

Missing link in birds believed found

AP Associated Press

By RANDOLPH E. SCHMID, AP Science Writer

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Separating the layers of sediment from an ancient lake was like turning the pages of a book to get a glimpse of life in the time of dinosaurs, an international team of scientists said Thursday.

"A world lost for more than 100 million years was being revealed to us," said Hai-lu You of the Chinese Academy of Geological Sciences.

What they found is being called the missing link on the evolution of birds, a loon-like creature that lived in northwest China and is the earliest example of modern birds that populate the planet today.

Before their discovery, reported in Friday's issue of the journal *Science*, the only evidence for this creature — *Gansus yumenensis* — was a single, partial leg discovered in the 1980s.

Now researchers have dozens of nearly complete fossils of *Gansus*, said a beaming Matt Lamanna of the Carnegie Museum of Natural History in Pittsburgh.

"Most of the ancestors of birds from the age of dinosaurs are members of groups that died out and left no modern descendants. But *Gansus* led to modern birds, so it's a link between primitive birds and those we see today," Lamanna said.

Previously there was a gap between ancient and modern species of birds, and "*Gansus* fits perfectly into this gap," added Jerald D. Harris of Dixie State College in Utah.

It was about the size of a modern pigeon, but similar to loons or diving ducks, the researchers said. One of the fossils even has skin preserved between the toes, showing that it had webbed feet.

"We were lucky far beyond our expectations" in finding these fossils, added You.

"*Gansus* is the oldest example of the nearly modern birds that branched off of the trunk of the family tree that began with the famous proto-bird *Archaeopteryx*," said Peter Dodson of the University of Pennsylvania.

The remains were dated to about 110 million years ago, making them the oldest for the group *Ornithurae*, which includes all modern birds and their closest extinct relatives. Previously, the oldest known fossils from this group were from about 99 million years ago.

The fact that *Gansus* was aquatic indicates that modern birds may have evolved from animals that originated in aquatic environments, the researchers said.

"Our new specimens are extremely well preserved, with some even including feathers," Lamanna said. "Because these fossils are in such good condition, they've enabled us to reconstruct the appearance and relationships of *Gansus* with a high degree of precision. They provide new and important insight into the evolutionary transformation of carnivorous dinosaurs into the birds we know today."

The remains were found in an ancient lake bed near the town of Changma.

"We went to Changma hoping that we'd discover one, maybe two, fragments of fossil birds," he said. "Instead, we found dozens, including some almost complete skeletons with soft tissues."

The new fossil material "is remarkable for its excellent preservation. ... The new fossils demonstrate that Gansus clearly is a bird that spent much of its life looking for food in water," commented Hans-Dieter Sues, associate director for research and collections at the Smithsonian's National Museum of Natural History.

Gansus is an additional "link in a long chain of intermediate forms between Archaeopteryx, the oldest known bird from the late Jurassic, and modern birds," said Sues, who was not part of Lamanna's research team.

Funding for the research was provided by the Discovery Quest program for The Science Channel, Carnegie Museum of Natural History, Dixie State College of Utah, the Chinese Geological Survey and the Ministry of Science and Technology of China.

At one point during the field work, Lamanna told his colleagues he would eat a duck foot if they found the fossil they were seeking while the television camera crew was still there.

So, did they?

"It tasted sort of like chicken, but real rubbery," he recalled.

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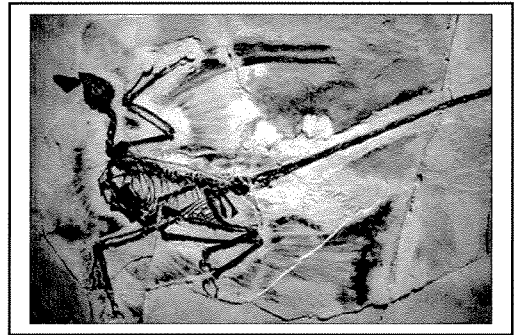
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Dinosaur may have resembled the biplane

By RANDOLPH E. SCHMID, AP Science Writer

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When the Wright Brothers first took to the sky in a biplane, they were using a design nature may have tried 125 million years earlier. A new study of one of the earliest feathered dinosaurs suggests it may have had upper and lower sets of wings, much like the biplanes of early aviation. Today, the biplane is widely considered an old-fashioned rarity.



And the design is no longer seen in birds, though it's not clear if it was a step on the way to modern birds or a dead end, tested by nature and discarded.

The intriguing possibility of a biplane dinosaur — *Microraptor gui* — is suggested by Sankar Chatterjee of Texas Tech University in this week's online issue of Proceedings of the National Academy of Sciences.

Microraptor was described by Xing Xu of the Chinese Academy of Sciences in 2003 as having aerodynamic feathers on both its arms and legs. Xu suggested at the time that it glided, extending its legs backward so its wings were arranged one behind the other, like a dragonfly.

But that would be aerodynamically inefficient for a feathered creature, Chatterjee concluded, noting that the feathers on the legs would not face forward.

Instead, he suggested, the legs of the two-pound creature could have been held below the body in flight, creating two staggered wing sections, the upper one slightly ahead of the lower one.

One other flying dinosaur, *Pedopenna*, also had feathers on its legs, Chatterjee said, and modern raptors such as falcons have short feathers on their upper legs which reduce air resistance as they fly.

"Aircraft designers have mimicked many of nature's flight 'inventions,' usually inadvertently," Chatterjee wrote. "Now, it seems likely that *Microraptor* invented the biplane 125 million years before the Wright 1903 Flyer."

Xu, who said a variety of reconstructions have been suggested since the original one, called Chatterjee's proposal "likely," but added that "we really need to work painstakingly to check all details and have an accurate reconstruction, and then we can compare different models in computer or even in wind tunnel, which we are planning to do."

"*Microraptor* is a critical species in understanding the origin of flight," added Xu, who was not associated with Chatterjee's research team.

Matthew Carrano, curator of dinosaurs at the Smithsonian's National Museum of Natural History, said the question focuses on what the legs can do, and it's a difficult problem because the fossils are flat and require interpretation as to what they would have looked like in three dimensions.

Carrano, who also was not part of Chatterjee's research team, said this creature was probably a side branch rather than a stage evolution had to pass through on the way to today's birds.

"It's difficult to see how this animal does anything well, it seems so ungainly," Carrano said. "It forces us to think creatively because it's so far off the beaten path."

There are often such experiments that fall by the wayside, he said.

"The important thing is, because we've now got all these feathered dinosaurs to look at, it has kind of opened the gates a bit to speculating about how flight evolved," Carrano said.

Chatterjee's research was funded by Texas Tech University.

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