Fossil Raises Question About Earliest Primates

The first true primates evolved much later than originally thought and were characterized most significantly not by their teeth but their feet and eyes, according to fossil evidence recovered recently from the Badlands in Wyoming. The grasping toe and forward-looking eyes provided an adaptive combination that allowed the original primates to move quickly through the trees, avoid predation and develop the extended pattern of parental caretaking necessary for evolution of the human brain, according to the interpretation of a Johns Hopkins University paleontologist.

The new evidence is bound to fuel an old debate concerning the most significant evolutionary step that led to the inevitable unfolding of high primates — monkeys, apes and humans. The consensus in the field has been that certain ancient squirrel-like mammals called *Plesiadapiformes* were the most distant relatives of modern primates; fossil evidence from the late dinosaur era indicates that these animals had developed teeth similar to those of primates, which are associated with a significant change in diet.

But according to Robert T. Bakker — who together with University of Maryland medical student Julius Goepp discovered the Wyoming fossils — the 50-million-year-old fossils of the *Cantius trigonodus*, an animal similar to the modern bush baby, indicate more significant evolutionary adaptations. The first fossil foot skeleton of the *Cantius* ever recovered indicates that the squirrel-like claw was replaced by a strong, grasping toe, and a partial skull from the same period shows that the *Cantius* had developed forward vision, which provided improved depth perception; both of these adaptations would have been necessary for the primitive primates to move quickly through the dense tropical rain forests that then characterized the Wyoming Badlands, according to the researchers.

Significantly, Bakker says, the skull shows that the *Cantius* had very primitive teeth, indicating that the changes in diet were incidental to the dramatic change in style of locomotion. "The shift in diet was not a profound evolutionary threshold and certainly didn't lead inevitably to apes and humans," Bakker told SCIENCE NEWS. "What did," he said, "was this totally novel and extraordinarily effective way of moving through trees that all modern primates have." Paleontologists have placed undue emphasis on primate teeth rather than their feet simply because teeth fossils are quite common while foot fossils are very perishable and rare, Bakker says.

The most important consequence of the early primates' move to the trees was probably not their access to fruit, Bakker adds, but rather their immunity to predators. Only with such immunity, he explains, could the species develop the extended period of bonding between parent and offspring, characteristic of all modern primates, which allows for significant early learning. "Once the parent-adolescent bonding had established a very long and slow period of growth, then the whole nature of brain evolution could rapidly change," Bakker explains. "A primate can be born with a very large brain that then gets filled up with learning and experience, while the offspring is still protected by its parent." Humans, Bakker notes, have since lost the grasping toe but have retained the long period of adolescent learning that the toe once made possible. Other mammals are more instinctual, he says, because their smaller brains are adapted for more immediate survival away from the mother.

According to Bakker, this new evidence supports the view of a significant number of paleontologists who believe that the ancient *Plesiadapiformes* should not be considered primates at all. But that issue is still a matter of disagreement. According to University of Michigan paleontologist Philip Gingerich, for example, "Everybody recognizes that they [the *Plesiadapiformes*] are a quite archaic and primitive form of primates. But they're closer to primates than to anything else." Gingerich also questions Bakker's conclusions about the relative significance of the *Cantius*'s teeth and feet, noting that the teeth of the *Cantius* are only trivially different from what is known to come later — in a descendant of the *Cantius* called *Notharctus*, which also had a grasping toe. All Bakker's findings do, Gingerich says, is push the emergence of "modern primates" back about 3 million years. —*W. Herbert*

Robert T. Bakker

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New fossil evidence indicates that the Cantius trigonodus, *a primitive primate, had a grasping big toe (left), which may have keyed the evolution of all modern primates, including humans. The* Cantius, *reconstructed from existing evidence (above), lived 50 million years ago in what is now the state of Wyoming.*

The dismantling of DOE?

At long last the controversial plan to dismantle the U.S. Department of Energy has been proposed. Last fall, President Reagan announced his desire to abolish the department and to transfer many of its programs to other agencies in order to save money (SN: 10/3/81, p. 212; 2/23/82, p. 132). Now, William V. Roth Jr. (R-Del.) has introduced in the Senate such a proposal.

Under this proposed "Federal Energy Reorganization Act of 1982," the authority to carry out many of DOE's research and development programs — including defense weapons programs and environmental safety and health research — would be transferred to the Department of Commerce. Also, the Department of Interior would be in charge of federal leasing programs, such as those dealing with offshore oil, and the Department of Agriculture would take over financial assistance programs that encourage production and use of biomass-derived alcohol fuels. In addition, the Federal Energy Regulatory Commission, now under DOE, would be recognized as a separate, independent regulatory commission.

This proposed shuffling of DOE's programs must be approved by both the U.S. Senate and House of Representatives. "The Senate is more apt to accept it," a DOE official recently told SCIENCE NEWS. "Based on preliminary indications," the official said, "the House will not be so inclined." □