

Asia's mysterious role in the early origins of humanity

Bizarre fossils from China are revealing our species' Asian origins and rewriting the story of human evolution



Detlev van Ravenswaay/Getty

By **Kate Douglas**

DECEMBER 1941. Japan has just entered the second world war. China, already fighting its neighbour, is in the firing line. At the Peking Union Medical College Hospital, Hu Chengzhi carefully packs two wooden crates with the world's most precious anthropological artefacts. Peking Man – in reality some 200 fossilised teeth and bones, including six skulls – is to be shipped to the US for safekeeping. This is the last anyone ever sees of him.

At the time, the Peking Man remains were the oldest known fossils belonging to human ancestors. Their discovery in the 1920s and 30s caused a sensation, triggering declarations that the cradle of humanity had been found. But just a few decades later, all eyes had turned to Africa. A slew of discoveries there left little doubt that it was our true ancestral home. As far as human evolution was concerned, Asia was out of the picture.

Not any more. The last decade has seen the discovery of new Asian fossils, among others by



Rewriting human evolution

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The first Peking Man remains were found in 1923, nearly 50 kilometres outside Beijing. Alongside the broad-nosed individuals with thick brows were burnt animal bones, suggesting an early human ancestor capable of controlling fire. Only four other ancestral human species had been discovered at that time, including Neanderthals in Germany and *Australopithecus africanus*, identified from the ape-like Taung Child remains in South Africa. Team leader Davidson Black believed the Chinese fossils represented a new species, which he called *Sinanthropus pekinensis*.

For a while, all the excitement in palaeoanthropology focused on east Asia. Then, in the 1950s, husband-and-wife team Louis and Mary Leakey began digging at Olduvai gorge in Tanzania. By 1959, they had discovered a 1.8-million-year-old species, *Paranthropus boisei*. This presaged a flood of remarkable discoveries in East Africa, including the earliest *Homo* species – *Homo habilis* – at Olduvai; footprints at nearby Laetoli, revealing that our ancestors walked upright at least 3.7 million years ago; and the famous “Lucy” (*Australopithecus afarensis*), that lived 3.2 million years ago, in Ethiopia. Peking Man and Asia were sidelined.

From these and subsequent discoveries emerged the standard model of human evolution. It traces our family tree back to a split with the forebears of chimps 6 to 10 million years ago. The next few million years saw the evolution of a profusion of hominin species the length and breadth of Africa, before our own genus, *Homo*, emerged around 2 million years ago.

H. erectus, an early member of our genus, clearly had a wanderlust. It migrated all the way to South-East Asia as early as 1.8 million years ago. Today, Peking Man is recognised as a late representative that lived 700,000 years ago. While nobody disputes that several human species populated Eurasia very early on, the textbook version sees them as evolutionary dead ends. Our own species, the story goes, descends directly from African *H. erectus* and only emerged from the continent some 60,000 years ago, at which point it swept across the globe, replacing all other hominin species.

That, until very recently, was the accepted story. There were details to fill out, but the plot and main characters were clear. As fossils trickled out of Asia, drawing far less attention in the West than African fossils did, they were often dismissed because they contradicted the dominant narrative.

Transitional humans

In 1992, for instance, researchers reported finding a pair of 900,000-year-old skulls in Yunxian, central China. Their features looked like a mix of *H. erectus* and *H. sapiens* – which was odd

similar mix of features, typical of “transitional forms”, that cannot be ascribed to any well-defined species. Although the Yunxian and Dali Man fossils are particularly fine examples, many more have been found in east Asia.

Then, in 2009, Chinese scientists announced the discovery of a 110,000-year-old jawbone in the southern province of Guangxi. Though relatively primitive, it displayed a prominent human-like chin. The team classified it as *H. sapiens*, which would mean that our species was in Asia a good 50,000 years before we previously thought. Still, many were sceptical, reluctant to rewrite humanity's origins. Some suggested it may have been a hybrid of *H. sapiens* with another now-extinct species – though that would still imply that humans were in east Asia. Who or what the Guangxi remains belonged to is still hotly debated.

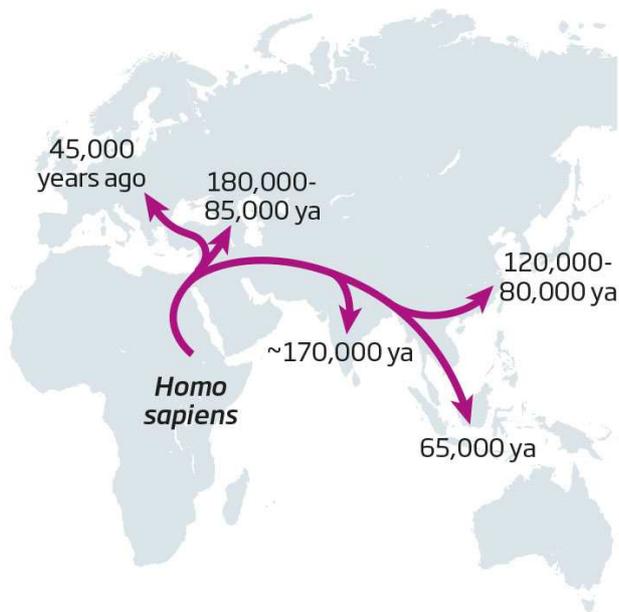
The tide began to turn in 2015, when 47 teeth were found inside a cave in Daoxian, also in southern China. Teeth are one of the best ways to distinguish between hominin species, and these were distinctly human – belonging to our own species – not to mention very old. According to Wu Liu at the Institute of Vertebrate Paleontology and Paleoanthropology in Beijing and his colleagues, they had been lying around for 80,000 to 120,000 years. For Wu, the mounting evidence could only mean one thing: “Early modern humans were in southern China at least 100,000 years ago.”

That would put our species' first foray out of Africa at least 40,000 years further back in time, yet this early Asian expansion hypothesis is gaining traction. “The traditional view, that modern humans swept out of Africa as a single exodus 60,000 years ago is now being called into question,” says Michael Petraglia at the Max Planck Institute for the Science of Human History, Germany.

In December 2017, Petraglia co-authored a review that considers the “Asian perspective” on human evolution, drawing on all the evidence. “Palaeoanthropologists are now increasingly arguing, on the basis of fossil, archaeological and genetic evidence, that humans began spreading out of Africa by at least 120,000 years ago, and in multiple waves,” says Petraglia.

Out of Africa, earlier

Until recently, the consensus was that *Homo sapiens* left Africa around 60,000 years ago. Growing evidence suggests that is wrong



An earlier exit from Africa fits better with other recent discoveries. Just last year, a collection of Moroccan fossils suggested that our species could be 300,000 to 350,000 years old, adding at least 100,000 years to our history. Then, earlier this year, we learned that a group of *H. sapiens* was living in what is now Israel at least 177,000 years ago. Another group was making tools in south India at around the same time. And in April, reports of a fossilised finger bone pointed to the presence of *H. sapiens* in what is now Saudi Arabia at least 85,000 years ago. Early humans clearly weren't the stay-at-homes we once thought. There seems little doubt that our direct ancestors ventured east out of Africa far earlier than the standard narrative allows.

This is a huge change to the standard view. But it doesn't explain those weird transitional fossils from China that display a mix of *H. erectus* and *H. sapiens* features. Being hundreds of thousands of years old, they predate even the earlier exodus out of Africa. The most radical suggestion is that they are evidence that *H. erectus* evolved into *H. sapiens* in east Asia. Wu Xinzhi at the Chinese Academy of Sciences in Beijing is the fiercest proponent of this suggestion, a form of "multiregionalism". The idea that we evolved from a number of separate populations was once regarded as maverick, but has become more respectable. Most notably, the latest evidence from inside Africa undermines the notion that *H. sapiens* emerged from a single population in the east of the continent. Instead, most now agree there were isolated populations across Africa that sporadically came together and mated, creating a variety of human forms.

"Some say Asia should have equal billing as the birthplace of our species"

Wu Xinzhi's suggestion, however, remains radical. He believes that the transitional fossils are evidence of Asian *H. erectus* evolving into our own species in Asia, that Peking Man was an ancestor of modern Asian people and that Asia should have equal billing with Africa as the birthplace of our species. While some Chinese palaeontologists support this view, others see a hint of nationalism at play. To bolster his argument that China's hominins were evolving along similar lines to those in Africa, Wu Xinzhi, along with Sheela Athreya at Texas A&M University,

per cent of the DNA in Chinese populations can be traced back to Africa.



Old bones, like these from the Peking Man cave, tell new stories

AFP/Getty Images

A more likely explanation for the transitional fossils is that Asia, like Africa, was once home to various human groups that exchanged genes. Along with *H. erectus*, genetic studies have revealed a number of hominins whose identity is still a mystery. Later, there was the diminutive “hobbit”, *H. floresiensis*, found on the Indonesian island of Flores from 100,000 years ago, preceded by an ancestral species going back 700,000 years. Denisovans were probably there too: although their identified remains currently amount to just three teeth and a finger bone found in Siberia, dental and genetic evidence indicate they were also in South-East Asia. Even Neanderthals, which have only been positively identified as far east as central Asia’s Altai mountains, may once have roamed further east. Their characteristic features are now being identified in Chinese fossils.

If these various species interbred, they should have left behind hybrids scattered across Asia (see “Hybrid shapes”). Indeed, the surprisingly rich variety among east Asian fossils suggests hybridisation was widespread, says María Martínón-Torres, director of the National Research Centre on Human Evolution in Spain.

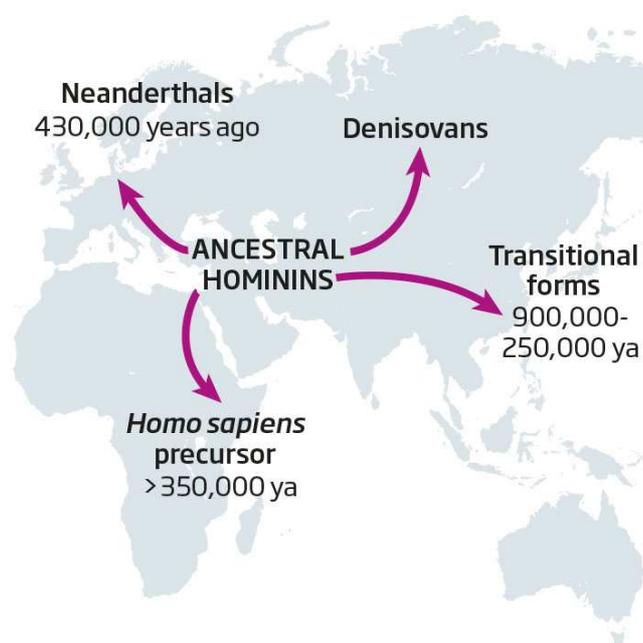
Martínón-Torres and her colleagues have also shown that hominins in Africa and Eurasia did evolve relatively independently for a long time. When they examined 5000 fossil teeth spanning 2.5 million years, they found that each continent had its own distinct type of teeth – strong evidence that Eurasia was a centre of speciation in its own right.

Rather than multiregionalism, she and her collaborators suggest a “source and sink” model to

disappearing depending on fluctuations in the climate over hundreds of thousands of years. During cold periods, much of central Asia and the northern steppe would have become uninhabitable. These are the “sinks”. But hominins would have been able to survive in more southerly regions, on some islands and in regions where the climate remained relatively stable, such as the Middle East – the “sources”.

Eastern cradle

According to one idea, the Middle East was home to a source population of hominins. Offshoots could have travelled far, including back into Africa where they evolved into our species



If correct, this points to a strong but discontinuous occupation of east Asia. Although Martín-Torres doesn't believe that our species arose independently in Asia, she does think it likely that we have roots in Asia – though probably not in the Far East. Peking Man was a true pioneer, but most of his relatives didn't travel nearly as far, settling instead in the Middle East where the climate was more favourable. This, she suggests, was the source population of Neanderthals, Denisovans and another branch of our family tree, which migrated back to Africa before evolving there into *H. sapiens*. “Maybe Africa was not the only human cradle,” she says.

The truth is, the story of our evolution is still being rewritten and we can't be sure how it will turn out. What is certain is that Asia can no longer be sidelined. It is possible that the species we evolved from made its own migration into Africa before giving rise to us. Our ancestors then left Africa at least 100,000 years ago and travelled the breadth of Eurasia for millennia.

The Chinese government recently set up a lab at the Institute of Vertebrate Paleontology and Paleoanthropology to extract and sequence ancient genetic material. “We only have one genome,” says Qiaomei Fu, who heads the lab. It is from a 40,000-year-old individual found near Beijing. More DNA work should shed new light, perhaps even identify new human species. These and other future discoveries in Asia are sure to unearth more twists in the tale. “Asia,” says Martín-Torres, “is like Pandora's box.” Which just makes it more enticing.

How to spot a hybrid fossil

We now know that our ancestors, in all their forms, were a promiscuous bunch. It seems as if every new genetic study reveals yet more interbreeding between groups that were once thought to be distinct species. But in the medley of bones being dug up, how do we identify which ones are from hybrids? Studies of living primates offer useful insights.

Contrary to expectations, hybrids aren't a mosaic of their parents' features. Instead, interbreeding in baboon species often leads to evolutionary innovation. The offspring tend to take highly variable forms, be unusually large or small, and have overcrowded and misaligned teeth.

This has led María Martín-Torres, director of the National Research Centre on Human Evolution in Spain, and her colleagues in China to suggest a new explanation for the many strange human forms that have been found on the Indonesian island of Flores. Perhaps, they say, the hobbit species, *H. floresiensis*, hybridised with *H. sapiens* or possibly even *H. erectus*. "Hence its considerable number of pathologies and unusual features," says Martín-Torres.

This article appeared in print under the headline "Our African Origins"

Magazine issue 3185, published 7 July 2018

