Fossil Finds Diversify Ancient Apes

The Miocene period of 25 million to 10 million years ago was marked by the appearance of ape-like ancestors of modern apes and humans, known as hominoids, in Africa, Asia and Europe. Although questions and debates persist about the evolutionary relationships of various fossil hominoids to one another, two new types of the early apes have now entered the scene.

The fragmented fossil skulls, jaws and limb bones found along Lake Turkana in northern Kenya suggest that there was a greater diversity of hominoid lines than previously believed, report Richard Leakey and Meave G. Leakey in the Nov. 13 NATURE. The new material also supports arguments for the spread of hominoids from Africa to Asia early in the Miocene period, say the investigators, both of the National Museums of Kenya in Nairobi.

The age of the sediments in which the fossils were found has not been determined yet, but various animal remains in the same sediments are similar to those uncovered at other east African sites dated at 16 million to 18 million years old.

"The most interesting thing about these finds," paleontologist Peter Andrews of the British Museum in London told SCIENCE NEWS, "is that they show the number of hominoid species during the Miocene to have been rather greater than was previously known." It is not clear how the new hominoids fit into the evolutionary scheme, adds Andrews; answering this "key question" requires a closer examination of the remains, particularly the structure of the jaws and tooth enamel.

Nevertheless, say the Leakeys, when compared with other fossil hominoids, the fossils represent two distinct genera. The larger, baboon-size ape was dubbed *Afropithecus*, and the slightly smaller ape was named *Turkanapithecus*.

Afropithecus, explain the researchers, displays the characteristics of a variety of hominoids combined in a single, distinctive category. Its palate is shallow, long and narrow and the nasal passage is "remarkably narrow and high." The forehead inclines steeply to a long muzzle. The size of the canine teeth of the best-preserved specimen suggests that it was a male.

Another 17-million-year-old east African hominoid recently discovered by Richard Leakey and Alan Walker of Johns Hopkins University in Baltimore (SN: 12/7/85, p.360) is also a representative of *Afropithecus*, according to the investigators. Leakey and Walker originally assigned the find to another genus, *Sivapithecus*. There are two controversial lines of thought about *Sivapithecus*: Some scientists argue that it was an early African ape and human ancestor that migrated to Asia, while others contend it developed along a separate family line that led to Asian orangutans.

The new finds do not resolve this conflict, but the Leakeys now believe that *Sivapithecus* was restricted to Asia. They hold, however, that ancestral forms of this group first appeared in Africa.

The second new hominoid, *Turkanapithecus*, is short-faced with a narrow palate and tooth rows converging toward the back. Little is known about the cranial features of small-bodied Miocene apes, but the teeth of *Turkanapithecus* clearly separate it from other hominoid categories, say the researchers.

One possibility, says paleontologist Terry Harrison of New York University, is that *Turkanapithecus* is related to a European hominoid known as *Oreopithecus*. Harrison discusses new 17-million-year-old *Oreopithecus* specimens in the December AMERICAN JOURNAL OF PHYSICAL ANTHROPOLOGY.

He has seen the Leakeys' new finds, but says it is not yet clear if there is a link between the African and European apes. "The ancestry of *Oreopithecus* appears to be from east Africa," notes Harrison.

The first *Oreopithecus* fossil was discovered in 1872, and since then a number of well-preserved partial skeletons have been unearthed. Still, much about this group of hominoids is poorly understood. They apparently evolved on a group of islands near northern Italy over a period of 5 million to 10 million years. *Oreopithecus* remains reveal a number of curious specializations, says Harrison, including teeth used for browsing combined with human-like canines. It is a mystery how this line of hominoids settled on islands, he adds, since they had long arms and short legs ill-suited for swimming.

The Leakeys also express puzzlement that *Afropithecus* and *Turkanapithecus* have not been found at more abundant Miocene ape sites in western Kenya. It may be that different environments fostered different hominoids. "These new fossils come from a nonforested part of Kenya," says the British Museum's Andrews. "This is a new area and habitat for early hominoids." *—B. Bower*

Mulling over mastodon mass extinctions

At the end of the Pleistocene epoch, about 10,000 years ago, mastodons, mammoths and many other large mammals that roamed North America suddenly died off. Two theories have been proposed to explain these Pleistocene extinctions. One holds that extreme seasonal shifts in temperature were responsible; the other is that humans, by hunting the animals, had a hand in their demise.

While the cause of the extinctions is still a matter of debate, some scientists have been cooking up promising methods for testing these ideas. These tools, as well as a new, third extinction theory, were discussed last week at the meeting of the Geological Society of America (GSA) in San Antonio, Tex.

At a GSA meeting three years ago, Daniel C. Fisher and Paul L. Koch of the University of Michigan in Ann Arbor concluded that humans had been hunting as well as scavenging mastodons. They based this theory on the finding that all the scavenged animals had died during one season, the fall, whereas the non-butchered mastodons had died at the end of the winter (SN: 11/12/83, p.312).

Specifically, they based their conclusions on the thickness of growth bands on the animals' tusks, assuming that thin groups of bands corresponded to winter growth and thick groups to summer. The problem with this approach, says Koch, is that the thickness of the bands might be controlled by the animals' reproductive cycles. So the researchers searched for a method that would more reliably reflect the environmental temperature and not the animals' biology.

Since mastodons could keep their own temperatures relatively constant, the researchers reasoned that the changes in oxygen isotope ratios measured in the tusks must reflect changes in season — oxygen-18 is more prevalent in North American rainwater in the summer and oxygen-16 in the winter. They found that the tusk ratio of oxygen-16 and oxygen-18, which the animals ingested when they drank water, corresponded to the thickness of the growth bands, confirming, they conclude, the seasonality of the deaths.

This "is the first time anyone's been able to measure [prehistoric] seasonality in a continental region," says Koch.

Fisher cautions that while these findings are consistent with the hunting hypothesis, they certainly do not prove it. The next step, adds Koch, is to use the same oxygen isotope method on tusks to see if the seasons really did become more extreme, as the climate theories suppose.

The researchers are also working on another way to test both hypotheses.