helping individuals adapt to changing circumstances and cooperate in groups. During the formative years of adolescence, the social environment shapes people's socio-cognitive skills needed in adulthood. Although peer influence among adolescents is traditionally associated with risky and unruly conduct, with long-term negative effects on educational, economic and health outcomes, recent findings suggest that peers may also have a positive impact. Here, we present a series of experiments with 10–20-year-olds ( $n = 146$ ) showing that positive and negative peer effects reflect a domain-general factor of social information use which declines during adolescence. Exposure to disobedient peers provoked rule breaking, and selfish peers reduced prosocial behaviour, particularly in early adolescence. However, compliant peers also promoted rule compliance and fair peers increased prosociality. A belief formation task further revealed that younger adolescents tend to assimilate social information, while older adolescents prioritize personal views. Our results highlight early adolescence as a key window for peer-based interventions to improve developmental trajectories.

<https://royalsocietypublishing.org/doi/full/10.1098/rspb.2022.0045>

### **ALBERTO J. C. MICHELETTI et al – Religious celibacy brings inclusive fitness benefits**

The influence of inclusive fitness interests on the evolution of human institutions remains unclear. Religious celibacy constitutes an especially puzzling institution, often deemed maladaptive. Here, we present sociodemographic data from an agropastoralist Buddhist population in western China, where parents sometimes sent a son to the monastery. We find that men with a monk brother father more children, and grandparents with a monk son have more grandchildren, suggesting that the practice is adaptive. We develop a model of celibacy to elucidate the inclusive fitness costs and benefits associated with this behaviour. We show that a minority of sons being celibate can be favoured if this increases their brothers' reproductive success, but only if the decision is under parental, rather than individual, control. These conditions apply to monks in our study site. Inclusive fitness considerations appear to play a key role in shaping parental preferences to adopt this cultural practice.

<https://royalsocietypublishing.org/doi/full/10.1098/rspb.2022.0965>

### **SABINE NÖBEL et al – The importance of population heterogeneities in detecting social learning as the foundation of animal cultural transmission**

High levels of within-population behavioural variation can have drastic demographic consequences, thus changing the evolutionary fate of populations. A major source of within-population heterogeneity is personality. Nonetheless, it is still relatively rarely accounted for in social learning studies that constitute the most basic process of cultural transmission. Here, we performed in female mosquitofish (*Gambusia holbrooki*) a social learning experiment in the context of mate choice, a situation called mate copying (MC), and for which there is strong evidence that it can lead to the emergence of persistent traditions of preferring a given male phenotype. When accounting for the global tendency of females to prefer larger males but ignoring differences in personality, we detected no evidence for MC. However, when accounting for the bold–shy dichotomy, we found that bold females did not show any evidence for MC, while shy females showed significant amounts of MC. This illustrates how the presence of variation in personality can hamper our capacity to detect MC. We conclude that MC may be more widespread than we thought because many studies ignored the presence of within-population heterogeneities.

<https://royalsocietypublishing.org/doi/full/10.1098/rspb.2022.0431>

### **LUCAS R. HEARN, OLIVIA K. DAVIES & MICHAEL P. SCHWARZ – Extreme reproductive skew at the dawn of sociality is consistent with inclusive fitness theory but problematic for routes to eusociality**

To understand the earliest stages of social evolution, we need to identify species that are undergoing the initial steps into sociality. *Amphylaeus morosus* is the only unambiguously known social species in the bee family Colletidae and represents an independent origin of sociality within the Apoidea. This allows us to investigate the selective factors promoting the transition from solitary to social nesting. Using genome-wide SNP genotyping, we infer robust pedigree relationships to identify maternity of brood and intracolony relatedness for colonies at the end of the reproductive season. We show that *A. morosus* forms both matrilineal and full-sibling colonies, both involving complete or almost complete monopolization over reproduction. In social colonies, the reproductive primary was also the primary forager with the secondary female remaining in the nest, presumably as a guard. Social nesting provided significant protection against parasitism and increased brood survivorship in general. We show that secondary females gain large indirect fitness benefits from defensive outcomes, enough to satisfy the conditions of inclusive fitness theory, despite an over-production of males in social colonies. These results suggest an avenue to sociality that involves high relatedness and, very surprisingly, extreme reproductive skew in its earliest stages and raises important questions about the evolutionary steps in pathways to eusociality.

<https://royalsocietypublishing.org/doi/abs/10.1098/rspb.2022.0652>

### **JUSTIN A. LEDOGAR et al – Mechanical compensation in the evolution of the early hominin feeding apparatus**

Australopiths, a group of hominins from the Plio-Pleistocene of Africa, are characterized by derived traits in their crania hypothesized to strengthen the facial skeleton against feeding loads and increase the efficiency of bite force production. The crania of robust australopiths are further thought to be stronger and more efficient than those of gracile australopiths. Results of prior mechanical analyses have been broadly consistent with this hypothesis, but here we show that the predictions of the hypothesis with respect to mechanical strength are not met: some gracile australopith crania are as strong as that of a robust australopith, and the strength of gracile australopith crania overlaps substantially with that of chimpanzee crania. We hypothesize that the evolution of cranial traits that increased the efficiency of bite force production in australopiths may have simultaneously weakened the face, leading to the compensatory evolution of additional traits that reinforced the facial skeleton. The evolution of facial form in early hominins can therefore be thought of as an interplay between the need to increase the efficiency of bite force production and the need to maintain the structural integrity of the face.

<https://royalsocietypublishing.org/doi/abs/10.1098/rspb.2022.0711>

**DENIS TVERSKOI, SUDARSANAM BABU & SERGEY GAVRILETS – The spread of technological innovations: effects of psychology, culture and policy interventions**

Technological innovations drive the evolution of human societies. The success of innovations depends not only on their actual benefits but also on how potential adopters perceive them and how their beliefs are affected by their social and cultural environment. To deepen our understanding of socio-psychological processes affecting the new technology spread, we model the joint dynamics of three interlinked processes: individual learning and mastering the new technology, changes in individual attitudes towards it, and changes in individual adoption decisions. We assume that the new technology can potentially lead to a higher benefit but achieving it requires learning. We posit that individual decision-making process as well as their attitudes are affected by cognitive dissonance and conformity with peers and an external authority. Individuals vary in different psychological characteristics and in their attitudes. We investigate both transient dynamics and long-term equilibria observed in our model. We show that early adopters are usually individuals who are characterized by low cognitive dissonance and low conformity with peers but are sensitive to the effort of an external authority promoting the innovation. We examine the effectiveness of five different intervention strategies aiming to promote the diffusion of a new technology: training individuals, providing subsidies for early adopters, increasing the visibility of peer actions, simplifying the exchange of opinions between people, and increasing the effort of an external authority. We also discuss the effects of culture on the spread of innovations. Finally, we demonstrate that neglecting the cognitive forces and the dynamic nature of individual attitudes can lead to wrong conclusions about adoption of innovations. Our results can be useful in developing more efficient policies aiming to promote the spread of new technologies in different societies, cultures and countries.

<https://royalsocietypublishing.org/doi/full/10.1098/rsos.211833>

**MARIO GALLEGO-ABENZA, PALMYRE H. BOUCHERIE & THOMAS BUGNYAR – Early social environment affects attention to social cues in juvenile common ravens, *Corvus corax***

Social competence, i.e. defined as the ability to adjust the expression of social behaviour to the available social information, is known to be influenced by early-life conditions. Brood size might be one of the factors determining such early conditions, particularly in species with extended parental care. We here tested in ravens whether growing up in families of different sizes affects the chicks' responsiveness to social information. We experimentally manipulated the brood size of 13 captive raven families, creating either small or large families. Simulating dispersal, juveniles were separated from their parents and temporarily housed in one of two captive non-breeder groups. After five weeks of socialization, each raven was individually tested in a playback setting with food-associated calls from three social categories: sibling, familiar unrelated raven they were housed with, and unfamiliar unrelated raven from the other non-breeder aviary. We found that individuals reared in small families were more attentive than birds from large families, in particular towards the familiar unrelated peer. These results indicate that variation in family size during upbringing can affect how juvenile ravens value social information. Whether the observed attention patterns translate into behavioural preferences under daily life conditions remains to be tested in future studies.

<https://royalsocietypublishing.org/doi/full/10.1098/rsos.220132>

**JOAQUIN NAVAJAS et al – Diversity of opinions promotes herding in uncertain crowds**

Classic and recent studies demonstrate how we fall for the 'tyranny of the majority' and conform to the dominant trend when uncertain. However, in many social interactions outside of the laboratory, there is rarely a clearly identified majority and discerning who to follow might be challenging. Here, we asked whether in such conditions herding behaviour depends on a key statistical property of social information: the variance of opinions in a group. We selected a task domain where opinions are widely variable and asked participants (N = 650) to privately estimate the price of eight anonymous paintings. Then, in groups of five, they discussed and agreed on a shared estimate for four paintings. Finally, they provided revised individual estimates for all paintings. As predicted (<https://osf.io/s89w4>), we observed that group members converged to each other and boosted their confidence following social interaction. We also found evidence supporting the hypothesis that the more diverse groups show greater convergence, suggesting that the variance of opinions promotes herding in uncertain crowds. Overall, these findings empirically examine how, in the absence of a clear majority, the distribution of opinions relates to subjective feelings of confidence and herding behaviour.

<https://royalsocietypublishing.org/doi/full/10.1098/rsos.191497>

**GERALD J. HAEFFEL – Psychology needs to get tired of winning**

Psychological science is on an extraordinary winning streak. A review of the published literature shows that nearly all study hypotheses are supported. This means that either all the theories are correct, or the literature is biased towards positive findings. Results from large-scale replication projects and the prevalence of questionable research practices indicate the latter. This is a problem because science progresses from being wrong. For decades, there have been calls for better theories and the adoption of a strong inference approach to science. However, there is little reason to believe that psychological science is ready to change. Although recent developments like the open science movement have improved transparency and replicability, they have not addressed psychological science's method-oriented (rather than problem-oriented) mindset. Psychological science still does not embrace the scientific method of developing theories, conducting critical tests of those

theories, detecting contradictory results, and revising (or disposing of) the theories accordingly. In this article, I review why psychologists must embrace being wrong and how the Registered Report format might be one strategy for stopping psychology's winning streak.

<https://royalsocietypublishing.org/doi/full/10.1098/rsos.220099>

### **BENEDETTA CEVOLI, CHRIS WATKINS & KATHLEEN RASTLE – Prediction as a basis for skilled reading: insights from modern language models**

Reading is not an inborn human capability, and yet, English-speaking adults read with impressive speed. This study considered how predictions of upcoming words impact on this skilled behaviour. We used a powerful language model (GPT-2) to derive predictions of upcoming words in text passages. These predictions were highly accurate and showed a tight relationship to fine-grained aspects of eye-movement behaviour when adults read those same passages, including whether to skip the next word and how long to spend on it. Strong predictions that were incorrect resulted in a prediction error cost on fixation durations. Our findings suggest that predictions for upcoming words can be made based on the analysis of text statistics and that these predictions guide how our eyes interrogate text at very short timescales. These findings open new perspectives on reading and language comprehension and illustrate the capability of modern language models to inform understanding of human language processing.

<https://royalsocietypublishing.org/doi/full/10.1098/rsos.211837>

### **ALASTAIR KEY et al – On the earliest Acheulean in Britain: first dates and in-situ artefacts from the MIS 15 site of Fordwich (Kent, UK)**

Northern Europe experienced cycles of hominin habitation and absence during the Middle Pleistocene. Fluvial gravel terrace sites in the east of Britain and north of France provide a majority of the data contributing to this understanding, mostly through the presence or absence of stone-tool artefacts. To date, however, relatively few sites have been radiometrically dated, and many have not been excavated in modern times, leading to an over-reliance on selectively sampled and poorly dated lithic assemblages. This includes Fordwich (Kent, UK), where over 330 bifaces were discovered through industrial quarrying in the 1920s. Here, we present the first excavation and dating of artefacts discovered in situ at Fordwich, alongside their technological analysis and relationship to those previously recovered. The site is demonstrated to retain deposits of Lower Palaeolithic artefacts, with 251 flakes, scrapers and cores identified to date. Infrared-radiofluorescence (IR-RF) dating of feldspar reveals 112 artefacts to have come from levels dating to at least  $570 \pm 36$  to  $513 \pm 30$  thousand years ago (ka) and are most plausibly assigned to an MIS 14 deposition, with artefacts produced during MIS 15 (approx. 560–620 ka). Indeed, these IR-RF samples provide minimum ages for artefacts. Combined with evidence from exposures linked to the original quarrying activities, a similar MIS 15 age is suggested for the more than 330 handaxe artefacts discovered in the 1920s. The remaining excavated artefacts come from levels dated to between  $347 \pm 22$  and  $385 \pm 21$  ka (MIS 10 or 11), with this later age interpreted to reflect post-MIS 14 deposition by substrate gullying and solifluction. These data demonstrate Fordwich to be one of the earliest Palaeolithic sites in northwestern Europe, and to retain the only large Acheulean handaxe assemblage directly dated to pre-MIS 13. Thus, Fordwich is determined to be a crucial piece of the pre-Anglian Palaeolithic puzzle in northern Europe.

<https://royalsocietypublishing.org/doi/full/10.1098/rsos.211904>

---

## Science

### PAPERS

### **YUE-CHEN LIU et mul with DAVID REICH – Ancient DNA reveals five streams of migration into Micronesia and matrilocality in early Pacific seafarers**

Micronesia began to be peopled earlier than other parts of Remote Oceania, but the origins of its inhabitants remain unclear. We generated genome-wide data from 164 ancient and 112 modern individuals. Analysis reveals five migratory streams into Micronesia. Three are East Asian related, one is Polynesian, and a fifth is a Papuan source related to mainland New Guineans that is different from the New Britain-related Papuan source for southwest Pacific populations but is similarly derived from male migrants ~2500 to 2000 years ago. People of the Mariana Archipelago may derive all of their precolonial ancestry from East Asian sources, making them the only Remote Oceanians without Papuan ancestry. Female-inherited mitochondrial DNA was highly differentiated across early Remote Oceanian communities but homogeneous within, implying matrilocality whereby women almost never raised their children in communities different from the ones in which they grew up.

<https://www.science.org/doi/10.1126/science.abm6536>

---

## SUBSCRIBE to the EAORC Bulletin

If you would like to subscribe to this free weekly newsletter, please contact [martin.edwardes@btopenworld.com](mailto:martin.edwardes@btopenworld.com).

---

## UNSUBSCRIBE from the EAORC Bulletin

Send an email to [martin.edwardes@btopenworld.com](mailto:martin.edwardes@btopenworld.com) with the subject "EAORC unsubscribe".

---

## PRODUCED BY AND FOR THE EAORC EMAIL GROUP

EAORC is a fee-free academic internet news service and has no commercial sponsorship or other commercial interests.

EAORC website information is at <http://martinedwardes.me.uk/eaorc/>

If you have received this bulletin, and are unhappy about receiving it, please contact [martin.edwardes@btopenworld.com](mailto:martin.edwardes@btopenworld.com).