

# CREATURES THAT CROSSED AN OCEAN TO FIND INDIA

Relevant for: Environment | Topic: Biodiversity, Ecology, and Wildlife Related Issues

Preserved: A species of bat and a primitive lemur have been found in Gujarat's Vastan lignite mine. | Photo Credit: AFP

You will most likely see lemurs in a Hollywood animation movie; singing, dancing and playing pranks. In the wild, they are found only on the island of Madagascar, which, to naturalists has always been a place of intriguing creatures.

Many life forms in Madagascar have affinities to lineages found in India (3,800 km away) rather than Africa (413 km). This posed a 'difficult enigma' to naturalists.

Zoologist Philip Sclater was perplexed by the presence of lemurs, their relatives, and their fossils in Madagascar and India, but not in nearby Africa or the Middle East. In the 1860s, he proposed that a large island or continent must have once existed between India and Madagascar, serving as a land bridge. Over time, this island had sunk. He called this proposed island Lemuria.

Sclater's hypothesis fascinated occultists such as Helena Blavatsky, who thought that this had to be the place, now lost, where humans originated.

Tamil revivalists such as Devaneyya Pavanar also took up the idea, in the form of a Tamil civilisation, lost to the sea as described in literature and in Pandyan legends. They called this submerged continent Kumari Kandam.

Sclater's ideas lost favour when another 'outlandish' theory, of continental drift, began to gain acceptance. In plate tectonics, the large rocky plates that we stand on float on molten subterranean rocks and move 2-15 cm per year relative to each other. A landmass called Gondwana, split into two 165 million years ago — one containing what is now Africa and South America, the other comprising India, Madagascar, Australia and Antarctica.

Around 115 million years ago, Madagascar and India together broke free. Around 88 million years ago, India moved northward, dropping a few parcels of land along the way to form Seychelles. It joined the Eurasian mass 50 million years ago giving rise to the Himalayas and South Asia that we are familiar with.

Around 115 million years ago, it was the dinosaurs that ruled. Many life forms had not even evolved. Supporting the Gondwana breakup, dinosaur fossils found in India and Madagascar are closely related, and do not resemble species found in Africa and Asia. Fragments of *Laplatosaurus madagascarensis* have been found in both India and Madagascar.

A powerful technique, the molecular clock, is used to estimate the time when two forms of life diverged from each other. It is based on the observation that evolutionary changes in the sequence of an RNA or a protein molecule occur at a fairly constant rate. The difference in the amino acids of, say the haemoglobin of two animals can tell you how long ago their lineages diverged. Molecular clocks corroborate well with other evidence, such as the fossil record.

South India and Sri Lanka have only two genuses of the cichlid family of freshwater and brackish-water fishes — the *Etroplus* (a food fish in Kerala, where it is called *pallathi*) and

*Pseudotroplus*. Molecular comparisons show that the nearest relatives of *Etroplus* are found in Madagascar, and their common ancestor diverged from African cichlids 160 million years ago. A fourth group is in South America, thus, accounting for the fragments of Gondwana.

India occupies a pivotal position in the distribution of life forms in Asia, Madagascar and Africa. Gondwana creatures moved out of India. Others crossed over to stay. For example, Asian freshwater crabs ( *Gecarcinucidae*) are now found all over Southeast Asia but their most recent common ancestor evolved in India. The frog family, *Sooglossidae*, is found only in India and the Seychelles (Datta-Roy and Karanth, *Journal of Biosciences*, 2009).

Fossil finds in the Vastan lignite mine in Gujarat by researchers from HNB Garhwal University, Panjab University and Johns Hopkins University have identified the earliest Indian mammal, a species of bat, and the earliest euprimate, a primitive lemur. These were dated 53 million years ago, around the time (or just before) the India-Eurasian plates collided ( *Journal of the Paleontological Society of India*, 2005).

What about the lemurs? Madagascar is a large island, with a variety of climatic conditions. Evidence favours an ancestor primate crossing over from Africa. No monkey, ape or large predator managed the crossing, so dozens of lemur species proliferated.

In India, we have the lorises, which are the closest extant relatives of the lemurs. These are shy, nocturnal forest dwellers, with large, appealing eyes. They are also believed to have survived oceanic rides from Africa. They are mostly found in the Northeastern States (slow loris), and where Karnataka, Kerala and Tamil Nadu meet (slender loris).

( *The article was written in collaboration with Sushil Chandani who works in molecular modelling. sushilchandani@gmail.com*)

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