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In Ancient Skulls From Ethiopia, Familiar Faces

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In the 160,000-year-old fossilized skulls of two adults and a child found in Ethiopia, scientists think they see for the first time the faces of the immediate ancestors of modern humans.

Except for a few archaic characteristics, the skulls are readily recognizable. They are longer than their Neanderthal contemporaries from Eurasia or earlier ancestors. Their midfaces are broad, but the nasal bones are tall and narrow. The brow ridges are less prominent than those displayed in skulls from earlier branches of the family tree. And the cranial vaults are higher and within modern dimensions.

The discovery of the oldest near-modern human remains, announced yesterday, is considered a major step in establishing the time and place for the emergence of anatomically modern Homo sapiens, probably 150,000 years ago in Africa, as previous genetic studies suggested.

"We can now see what our direct ancestors looked like," said Dr. Tim D. White, a paleoanthropologist from the University of California at Berkeley, who is a leader of the international team that excavated and analyzed the skulls.

That had been impossible because of the frustrating gap in fossil evidence between 100,000 and 300,000 years ago, when the transition from prehumans to modern humans is thought to have taken place.

Dr. Christopher Stringer of the Natural History Museum in London, who did not participate in the research, hailed the findings as "some of the most significant discoveries in early Homo sapiens so far."

Another independent observer, Dr. Richard G. Klein of Stanford University, said, "These are basically modern people, remarkably modern in appearance."

The discovery team and other scientists said the research appeared to confirm the idea that modern humans originated in Africa and then spread into Asia and Europe. In that case, they said, the Neanderthals, who became extinct in Europe 30,000 years ago, could not have been direct forebears of today's humans.

In a report in today's issue of the journal Nature, released online yesterday morning, Dr. White and his collaborators concluded that the Ethiopian skulls "represent the probable immediate ancestors of anatomically modern humans" and "their anatomy and antiquity constitute strong evidence of modern-human emergence in Africa."

The "out of Africa" hypothesis, forcefully advocated by Dr. Stringer among others, had gained wide support in the two decades since molecular research on the genetic diversity among human populations pointed to a common ancestor in Africa, which became known as the African Eve. The research was based on evolutionary changes in mitochondrial DNA, which is passed from mother to daughter. Studies of the male Y chromosome reached similar conclusions. But scientists had been unable to pin down the time of origin or find supporting fossil evidence. The earliest fossils of modern Homo sapiens, from Ethiopia, South Africa and Israel, are not much more than 100,000 years old.

If correct, Dr. White's group emphasized, the new research ruled out the alternative multiregional hypothesis, held by a minority of scientists. They proposed that modern humans evolved in parts of Africa, Asia and Europe at roughly the same time. The Homo erectus species, which had migrated out of Africa much earlier, was thought to have evolved into Asian humans and European humans, possibly through intermediate stages, including Neanderthals.

Dr. Milford Wolpoff of the University of Michigan, a leading proponent of the multiregional theory, questioned whether the skulls had any bearing one way or other on the Neanderthals' place in evolution. "All the specimens show is that there was a trend of evolution in Africa toward modernity, just as there was in China and Europe," he said.

But Dr. White's group said the fossil skulls showed that Homo sapiens with almost entirely human characteristics had already evolved in Africa before Neanderthals evolved into their classic form. Soon afterward, fully modern Homo sapiens entered Europe and the Neanderthals began their decline.

"We can conclusively say that Neanderthals had nothing to do with modern humans," said Dr. Berhane Asfaw, a co-leader of the discovery team from Rift Valley Research in Addis Ababa, the Ethiopian capital.

In a background news release to the journal articles, the researchers said that even if descendants of the transitional people from Ethiopia "interbred with surviving Neanderthal populations, the latter appear to have contributed very little to the modern human gene pool."

The team concluded, "In this sense, we are all African."

The fossils were found in 1997 in an arid valley bordering the Middle Awash River near the village of Herto, 140 miles northeast of Addis Ababa. The fossils were buried between layers of volcanic ash, from which geologists on the project determined their age to be about 160,000 years. When the people the skulls belonged to lived there, paleontologists said, they hunted and fished on the shore of a freshwater lake.

The fossils were so fragmented that it took years of cleaning, reassembling and analyzing before the discoverers felt they could report their findings. They also kept hoping they would find more remains. They collected more than 600 stone tools but never found the lower jaws to the skulls or any parts of the skeletons.

Anthropologists suspect the skulls had been were removed from the bodies as part of an ancient mortuary practice. There were parallel incisions around the perimeter of one skull and more cut marks on the other two. Similar modifications have been observed by anthropologists in societies.

The three skulls, all missing the lower jaws, were excavated a few hundred feet from one another. The most complete one, probably that of an adult male, especially impressed scientists with its humanlike size and shape, very nearly modern.

So the team decided that the specimen belonged in the same genus and species as modern humans, Homo sapiens. But there were enough differences, they concluded, that the fossils were probably a subspecies, Homo sapiens idaltu, to differentiate them from fully modern humans, Homo sapiens sapiens. Idaltu means elder in the local Afar language.

"When we compared the cranium to thousands of modern human crania, several dimensions and characters were outside the modern range," Dr. White said in an interview. "If we just called it homo sapiens sapiens, that implied it's the same thing, and it's actually not the same, though very close."

In a commentary accompanying the reports, Dr. Stringer said this fossil "helps to clarify the pattern of early Homo sapiens evolution in Africa, as it shows an interesting combination of features from archaic, early modern and recent humans."

The second skull was of a larger adult with modern human characteristics. The third was the skull of a 6- or 7-year-old child. The specimens are being studied at the National Museum of Ethiopia in Addis Ababa.

"The key point is that we now have good fossil evidence of people like us evolving in Africa when the only people in Europe were Neanderthals," Dr. Klein of Stanford said. "The Herto humans are anything but Neanderthals."