

Old-School Tools

Fall 2011



This eight-inch-long hand ax, viewed from two angles, was made by hominids in Africa 1.76 million years ago.

One of modern humans' predecessors, *Homo erectus*, used advanced tool-making methods at least 300,000 years earlier than previously thought, according to a new study.

A team of Columbia geologists led by Christopher Lepre and Dennis Kent made the determination by dating mudstone at an archaeological site in Kokiselei, Kenya, where French scientists had found ancient stone axes in the late 1990s. Since the French made their original discovery of the tools, there has never been any serious

question about who produced them: Their oval shape and carefully sharpened edges are the signatures of *Homo erectus* craftsmanship, which was unusually sophisticated for the period in which he lived.

“The skill involved in manufacturing such a tool suggests that *Homo erectus* was dexterous and able to think ahead,” says Lepre, whose paper appeared in the journal *Nature*. “He could probably chop wood and slaughter large animals.”

Scientists were less sure, however, about when the tools were made. The sediments in which they were found were estimated to be roughly 1.4 to 1.9 million years old. Until now, most scientists suspected that the tools were made during the recent end of that range, perhaps 1.5 million years ago.

But the Columbia geologists challenged this consensus by using a novel dating technique called magnetostratigraphy. This involved making microscopic observations of individual grains of sand in the mudstone in which the tools were found. Elongated grains of sand tend to point north, as a result of the earth’s magnetic field. And scientists today know that the earth’s magnetic fields have been shifting in regular cycles for millions of years. By analyzing the positions of the sand grains and correlating this data with the earth’s polarity cycles, the geologists concluded that the sediment is 1.76 million years old.

“We knew that Kokiselei was a very old site, but we were taken aback when we realized that the geological data indicate that it’s the oldest site ever to contain these types of tools,” says Lepre, who holds appointments at Columbia’s Lamont-Doherty Earth Observatory and at Rutgers University.

The finding raises new questions about *Homo erectus*, believed to have hit an evolutionary dead end about 70,000 years ago. The authors point out that archaeological evidence suggests that populations of *Homo erectus* that lived in Central Asia much later did not make sharp instruments.

“These tools represented a great technological leap,” said geologist and study coauthor Dennis Kent, who also has joint appointments at Lamont-Doherty and Rutgers. “So why didn’t *Homo erectus* take the tools with them to Asia? That’s the mystery.”

Scientists from France’s National Center for Scientific Research and Seton Hall University also contributed to the study.



[All categories >](#)