

New fossil find provides important clues to man's prehistory

Frank Gaglioti
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The April 23 issue of the *Science* magazine announced the discovery of the fossilised remains of a new species of hominid [human ancestor], which provides important clues into the early history of human beings. The find was made by a multinational team of scientists headed by Ethiopian anthropologist Dr. Berhane Asfaw.

The new species was originally discovered in 1996 in the Afar depression in eastern Ethiopia on the edge of the Horn of Africa. But it has taken three years to fully explore and reveal the potential of the site. The species, which has been named *Australopithecus garhi*, was identified by a skullcap and an upper jaw with teeth. The Berkley Geochronology Center used the argon-argon radioisotopic method to date the fossil at 2.5 million years old.

The latest discovery has features that are intermediate between *Homo habilis*, the earliest true human and *Australopithecus afarensis*, best known from the fossil "Lucy"--also discovered in the Afar region that gives the species its name. *A. garhi's* teeth are much bigger than those in *A. afarensis*, placing *A. garhi* closer to true humans; but its cranial structure has features similar to those found in "Lucy". Professor Tim White, from University of California, Berkley described the new species as being "most like its ancestor *afarensis*--the face projects forward, the brain case is crested and small, but the premolars and molars are enormous. This combination of features has never been seen before, and that's why we named a new species."

The scientific team also reported the discovery of a thighbone and forearm of an individual which was 1.2 metres tall, from a similar period but which could not be positively identified as the same species. The thighbone showed there had been an elongation from *Australopithecus* closer to the proportions of modern

humans, while the forearm was still elongated as in its *Australopithecus* forebears.

Although the *A. garhi* fossil has intermediate features and lived in a period between "Lucy"--3.3 million years ago and *Homo habilis* --1.9 million years ago, the scientists have not claimed that it represents a direct descendent of *Homo* even though it represents a promising candidate. The report states: "It is in the right place, at the right time, to be the ancestor of early *Homo*, however defined. Nothing about its morphology would preclude it from occupying this position."

In an accompanying paper, the team of scientists reported the nearby discovery of fossilised limb bones of antelopes, horses and other large mammals showing cut marks. Some of the bones had been bashed open by hammer stones to extract the marrow--clear signs of butchery, but the tools used to butcher the animals were not found. Although these fossils date from the same period and were found only one meter from the *A. garhi* skull, the evidence of butchery has not been definitively linked with *A. garhi*. It is the most likely candidate, nevertheless.

The current findings give a tantalising glimpse into the lifestyle of the creature that wielded the earliest stone tools. Archaeologist Sileshi Semaw from Indiana University discovered tools aged 2.5 million years old just north of the site of the current discovery two years ago-- *A. garhi* provides a possible user.

The discovery will reinvigorate the ongoing controversy over which hominid first used such primitive tools-- *Homo habilis* or an *Australopithecus* species. The famous paleoanthropologist, Mary Leakey originally named the tools of this period "Oldowan" after the Olduvai Gorge, Tanzania in 1971 where she first discovered such tools with bone fragments with cut marks, possibly indicating butchery. Prior to the

latest find, "Oldowan" tools were always found in close association with the fossils of both Homo and Australopithecus together, making it impossible to tell which had used the tools.

The latest find provides evidence that by 2.5 million years ago human ancestors had developed the ability to manufacture and master certain tools such as stone knives and the ability to obtain meat and marrow, marking a pivotal period in human evolution that enabled hominids to exploit a high quality food resource. Professor White described the evolutionary significance of this breakthrough as "the development of stone tool technology allowed this dietary revolution. This is the earliest evidence of a key adaptation that let our ancestors spread beyond Africa."

Drawing on the scientific work of his day, Fredrick Engels brilliantly anticipated the current discoveries in his famous pamphlet *The Part Played by Labour in the Transition from Ape to Man* where he explained the significance of a meat diet. He wrote that "the meat diet ...had its greatest effect on the brain, which now received a far richer flow of the materials necessary for its nourishment and development, and which, therefore, could develop more rapidly and perfectly from generation to generation." The development of a meat diet led to two further advances: the domestication of animals and the mastery of fire. Engels went on "just as man learned to consume everything edible, he also learned to live in any climate. He spread over the whole of the habitable world, being the only animal fully able to do so of its own accord."

It is interesting to note that while the brain capacity of *A. garhi* is similar to that of *A. afarensis* at 450 cubic centimetres (ccs), *Homo habilis* has a brain capacity of 650 ccs--a 200 ccs increase in about half a million years while the proceeding period of 800, 000 years from *A. afarensis* to *A. garhi* saw no increase in brain capacity. The findings are thus direct evidence that the development of the brain may indeed have been related to the new diet.

The anthropological community has welcomed the discovery. Philip Rightmire at State University of New York in Binghamton stated that the researchers "have made a convincing case for naming the new species" and "with the addition of this to the inventory, there are more species than one can shake a stick at. Now it will be a real challenge to sort them out and put them into a

coherent evolutionary scheme". Donald C. Johanson of the University of Arizona who discovered "Lucy" stated that "it is a very welcome discovery. [The new species] was not only anatomically different but behaviorally different. It is tantalising material. The whole human family tree is more complex than we have thought before."



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