Meet your long-lost distant cousin, Homo luzonensis

Enlarge / Callao Cave in northern Luzon, where the fossils were found.
Detroit et al. 2019

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Our picture of hominin evolution in Asia just got more complicated, thanks to the discovery of a previously unknown hominin species on the island of Luzon in the Philippines. The new species, *Homo luzonensis*, lived at around the same time as the "Hobbits" of nearby Flores (*Homo floresiensis*).

The two species share a mix of modern and older traits. *Homo luzonensis'* teeth look like those of more recent members of our genus, *Homo*, but the hand and foot bones look more like they could have belonged to an Australopithecine—an early human relative that evolved around 3 million years ago and spent as much time in the trees as on the ground, a group that includes the famous skeleton named Lucy.

The combination didn't look like any other species anthropologists had seen before.

So far, everything we know about *Homo luzonensis* comes from a handful of bones and teeth from Callao Cave on the northern end of Luzon in the Philippines. The site has been uranium-series dated to a minimum of 67,000 to 50,000 years old. In 2011, a team of archaeologists, led by anthropologist Florent

Détroit of the Paris National Museum of Natural History, found two toe bones, two finger bones, seven teeth, and the shaft of a thigh bone (femur) in the same layer of sediment where they'd found a foot bone (metatarsal) in 2007. Those bits of bone are all that's left of at least two hominin adults and one child who died around 50,000 years ago. Archaeologists found two upper-right third molars, which means the teeth came from at least two adults. Meanwhile, the femur clearly belonged to a child.

Those three hominins weren't our ancestors; instead, they probably descended from species like *Homo erectus*, which first spread beyond Africa around 1.5 million to 2.0 million years ago, long before the ancestors of Neanderthals and Denisovans ventured into Eurasia 500,000 years ago (only to be followed and eventually edged out by modern humans starting around 200,000 years ago). So you can think of *Homo luzonensis* as a distant cousin—one of several that may have co-existed around the world up until 50,000 years ago.

My, what small teeth you have!

2 million or 3 million years ago, hominins like Australopithecines and the earliest members of our genus, *Homo*, had massive heavy jaws and big robust teeth, supported by powerful muscles that required thick anchor points on the skull. Over time, hominin diets shifted toward foods that required less work to chew, so humans and our more recent relatives tend to have smaller, less powerful jaws and teeth with more subtle anchor points on the skull. This is why some Australopithecines have cool sagittal crests and we don't.

The *Homo luzonensis* teeth from Callao Cave look more like those of more recent members of our genus than like Lucy. They're small, like ours, with simpler chewing surfaces. Their overall shape looks more like *Homo* species from the last 2 million years or so, though they're not quite as squarish as

ours tend to be. But you can see traces of earlier lineages in a few other traits, like the size difference between the premolars and the molars.

Overall, "*Homo luzonensis* shows a pattern that is not seen elsewhere in the genus *Homo*," wrote Détroit and his colleagues in a paper published today in *Nature*. In other words, its teeth look different from any other species, so it's probably a species we've never seen before.

But on the other hand…

The few hand and foot bones we have from *Homo luzonensis* look a lot more like Australopithecines. One of the finger bones (the middle bone of one of the fingers on the left hand) and a toe bone (the base of one of the middle toes on the right foot) are both curved, which is something you'd expect to see in older members of our family tree, like *Australopithecus afarensis*. And the way the end of the toe bone would have lined up with the metatarsal (a bone in the mid-foot) also looked more like an Australopithecine than like *Homo erectus* or a modern human.

"You could drop that bone among the fossils from 3 million years ago in Ethiopia in Hadar, and you wouldn't be able to pull it out," anthropologist Matthew Tocheri of Lakehead University, who wrote a paper commenting on the discovery, told Ars Technica. "I don't think there's anyone in this field who would say that that looks like what you might expect the toe bones of *Homo erectus* to look like. Instead, it's the exact opposite; you expect the toe bone of *Homo erectus* to look a lot more like our toe bones, where they're significantly shorter and the morphology has changed quite dramatically from what we see in earlier hominins."

Curved phalanges are usually the mark of a life spent doing a lot of climbing. Bones rebuild and remodel themselves constantly throughout our lives, so their final shape reflects

the kinds of stresses we put them under. If you were an early hominin, you'd be climbing and hanging around in trees about as often as you walked on the ground. After spending a lot of time gripping branches with your weight hanging below your arms, the bones at the base of your fingers would curve slightly to help bear the strain better. Curved toe bones suggest gripping with the feet.

That reveals more about an individual's lifestyle than their genetics, but it may suggest that *Homo luzonensis* navigated the world with a mix of walking and climbing, similar to Lucy and other Australopithecines who first emerged 3 million years ago.

Of course, two fingers and two toes aren't much to go on, and Détroit and his colleagues caution that we don't yet have enough information about *Homo luzonensis* to draw firm conclusions about how the species moved around. But they do say that the bones look distinctly more Australopithecine than *Homo*, and that may mean that the human story is more complex than we thought.

- From right to left, two premolars and three molars from the upper right jaw of the same *Homo luzonensis* adult.
  Detroit et al 2019
- The bone from the base of the toe (proximal phalanx) from *Homo luzonensis*.
  Detroit et al. 2019
- Compare the teeth and phalanx of *Homo luzonensis* to those of *Homo sapiens* (right) and *Australopithecus afarensis* (left).
  Tocheri 2019

Intrigue in the family tree

Homo luzonensis lived and died just 2,800km (1,730mi) from the

Indonesian island of Flores, where archaeologists discovered the fossil remains of a diminutive hominin species called *Homo floresiensis*. Nicknamed the Hobbit, it dates from 100,000 to 60,000 years ago. That discovery dropped a very strong hint that the story of *Homo erectus* and its descendants among the islands of Southeast Asia might have been more complicated than we thought—and was so a long time before Denisovans and modern humans showed up.

"These new fossils, and the assignation of them to a new species (*Homo luzonensis*), fulfills one of the predictions Mike Morwood and others (myself included) made when we first reported (15 years ago!) the discovery *of Homo floresiensis*: that other unknown species of hominins would be found in the islands of Southeast Asia," anthropologist Richard Roberts told Ars. (He's a co-discoverer of *Homo floresiensis* and based at the University of Wollongong.) "So, while in some ways a new species in the region is not unexpected, it is nonetheless exciting to see this new material finally come to light."

And it raises the intriguing (but totally speculative, so far) prospect that others may still be waiting to be found.

Both Luzon and Flores have been separated from the nearest mainland since well before hominins ventured into the region, so whatever groups of hominins made it to the islands (possibly washed ashore by accident) would have been isolated for hundreds of thousands of years afterward. As a result, they were free to evolve in their own directions. The result may have been a sudden branching of the hominin family tree into several new species. Today, they provide an opportunity for anthropologists to watch the same story play out, in parallel, on different tropical islands.

Homo luzonensis and *Homo floresiensis* have enough in common to suggest a common ancestor. "The skeletons of both species present anatomical traits that are either rare or absent elsewhere in the genus *Homo* but have similarities with those

of Australopithecus," wrote Détroit and his colleagues. It's likely that the two species share a common ancestor that they don't have in common with us, similar to the way we're more closely related to Neanderthals and Denisovans than to *Homo erectus.* Right now, however, there's not enough evidence yet to be sure, and no DNA from either species so far.

A family mystery

The most widely accepted version of this idea is that that common ancestor is *Homo erectus*. There is fossil evidence of the species' presence in Asia during the right time period to have given rise to *Homo luzonensis*, and there's no fossil evidence of any other hominin species in the area at the same time. When authors did a statistical analysis of every feature they could quantify, *H. luzonensis* looked more like Asian *Homo erectus* specimens than like any other known species. They suggest that *Homo floresiensis'* dwarfism evolved on Flores (and we know the same thing happened with modern humans on the island), and that *Homo luzonensis'* Australopithecine-like feet and hands evolved on Luzon in a way that just coincidentally happened to resemble its earlier relative.

But Tocheri, whose work focuses on hands and feet, says that's possible, but he argues that it's less likely than the idea that other very early members of *Homo* may have left Africa at around the same time as *Homo erectus.* In this view, *Homo luzonensis* and *Homo floresiensis* look a bit like those earlier hominins because that is, in fact, who they're descended from. Several species like *Homo habilis* and *Homo rudolfensis*, which evolved earlier and had more Australopithecine-like traits, were still around when *Homo erectus* was beginning its Eurasian expansion, and Tocheri says that 2.1 million-year-old stone tools found in China last year may suggest an even earlier hominin migration.

"If we have missed these species that lived less than 100,000

years ago, how much are we missing from the earlier phases of evolution?” anthropologist John Hawks of the University of Wisconsin, co-discoverer of *Homo naledi*, told Ars in an email commenting on the study. “Could there have been earlier dispersals that we haven’t noticed because of bad search strategies and bad assumptions? I wouldn’t bet against finding that hominins were out of Africa a lot earlier than we thought.”

At the moment, we don’t have direct fossil evidence one way or the other, and what we have comes from late in *Homo luzonensis*’ and *Homo floresiensis*’ time. Stone tools and butchered animal remains on both islands suggest that hominins were there as early as 700,000 years ago. Learning whether those early occupants looked more like Lucy or more like *Homo erectus* could help sort out the family mystery.

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