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Capuchin cousins

The lost primates of the Caribbean

Colin Barras

PITY the mammals living on lush Caribbean islands. Over the last 12,000 years, they have suffered the highest extinction rates of any on Earth. Now, a primate skull found in an underwater cave on Hispaniola underscores what we have lost – a fauna so primitive and strange that the archipelago has been likened to Madagascar.

Today, there are no primates in the Caribbean, and it wasn't until 1952 that palaeontologists accepted that the islands had once been home to monkeys.

The new find – the first well-preserved skull from Hispaniola – confirms that this monkey was related to a group of primates still found in Central and South America that includes capuchins and squirrel monkeys. But although the skull is only a few thousand years old – too young to be called a fossil – the rear of its braincase is unlike that of any modern monkey. Instead, it most resembles a monkey that lived 16 million years ago in modern-day Argentina (*Proceedings of the Royal Society B*, DOI: 10.1098/rspb.2010.1249).

Such "undercurrents of primitiveness" in a recently extinct monkey suggest parallels with Madagascar, says Alfred Rosenberger at the City University of New York, whose team described the new skull.

Madagascar's lemurs belong to the strepsirrhines, a group of primates now relatively rare in Africa. Just as they reveal what the archaic strepsirrhines of Africa would have looked like long ago, the recently extinct Hispaniola monkey (*Antillothrix*) could be a window onto South America's ancient monkey fauna, says Rosenberger.

Because they have been isolated from mainland African monkeys for so long, many of Madagascar's monkeys have famously evolved bizarre features. Rosenberger says that the same is true of the Caribbean's lost monkeys. The extinct Jamaican monkey (*Xenothrix*), for instance, can "loosely" be compared to the Aye-aye, a peculiar Madagascan monkey with rodent-like incisors and a long finger for extracting insects from beneath bark.

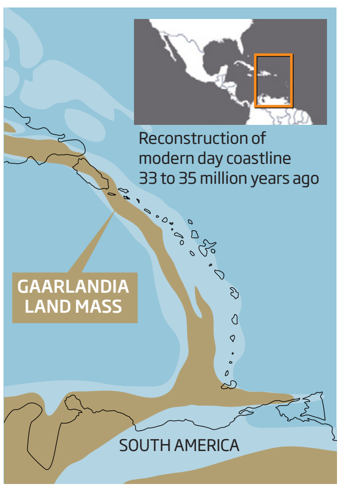
And the limbs of the Cuban monkey (*Paralouatta*) suggest it spent at least part of its life on the ground, not in the canopy, says Rosenberger – something no living New World monkey does.

Ross MacPhee at the American Museum of Natural History, New York, says the Hispaniola skull is an important discovery. He used to think that a single monkey species, likely an ancestor of modern Titis, reached the Caribbean by chance, giving rise to all of the region's monkeys. The morphology of the new skull doesn't support this scenario, so he now agrees several species crossed the ocean to reach the Caribbean from South America.

In fact, he has geological evidence to suggest that around 33 to 35 million years ago, a thin land bridge called Gaarlandia would have offered ancient primates a dry route into the region (see map). If so, then the monkeys arrived in the Caribbean 10 million years earlier than the oldest fossils yet found. ■

Parting of the waters

The Gaarlandia land bridge allowed monkeys to reach the Caribbean 33 to 35 million years ago



SOURCE: AMERICAN MUSEUM OF NATURAL HISTORY, 1999

'Sleep control' cells allow blind mice to see

WHAT happens when you take blind mice and see how they run? It turns out they can identify objects using receptors in the eye that were previously thought to have no role in forming images. Since humans possess the same receptors, the finding could point the way to giving blind people some ability to see.

Mice, and humans, have three types of light-detecting receptor in the eye. Rods and cones detect light, darkness, shape and colour, and make normal sight possible. Receptors of the third type, the melanopsin-containing ganglion cells (MCGCs), were until now thought only to respond to light over longer periods of time, to help moderate patterns of sleep and wakefulness.

To investigate their role in vision, Samer Hattar of the Krieger School of Arts and Sciences at Johns Hopkins University in Baltimore, Maryland, and colleagues engineered mice to lack rods and cones. When these mice were placed in a maze, they were able to identify a lever with a visible pattern on it which allowed them to escape. Mice that lacked rods, cones and MCGCs could not find the lever.

In another task, the team found that the MCGC mice could follow the movement of a rotating drum (*Neuron*, DOI: 10.1016/j.neuron.2010.05.023). This suggests MCGCs can form "low-acuity yet measurable images", Hatter says.

Tom Cronin at the University of Maryland notes that the mice in the experiment behave like people with "blindsight", who can navigate round objects without consciously perceiving them. "It's mind-boggling but I suspect that the mice are doing something like that," he says.

Hattar suggests that MCGCs may have allowed simple vision to evolve "before the introduction of the fancy photoreceptors – rods and cones". He hopes his finding might lead to ways to help blind people regain some degree of sight. Sujata Gupta ■