UC SANTA BARBARA

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Gail Gallessich

DISCOVERY OF OLDEST DINOSAUR BONES REPORTED IN SCIENCE

A team of paleontologists has discovered jaws from two of the oldest dinosaurs ever discovered, and the remains of eight other prehistoric animals, in a rich bed of fossils in Madagascar, providing a "time capsule" from the earliest days of dinosaurs and mammals and illuminating scientific understanding of the mid-late Triassic Period. The findings are reported in the October 22 issue of Science.

"We have discovered a spectacular new fauna of this age in southwest Madagascar," said Andre Wyss, associate professor of geology at the University of California, Santa Barbara, and co-leader of the research team. "It includes the fragmentary remains of two plant eating dinosaurs, prosauropods, about the size of a new-born calf, which are not only the earliest dinosaurs known from the island, but probably the earliest dinosaurs known from anywhere in the world."

"This fauna also includes spectacular, close mammal relatives -- mammal-like reptiles," said Wyss. "These are the first fossils of their kind known from Madagascar. Their preservation is superb, rivaling that of anything in the world."

This discovery is just the tip of the iceberg, according to Wyss. "A wealth of bones is pouring out of our quarries," he said. "Once these get cleaned up, we have no doubt that we'll know a great deal more about all of these animals, plus many others. There should be meat-eating dinosaurs present, as well as a host of other novel animals."

To establish the relative ages, scientists must look to what other kinds of fossils are found in association with the dinosaurs. "The Malagasy finding is unique in containing various kinds of animals -- such as certain non-dinosaurian reptiles and mammal relatives -- found elsewhere only in more ancient deposits, and thus lacking dinosaurs," said Wyss.

"Also, the Malagasy fauna lacks other, presumably younger, forms usually found alongside the earliest dinosaurs," he said. "The co-occurrence of dinosaurs and these more ancient kinds of animals -- as well as the non-occurrence of younger groups -- argues for the antiquity of the dinosaurs in this deposit."

Wyss explained that of the various early dinosaur sites known worldwide, it has been possible to directly date, by radioisotopic means, only one of them, the one from Argentina, which is roughly 227 million years old. "Our Malagasy fauna and its dinosaurs are possibly as much as 5 million years older, but all that we can say at this point is that all indications point to its being distinctly older than 227," he said.

The fossils are from a period that has long been a puzzle for paleontologists, the Middle to Late Triassic (225 to 230 million years ago.) At the opening of this period, a variety of reptiles, amphibians, and other vertebrates populated the land. By its close, early dinosaurs and mammals had appeared, but a sparse fossil record has left scientists with few clues about what happened in between.

The prosauropods, herbivores with small heads and long necks, could walk on two or four legs. These primitive dinosaurs either shared a common ancestor with, or were themselves ancestors to, the mighty sauropod dinosaurs that evolved later, such as Apatosaurus.

The five pre-mammalian animals that the researchers discovered should also shed light on the currently murky picture of the origins of the first true mammals. For example, an essential question is how this line of large, cold-blooded "mammal-like" reptiles evolved into small warm blooded mammals, many of which then evolved to much larger sizes once again, following the extinction of the dinosaurs.

The paleontologists also expect that their find will provide clues about how the breakup of the supercontinent Pangaea, which began in the Triassic, affected the course of evolution.

"There were critical evolutionary events occurring in the Triassic, in response to climate changes and the beginning of the break-up of the supercontinent Pangaea, but we haven't had a good record of them until now," said J. J. Flynn of the Field Museum in Chicago.

The fossils were discovered by John Flynn, of the Field Museum in Chicago, J. Michael Parrish, of the Northern Illinois University, Berthe Rakotosamimanana, of the Universite d'Antananarivo in Madagascar, William Simpson of the Field Museum, and Robin Whatley and Andre Wyss, of the University of California, Santa Barbara. Editors: Photographs of the fossils and the team are available. B-roll is also available. See sidebar story, "A Tale of Finding the Oldest Dinosaur Fossils."

WHAT OTHER SCIENTISTS ARE SAYING ABOUT THE DISCOVERY:"These discoveries from the Triassic of Madagascar provide an extremely important glimpse into a very poorly known chapter in the evolutionary history of dinosaurs and other backboned animals."

--David Krause, State University of New York- Stony Brook

"These new dinosaurs from Madagascar are among the earliest known from anywhere in the world. This discovery promises to fill a major gap in our understanding of the origin of mammals, dinosaurs, and their relatives. There have been precious few places where good fossils have been preserved.

The new sites in Madagascar are exceptional in that they contain a diverse group

of Triassic creatures from a pivotal stage in evolution."

--Neil Shubin, University of Pennsylvania

"These exciting new finds from the Triassic of Madagascar extend the record of prosauropod dinosaurs back much further than previously known. The cynodonts are some of the best specimens I have ever seen. They will bevery important in working out how these close relatives of mammals were related to one another and how they were distributed across the supercontinent of Pangaea."

--James Hopson, University of Chicago

"Early dinosaurs and their contemporaries have long been known from only small areas in South Africa, Argentina, and Brazil.

The Isalo fossils from Madagascar may win the prize for being the oldest known dinosaurs. And

what beautiful fossils they are -- the quality of preservation of some specimens

is remarkable."

--Catherine Forster, State University of New York- Stony Brook

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