

Ancient Skull Fills Big Fossil Gap

A skull recently unearthed in eastern Africa and belonging to the same evolutionary lineage as modern humans ranks as a "one from a million" addition to the hominid fossil record.

The approximately 1-million-year-old specimen—consisting of much of the braincase and parts of the face and jaws—represents the only substantial *Homo* cranium from between 1.4 million and 600,000 years ago.

At least one feature of the cranium looks like later *H. sapiens*, although in several other ways the specimen veers toward *H. erectus*, concludes a team led by geologist Ernesto Abbate of the University of Florence in Italy. If correct, their analysis indicates that skeletal traits typical of *H. sapiens* began to emerge about 300,000 years earlier than many scientists had thought.

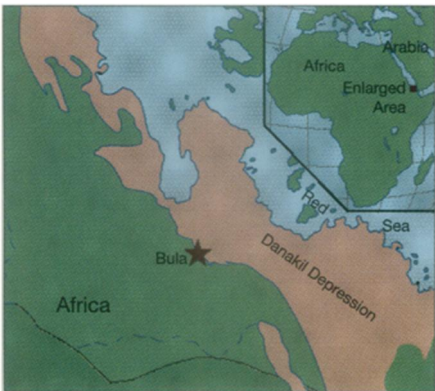
"The main point is that we have a well-founded date of about 1 million years for this *Homo* skull," Abbate says. "It fills a big hole in the fossil record."

Cleaning and restoration of the skull are still under way. The researchers have refrained from assigning it to a species until they can compare it in detail to other ancient *Homo* craniums.

Excavation of the skull occurred between 1995 and 1997 at a site bordering a geologic formation in Eritrea known as the Danakil Depression. The site, situated about 30 miles southwest of the Red Sea near the village of Bula, also yielded a pair of teeth and two pelvic fragments assigned to *Homo*.

Bones from a variety of animals turned up in *Homo*-bearing sediment, the researchers say. These included gazellelike creatures and extinct forms of horses, rhinoceroses, and hyenas.

Several features of the Eritrean *Homo* cranium appear in African specimens assigned to *H. erectus* or *H. ergaster*, Abbate and his coworkers report in the June 4 NATURE. For example, the new



Map shows African site that yielded a 1-million-year-old *Homo* cranium.

find has a long, oval-shaped braincase with a considerably smaller volume than that of *H. sapiens*. Also, a visorlike bony crest runs horizontally above the eyes.

However, the sharp angling and distinctive shape of the cranium near its midpoint strongly resemble early *H. sapiens* specimens, the investigators assert.

The Danakil cranium is missing its base, a repository of clues regarding the hominid's vocal tract structure and speech capacities.

Changes in Earth's magnetic field documented in Danakil's sediment layers, combined with previously known time ranges for extinct creatures found at the site, place the *Homo* material at about 1 million years old.

"If the dating is accurate, this is a very important find for the hominid fossil record," comments anthropologist Ian Tattersall of the American Museum of

Natural History in New York.

No scientific consensus exists on how to identify fossil members of *H. sapiens*, Tattersall adds. The Danakil skull displays few obvious anatomical links to *H. sapiens* and maintains a murky evolutionary status, he contends.

"This is a terrific find, and the dating looks good," remarks anthropologist Tim D. White of the University of California, Berkeley. "It establishes the Horn of Africa as a key area for unraveling *Homo* evolution."

White calls the evolutionary analysis of the Danakil cranium conducted by Abbate's group "very preliminary."

The new find should help to address controversies in *Homo* evolution, the Berkeley scientist notes, such as whether *H. erectus* was a direct ancestor of *H. sapiens* and whether a number of ancient *Homo* species existed simultaneously (SN: 5/31/97, p. 333). —B. Bower

Small comet theory melts under scrutiny

In science's version of an old-fashioned pillory, seven independent teams assailed the hypothesis that thousands of house-size snowballs plow into Earth's atmosphere each day.

At a meeting of the American Geophysical Union last week, the chairman of a session on this controversial topic issued a warning only half in jest. "I don't want any hitting in the trenches. No fighting, no biting," said Thomas M. Donahue of the University of Michigan in Ann Arbor.

Despite the admonition, the numerous critiques drew flashes of temper unusual at such conferences.

The small comet hypothesis was first proposed in 1986 by space scientist Louis A. Frank of the University of Iowa in Iowa City. Frank, along with Iowa's John B. Sigwarth, raised the idea after finding what he called "atmospheric holes" in images of Earth taken by the Dynamics Explorer 1 satellite. The holes were dark blemishes in the otherwise bright background of ultraviolet radiation emitted by the upper atmosphere.

To explain the spots, Frank proposed that 25,000 small, fluffy comets of almost pure water were bombarding Earth each day and disintegrating in the atmosphere. These clouds of water vapor show up as dark blotches on the images because they block atmospheric radiation from reaching the satellite, he said.

Although most researchers originally dismissed the idea, Frank captured both positive and negative attention last year when he presented corroborating evi-

dence from new instruments on NASA's Polar satellite (SN: 5/31/97, p. 332; 12/20 & 27/97, p. 389). Ultraviolet images taken by Polar showed the presence of atmospheric holes, but they bypassed some problems in the original data.

At the meeting in Boston last week, Frank offered additional observations to bolster his hypothesis. Analysis of the satellite images suggests that the number of dark spots varies with the time of day and the season, following the same cycle as meteors. Other researchers quickly challenged the new findings.

Frank reported that small comets strike the atmosphere most often in the morning. That timing fails to match their purported path in space, says Alan W. Harris, an astronomer at NASA's Jet Propulsion Laboratory in Pasadena, Calif. "That's just completely backwards."

According to earlier reports by Frank, the speedy comets move in the same direction as Earth and overtake it. If that were true, the comets should plow into Earth's trailing edge and therefore hit in the evening, Harris says.

He and his colleagues hunted for direct evidence of the comets but came up empty-handed. The team used the Spacewatch telescope in Arizona, an instrument built especially to look for objects near Earth. A decade ago, one Spacewatch researcher reported observing bodies fitting Frank's descriptions, but other investigators associated with the project dismissed these observa-