

# Primates of the Caribbean: Ancient DNA reveals history of mystery monkey

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*Xenothrix*'s close relative, the red titi monkey (*Callicebus cupreus*). Credit: ZSL

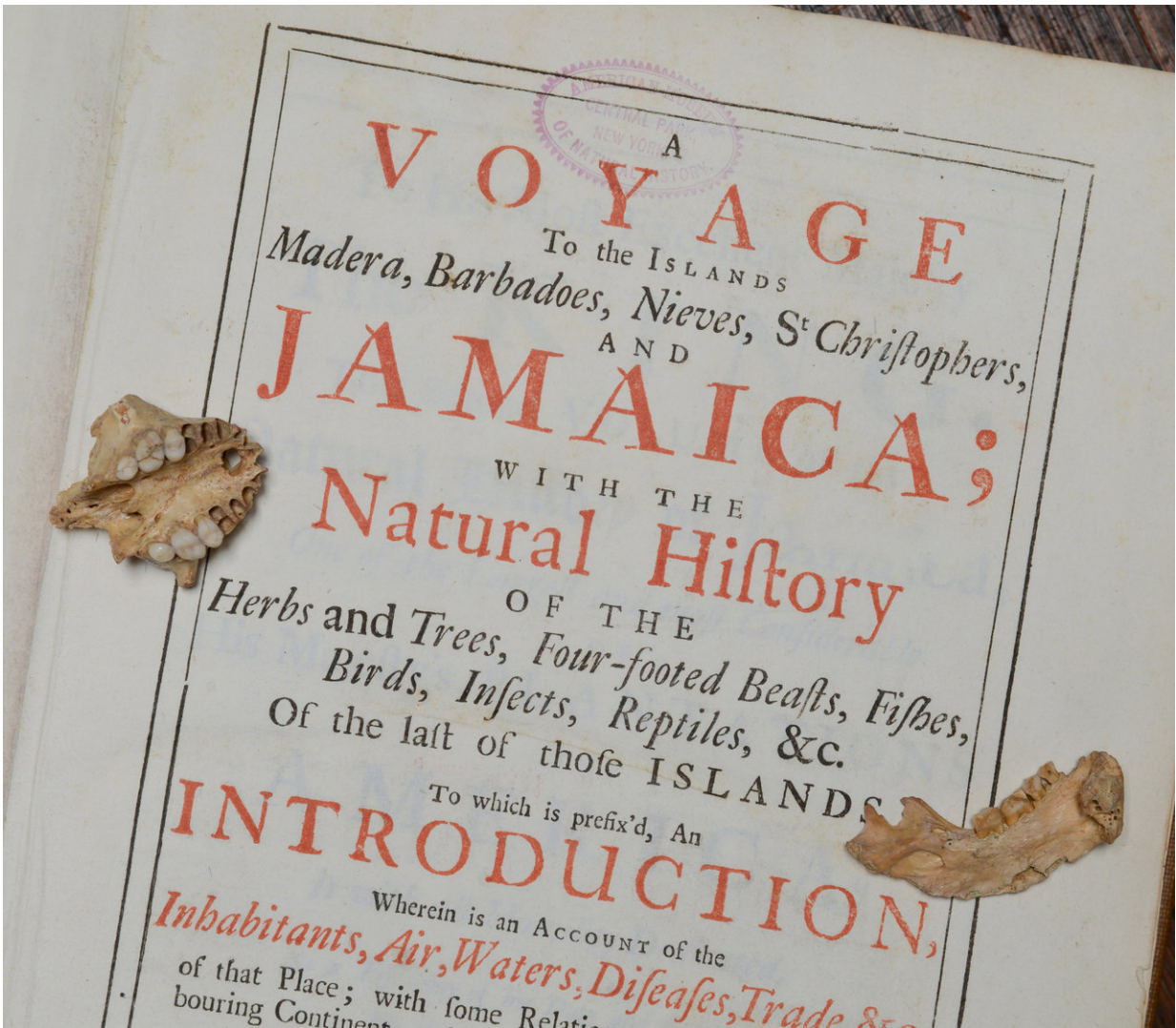
Analysis of ancient DNA of a mysterious extinct monkey named *Xenothrix*—which displays bizarre body characteristics very different to any living monkey—has revealed that it was in fact most closely related

to South America's titi monkeys (Callicebinae). Having made their way overwater to Jamaica, probably on floating vegetation, their bones reveal they subsequently underwent remarkable evolutionary change.

The research published today in *Proceedings of the National Academy of Sciences* and carried out by a team of experts from international conservation charity ZSL (Zoological Society of London), London's Natural History Museum (NHM), and the American Museum of Natural History in New York, also reveals that [monkeys](#) must have colonised the Caribbean islands more than once. The study reports an incredible discovery of how the unusual ecology of islands can dramatically influence animal evolution.

*Xenothrix*, unlike any other monkey in the world, was a slow-moving tree-dweller with relatively few teeth, and leg bones somewhat like a rodent's. Its unusual appearance has made it difficult for scientists to work out what it was related to and how it evolved. However, the scientific team have successfully extracted the first ever ancient DNA from an extinct Caribbean primate—uncovered from bones excavated in a Jamaican cave and providing important new evolutionary insights.

Professor Samuel Turvey from ZSL, a co-author on the paper, said: "This new understanding of the evolutionary history of *Xenothrix* shows that evolution can take unexpected paths when animals colonise islands and are exposed to new environments. However, the extinction of *Xenothrix*, which evolved on an island without any native mammal predators, highlights the great vulnerability of unique island biodiversity in the face of human impacts".



Skull of extinct monkey on 18th century book that might contain last mention or observation of species. Credit: © AMNH. Chesek

Professor Ian Barnes, whom runs the NHM's ancient DNA lab, and co-author said: "Recovering DNA from the bones of extinct animals has become increasingly commonplace in the last few years. However, it's still difficult with tropical specimens, where the temperature and humidity destroy DNA very quickly. I'm delighted that we've been able to extract DNA from these samples and resolve the complex history of



the primates of the Caribbean."

It is likely that *Xenothrix*'s ancestors colonised Jamaica from South America around 11 million years ago, probably after being stranded on natural rafts of vegetation that were washed out of the mouths of large South American rivers. Many other animals, such as large rodents called hutias (Capromyidae) that still survive on some Caribbean islands today, probably colonised the region in the same way.

Ross MacPhee of the American Museum of Natural History's Mammalogy Department, a co-author of the study, said: "Ancient DNA indicates that the Jamaican monkey is really just a titi monkey with some unusual morphological features, not a wholly distinct branch of New World monkey. Evolution can act in unexpected ways in island environments, producing miniature elephants, gigantic birds, and sloth-like primates. Such examples put a very different spin on the old cliché that 'anatomy is destiny.'"

What *Xenothrix* may have looked like has been greatly debated, with suggestions that it looked like a kinkajou (*Potos*) or a night monkey (*Aotus*). Living [titi monkeys](#) are small tree-dwelling monkeys found across tropical South America, with long soft red, brown, grey or black fur. They are active during the day, extremely territorial and vocal, and live up to 12 years in the wild, with the father often caring for the young.

Though the Galapagos Islands are famous for inspiring Charles Darwin's theory of evolution, the [islands](#) of the Caribbean have also been home to some of the most unusual and mysterious species to have ever evolved. However, the Caribbean has also experienced the world's highest rate of mammal extinction since the end of the last ice age glaciation, likely caused by hunting and habitat loss by humans, and predation by invasive mammals brought by early settlers.

**More information:** Roseina Woods et al., "Ancient DNA of the extinct Jamaican monkey *Xenothrix* reveals extreme insular change within a morphologically conservative radiation," *PNAS* (2018).

[www.pnas.org/cgi/doi/10.1073/pnas.1808603115](http://www.pnas.org/cgi/doi/10.1073/pnas.1808603115)

Provided by Zoological Society of London

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