Fossil of unknown mammal discovered

A team of paleontologists working in the Kayenta Formation of Arizona has discovered a fossilized jawbone, estimated to be about 180 million years old, of a mammal previously unknown to man. The jaw, as old as any mammalian fossil yet found in the world, dates from the same period as the teeth of a known early mammal found last fall at the Arizona site. The two specimens are the first remains of early mammals found in North America.

"The new mammal increases by one-third our knowledge of early mammals in the New World," said Farish A. Jenkins, curator of vertebrate paleontology at Harvard's Museum of Comparative Zoology. He announced the finding in Washington, D. C., at the National Geographic Society, which funded the research.

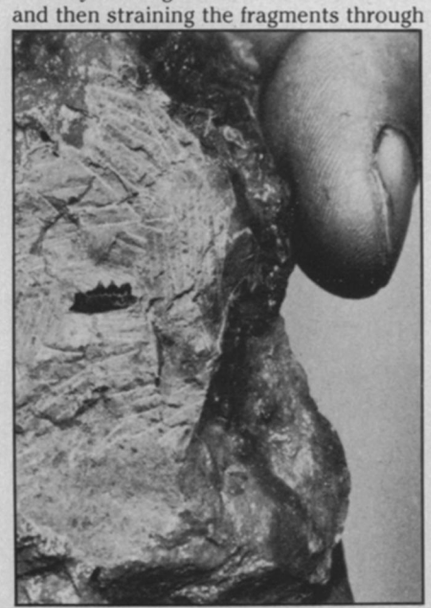
The new finding is significant because it shows that mammals were more diverse than previously thought. The teeth of the new variety, still unnamed, distinguish it from the two previously known varieties of early mammals. Of the other two known varieties, the teeth of Morganucodontid are lined up in a line parallel to the jaw, while those of Kuehneotheriid are arranged in a triangular pattern that allows the teeth to occlude as those of humans do. The teeth of the new variety are arranged in a pattern similar to Morganucodontid. But, Jenkins says, the new variety differs in that the middle cusp is higher and the wear facets on the teeth are distinct.

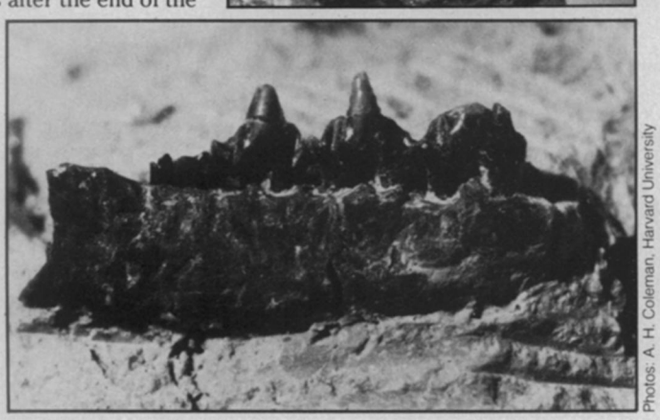
The Morganucodontids are thought to be ancestors to the platypus and other egg-laying mammals, while the Kuehneotheriids were ancestors to the placental mammals, which include nearly every other type of animal, including man. Discovery of the new variety, Jenkins says, will require the scientists to "rethink our hypothesis about relations of the earliest mammals" to their descendants. He declined to speculate about possible descendants of the new variety because "its intermediate features complicate the story."

Fossils of mammals after the end of the Cretaceous period 65 million years ago are plentiful but the samples of early mammals, paleontologists are fond of noting, fit into a shoebox. This is in part because the animals were small: The new variety, probably an insectivore, was about the size of a small mouse, Jenkins says. When the reign of the dinosaurs ended, the "age of mammals" began. Today about 4,000 kinds of mammals, including humans, are known and many others have emerged and become extinct.

The jawbone is the kind of discovery that justifies for paleontologists the tedious hours, months, and years they spend sifting through tons of rubble. Jenkins and his colleagues spent four years studying the Kayenta Formation. In the first three years the site yielded other significant fossils, including several small dinosaurs, an advanced mammal-like reptile called a tritylodontid, and one of the earliest turtles. But still there was no trace of early mammals.

One of Jenkins's colleagues, William Downs, returned to a portion of the site that had been particularly rich in fossils from the late Triassic or early Jurassic periods of the Mesozoic era when dinosaurs also began to appear. He chopped out 300 pounds of the rocks and treated them by eroding the sediments with water and then straining the fragments through screens. In November 1980 the effort paid off: He found a set of teeth from a Morganucodontid, the first discovery of an early mammal in North America.





Photos: A. H. Coleman, Harvard University

Features such as the raised middle cusp in the fossilized jaw of a recently discovered early mammal (extreme close-up, right) distinguishes it from two known varieties also dating from 180 million years ago. The fossil shown embedded in rock (above) was found in Arizona.

The jaw of the new animal surfaced late in July during a six-week extension of the regular dig. Kathleen Smith, assistant professor of anatomy at Duke University, broke a piece of rock and saw that it contained a bone about one centimeter long. Frustrated by the ceaseless, unproductive sifting of rock and tired of the heat and dust, she thrust the rock at Jenkins saying, "Here Jenkins. Here's your lousy jaw!" When he took the rock into the sunlight he realized that the fossil was different from specimens of the other two known early mammals. The discovery came on the day before the expedition ended. □

Shuttle 2: Delayed but still counting

Since early August, NASA had been working toward an Oct. 9 liftoff for the second flight of the space shuttle Columbia, a date chosen to allow time for unforeseen delays, as well as some rest for overworked launch personnel. In the early morning of Sept. 22, however, a mis-seated connector being used to fuel the craft's steering rockets unexpectedly came loose and spilled several gallons of nitrogen tetroxide oxidizer, which overflowed along the right side of the vehicle. There, it melted the adhesive holding a number of the critical thermal-protection tiles, some of which literally fell off. A delay in the launch, said NASA, was certain, possibly by several weeks.

The shuttle's second mission, to be flown by astronauts Joe H. Engle and Richard H. Truly, has the same primary goals as last April's maiden voyage: to get safely up and down again. But there are only four such test flights in the whole shuttle program (the Apollo missions, by comparison, were preceded by unmanned tests of the spacecraft and the entire manned Mercury and Gemini programs) so they are designed to evolve — safely — by leaps and bounds.

On the initial flight, for example, all five of the shuttle orbiter's main computers worked in parallel throughout the flight, in case one should malfunction. The second time out, only three will work together, while a fourth is held back for the sole task of handling the reentry and landing, and a fifth stands by in case of emergency. Setting up the reentry is the most massive computer job of the whole flight, and where the critical software on the first flight was radioed to the ground for final confirmation just before the reentry phase began, Columbia's computer will be entrusted with its own checkout. Additionally, the craft's inertial measurement units, which are responsible for enabling the shuttle to keep itself properly oriented in