might be possible to produce a human vaccine from a similarly modified HIV.

From the get-go, however, that suggestion met with controversy as researchers raised a bevy of safety concerns—including the possibility that the weakened virus might trigger the development of cancer. And any such approach to vaccine-making appeared doomed last year when studies by Ruth Ruprecht of the Dana-Farber Cancer Institute in Boston showed that SIV lacking *nef* and two other key genetic elements could still cause disease in infant monkeys (*Science*, 18 November 1994, p. 1154). Presumably, the animals' immune systems were too immature to combat even that virus.

But Desrosiers, who believes it is possible to engineer a safe attenuated vaccine by deleting several genes, hopes the Sydney Bloodbank cohort will open minds again. "I think it's going to refocus attention on the live attenuated vaccine," he says. Deacon agrees. "It's not necessarily saying OK, go out and make a vaccine strain out of one of these viruses," says Deacon. But, he says, "I'm sure that there are populations where the live attenuated is on balance the best immediate hope."

NIAID's Fauci acknowledges this point but is holding out for something safer. "We may ultimately have to go for a live, attenuated vaccine," says Fauci, "but there are many reasons [for] concerns about that approach."

–Jon Cohen

PALEOANTHROPOLOGY

Asian Anthropoids Strike Back

The dawn of the higher primates may just have gotten a bit earlier—and perhaps even moved to another continent. For the past year or so, several tiny primates have been battling for the distinction of being the oldest known anthropoid, the group of higher primates that includes humans as well as apes and monkeys. The African contenders, led by a small 37-million-year-old anthropoid called *Catopithecus*, had a lock on the title for several years, but last year a tiny challenger called *Eosimias* appeared in China. Still, *Catopithecus* appeared to be holding its own, in part because the *Eosimias* fossils were so fragmentary (*Science*, 30 June, pp. 1851 and 1885).

But at the annual meeting of the Society of Vertebrate Paleontology, held last week in Pittsburgh, *Eosimias* partisans revealed dramatic new finds that they say establish their animal as one of the earliest higher primates. "*Eosimias* is a member of the missing 'phantom lineage' of ancestral anthropoids," said K. Christopher Beard of the Carnegie Museum of Natural History as he showed slides of a remarkably complete fossil jaw. "It's a basal anthropoid."

If Beard is right, the new finds have major implications for the hotly contested issue of how and where higher primates evolved. *Eosimias*, newly dated to roughly 40 million years ago, could edge out *Catopithecus* as the first undisputed anthropoid and also raises the possibility that Asia was the birthplace of higher primates. In addition, the fossils offer new evidence concerning the thorny question of how to draw the primate family tree.

Various camps of researchers have argued that anthropoids are closely related to particular groups of primates—the tarsiers, for example, or a group of extinct primates called the omomyids. *Catopithecus* discoverer Elwyn Simons of Duke University, for his part, nominated another extinct group, the adapids, as the likely ancestor of anthropoids. And Beard maintains that the new *Eosimias* fossils show that anthropoids themselves are an ancient branch of the primate family tree, with roots extending deep into the past.

Given the diverse views of anthropoid origins, it's perhaps not surprising that early reports of *Eosimias* were greeted with skepticism. Last year, Beard and Qi Tao of the Institute of Vertebrate Paleontology and Paleoanthropology (IVPP) in Beijing named their fragmentary fossils *Eosimias*, or dawn monkey—and sparked a shower of criticism from those who felt the material was too incomplete to deserve the name. But last spring, Beard returned to localities along central China's Yellow River. There, he and colleague Tong Yongsheng of the IVPP found a remarkable new specimen of *Eosimias* that preserves both sides of the lower jaw and almost every tooth, including the often-lost incisors and canines.

PHOTOS BY K. C. BEARD

Small beginnings. At right is a reconstruction of what *Eosimias*, which weighed about 100 grams, looked like. The fossil jaw is at left.

Speaking to an intent audience of several hundred at the Pittsburgh meeting, Beard reeled off a list of features possessed by the new fossil that link *Eosimias* to anthropoids. Among them: The incisors are vertical, the second lower incisor is larger than the first, the premolars are obliquely oriented, and the angle of the back of the jawbone is rounded. Because *Eosimias* looks nothing like an adapid, Beard argued that adapids should be relegated to a distant branch of the primate family tree. Although *Eosimias* has more in common with omomyids and tarsiers, Beard says these groups are at least one step away from anthropoids.

Many researchers, including some of the skeptics, say that the new finds add weight to Beard's arguments. "I still have problems with some of his interpretations, but we've got to take this seriously now," says Duke paleoanthropologist Richard Kay, who has been reluctant to consider *Eosimias* a higher primate. "It seems that *Eosimias* is close to anthropoids." Kay remains skeptical, however, about Beard's proposed primate family tree; he continues to see a close kinship between anthropoids and tarsiers.

Other scientists remain wary of conferring anthropoid status on *Eosimias*. "Every single feature Beard uses to link *Eosimias* and anthropoids can be found alone or even in combination in other ancient primates that aren't anthropoids," says Tab Rasmussen of Washington University in St. Louis, the lone member of the adapid camp who attended the meeting. He also points out that there's a third, less well-established candidate for the first anthropoid, *Algeripithecus*, which may be older than both *Eosimias* and *Catopithecus*, but is known only from very fragmentary fossils. *Algeripithecus* resembles the other African finds—but not the Chinese ones, implying that *Eosimias* was a side branch. "I think Chris has found a fascinating new group—but they aren't anthropoids," says Rasmussen.

Despite the new finds, it's still too soon to classify the Chinese fossils, sums up omomyid expert Blythe Williams of Duke. She notes that although *Eosimias*'s incisors and canines are indeed similar to those of anthropoids, the molars resemble those of more primitive primates. "It's a beautiful specimen, but I don't think we have the evidence yet to say what it is," she says.

The real clincher, all agree, would be a skull. But time may be running out on the search. The Chinese government plans to dam the Yellow River—which will drown many of the *Eosimias* localities—by 1997. So Beard and colleagues will be out searching for one more year, hoping to find a definitive fossil to at last silence the skeptics.

–Elizabeth Culotta