

NEWS AND NOTES

New human fossils findings in Morocco could rewrite a lot of what we know about man's evolutionary history. They date back more than 300,000 years ago and are the oldest known *Homo sapiens* remains ever found. As with all previous ancient human fossils there were dug up in Morocco, not East Africa where experts have previously said humans exclusively evolved. A few other publications cast exciting light on other ancient species.

The oldest human fossil found in Morocco

Fossil evidence points to an African origin of *Homo sapiens* from a group called either *H. heidelbergensis* or *H. rhodesiensis*. The exact place and time of emergence of *H. sapiens* remain obscure, because the fossil record is scarce and the chronological age of many key specimens remains uncertain. In particular, it is unclear whether the present day 'modern' morphology rapidly emerged approximately 200 thousand years ago (ka) among earlier representatives of *H. sapiens* or evolved gradually over the last 400 thousand years. The authors of the *Nature* publication describe the finding of human fossils from Jebel Irhoud, Morocco, and interpret the affinities of the hominins from this site with other archaic and recent human groups. From the identification of a mosaic of features including facial, mandibular and dental morphology that aligns the authors conclude that the Jebel Irhoud material with early or recent anatomically modern humans and more primitive neurocranial and endocranial morphology. In combination with an age of 315 ± 34 thousand years this evidence makes Jebel Irhoud the oldest and richest African Middle Stone Age hominin site that documents early stages of the *H. sapiens* clade in which key features of modern morphology were established.

Jean-Jacques Hublin et al., (2017). New fossils from Jebel Irhoud, Morocco and the pan-African origin of *Homo sapiens*. *Nature* **546**: 289–292. doi:10.1038/nature22336

Oldest human tools discovered

The earliest fossil attributed to a modern form of *Homo sapiens* comes from eastern Africa and is approximately 195 thousand years old with the emergence of modern human biology placed at around 200 thousand years ago. However, the earliest Middle Stone Age assemblages come from eastern and southern Africa but date much earlier. In this article, the authors report on the ages, determined by thermoluminescence dating, of fire-heated flint artefacts obtained from new excavations at the Middle Stone Age site of Jebel Irhoud, Morocco, which are directly associated with newly discovered remains of *H. sapiens*. The analysis places these Middle Stone Age artefacts and fossils at 315 ± 34 thousand years ago, which is supported the recalculated uranium series with electron spin resonance date of 286 ± 32 thousand years ago for a tooth from the Irhoud hominin mandible. The north African site of Jebel Irhoud contains one of the earliest directly dated Middle Stone Age assemblages, and its associated human remains are the oldest reported for *H. sapiens*.

Daniel Richter et al. (2017). The age of the hominin fossils from Jebel Irhoud, Morocco, and the origins of the Middle Stone Age. *Nature* **546**: 293–296 doi:10.1038/nature22335

A mid-Paleocene fossil from New Zealand reveals an unexpected diversity of world's oldest penguins

We describe leg bones of a giant penguin from the mid-Paleocene Waipara Greensand of New Zealand. The specimens were found at the type locality of *Waimanu manneringi* and together with this species they constitute the oldest penguin fossils known to date. Tarsometatarsus dimensions indicate a species that reached the size of *Anthropornis nordenskjoeldi*, one of the largest known penguin species. Stem group penguins therefore attained a giant size very early in their evolution, with this gigantism existing for more than 30 million years. The new fossils are from a species that is

phylogenetically more derived than Waimanu, and the unexpected coexistence of Waimanu with more derived stem group Sphenisciformes documents a previously unknown diversity amongst the world's oldest penguins. The characteristic tarsometatarsus shape of penguins evolved early on, and the significant morphological disparity between Waimanu and the new fossil conflicts with recent Paleocene divergence estimates for penguins, suggesting an older, Late Cretaceous, origin.

Mayr, G. et al. (2017). A new fossil from the mid-Paleocene of New Zealand reveals an unexpected diversity of world's oldest penguins. *Sci. Nat* **104:9**. doi:10.1007/s00114-017-1441-0

99 Million-Year-Old Baby Bird Trapped in Amber Discovered in Myanmar

A 99 million-year-old baby bird encased in amber has been unearthed in Myanmar (Fig.1). The

ancient hatchling died when it was just a few days or weeks old after a blob of sticky tree resin fell on it, leaving half of its body frozen in time. Xing Lida, from the China University of Geosciences, led an international team of researchers in analyzing the three-inch specimen. The amber encases the bird's skull, neck, a partial wing, a hind limb and one foot. The hatchling would have belonged to a group of birds called *enantiornithines*, that lived during the Cretaceous period, 145 to 65 million years ago. They died out during the mass extinction event that killed off the dinosaurs. The bird was unusual in several ways, for example, the structure of its wings was very similar to those seen in modern flying birds, but it retained some features that are seen in more primitive theropods --- that is, the group of dinosaurs from which modern birds emerged. It is believed to be the most complete view of a hatchling's plumage from the Cretaceous period discovered to date, and it provides an amazing reference point for comparisons with the body



Figure 1. A 99 million year old bird encased in amber when it was just days or weeks old © Elsevier/Xing et al/Gondwana Research

forms of other fossilized birds and feathers found in amber.

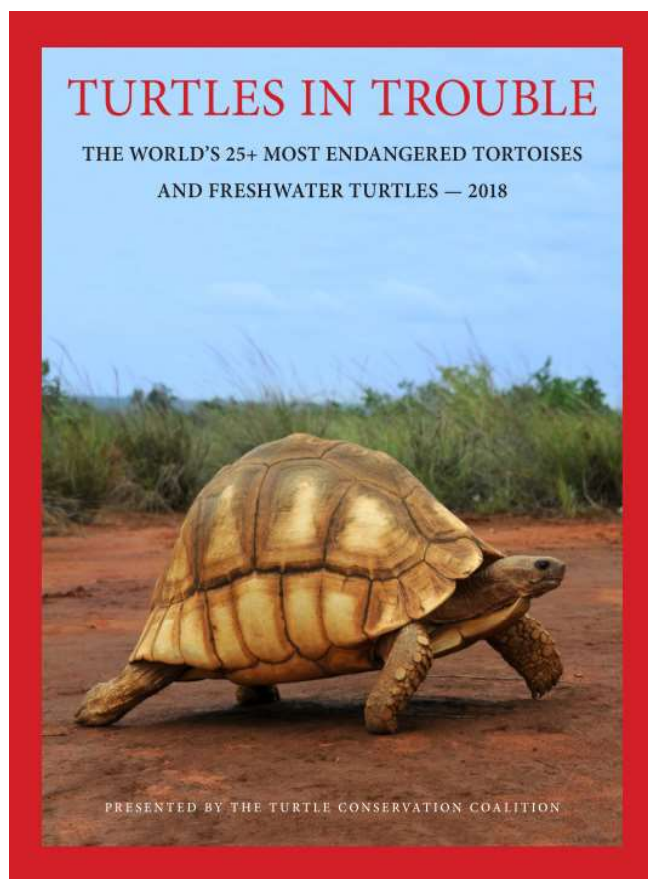
Lida Xing et al. (2017). A mid-Cretaceous enantiornithine (Aves) hatchling preserved in Burmese amber with unusual plumage. *Gondwana Research* **49**: 264-277. <https://doi.org/10.1016/j.gr.2017.06.001>

Evidence for early life in Earth's oldest hydrothermal vent

It is not known when or where life on Earth began, but some of the earliest habitable environments may have been submarine-hydrothermal vents. In this study, a team lead by Matthew S. Dodd describe putative fossilized microorganisms that are at least 3,770 million and possibly 4,280 million years old from the Nuvvuagittuq belt in Quebec, Canada. The finds are from ferruginous sedimentary rocks, interpreted as seafloor-hydrothermal vent-related precipitates. The structures are similar to those of filamentous microorganisms from modern hydrothermal vent precipitates and analogous microfossils in younger rocks. Comprised of tiny tubes and filaments made of an iron oxide known as haematite, the microfossils are believed to be the remains of bacteria that once thrived underwater around hydrothermal vents, relying on chemical reactions involving iron for their energy.

Along with a range of other features, these observations are consistent with an oxidized biomass that provides evidence for biological activity in submarine-hydrothermal environments more than 3,770 million years ago. The new discovery supports the idea that life emerged and diversified rapidly on Earth. Like the oldest microfossils previously reported – samples from western Australia dating to about 3.46bn years ago – the new discovery is set to be the subject of hot debate.

Matthew S. Dodd, et al. (2017). Evidence for early life in Earth's oldest hydrothermal vent precipitates. *Nature* **543**: 60–64. doi:10.1038/nature21377



New report about Turtles in Trouble

Indonesia's capital, Jakarta, has seen an increase in the sale of non-native species of tortoises and freshwater turtles that are prohibited for international commercial trade, according to a report by the wildlife-monitoring group TRAFFIC. Growing demand for these species, coupled with Indonesia's lax enforcement of customs regulation at international ports of entry and an outdated conservation act, have allowed the illicit international animal trade to grow, TRAFFIC said. The group has called on the Indonesian government to improve the country's conservation laws and regulations, and urged more stringent monitoring of the markets, pet stores and expos in Jakarta and across the country to document and assess the extent of any illegal trade. Jakarta is also known for its extensive bird markets, like Pramuka, where thousands of birds are traded every month. Most are illegally caught from the wild, resulting on a population decline and local extinction of many species that were common only a few years ago.

Primates in peril

Non-human primates play important roles in the livelihoods, cultures, and religions of many societies and offer unique insights into human evolution, biology, behaviour, and the threat of emerging diseases. They are an essential component of tropical biodiversity, contributing to forest regeneration and ecosystem health. Currently, there exists 504 species in 79 genera distributed in the Neotropics, mainland Africa, Madagascar, and Asia. Unfortunately, approx. 60% of all primate species are now threatened with extinction and 75% are in decline. This situation is the result of escalating anthropogenic pressures on primates and their habitats, leading to extensive habitat loss through the expansion of industrial agriculture, large-scale cattle ranching, logging, oil and gas drilling, mining, dam building, and the construction of new road networks in primate range regions. In addition, bush meat and the illegal trade of primates as pets and body parts, along with emerging threats, such as climate change and anthroponotic diseases. Given that primate range regions overlap extensively with a large, and rapidly growing, human population characterized by high levels of poverty, global attention is needed immediately to reverse the looming risk of primate extinctions.

Estrada et al. (2017). Impending extinction crisis of the world's primates: Why primates matter. *Sci. Adv.* **3** e1600946

The extinction of the Sumatran rhino

It is common knowledge that the Sumatran rhino, *Dicerorhinus sumatrensis harrissoni*, is close to extinction. The reasons for catastrophic population declines are less clear. Often, data necessary to improve decisions for conservation management are often lacking. The authors reviewed literature and assembled a comprehensive data set on surveys of the Sumatran rhino in the Malaysian state of Sabah on Borneo to chart the historical development of the population in Sabah and its exploitation until the present day. They fitted resource selection

functions to identify habitat features preferred by a remnant population of rhinos living in the Tabin Wildlife Reserve in Sabah, and ran a series of population viability analyses (PVAs) to extract the key demographic parameters most likely to affect population dynamics. We show that as preferred habitat, the individuals in the reserve were most likely encountered in elevated areas away from roads, in close distance to mud-volcanoes, with a low presence of human trespassers and a wallow on site, and within a neighbourhood of dense forest and grassland patches. The analysis also indicates that unrestrained hunting between 1930 and 1950 drastically reduced the historical rhino population in Sabah and that the remnant population could be rescued by combining the effort of total protection and stimulation of breeding activity. The authors recommend to translocate isolated reproductively healthy individuals to protected locations and to undertake measures to maximise conceptions, or running state-of-the-art reproductive management with assisted reproduction techniques.

P. Kretzschmar et al. (2016). The catastrophic decline of the Sumatran rhino (*Dicerorhinus sumatrensis harrissoni*) in Sabah: Historic exploitation, reduced female reproductive performance and population viability. *Global Ecology and Conservation* **6**: 257–275. <http://dx.doi.org/10.1016/j.gecco.2016.02.006>