

# Family Feud: Enter The 'Black Skull'

## An ancient African skull has stepped into a dispute over the purported 'common ancestor' of hominids, including humans

By BRUCE BOWER

A fossil skull known only by its museum number, KNM-WT 17000, made quite a splash last summer. The 2.5-million-year-old hominid, or human-like creature, was discovered in Kenya by Alan Walker of the Johns Hopkins University in Baltimore, Richard Leakey of the National Museums of Kenya in Nairobi and their colleagues (SN: 8/16/86, p.100). There were great expectations that this ancient fellow would throw a monkey wrench into previous notions of the course of early hominid evolution. The mix of primitive and advanced features on the skull has indeed surprised some paleontologists who, as a result, have rearranged branches of their proposed hominid "family trees."

But ironically, the new fossil — found in manganese-rich sediment that darkened it and led to its being dubbed the "black skull" — has also been used to buttress, rather than overturn, two opposing explanations of the transition from apes to humans.

On one side of this long-running debate (SN: 7/2/83, p.8) stand the discoverers of the famous partial skeleton known as Lucy, which was found with a number of other hominid fossils in Hadar, Ethiopia, about 10 years ago. Shortly after that excavation, Lucy's locators — Donald Johanson and William Kimbel of the Institute of Human Origins in Berkeley, Calif., and Tim White of the University of California at Berkeley — assigned all the remains to one species, *Australopithecus afarensis*. They maintained that smaller Hadar individuals such as Lucy were females and larger ones were males.

Johanson and White say that the black skull helps to confirm their position that *A. afarensis*, which dates to between 3.7 million and 3 million years ago, is the common ancestor for later hominids, including the human line. They acknowledge that WT 17000 forces them to reconsider the placement of some later species,

but view the skull as an evolutionary link between *A. afarensis* and the more specialized *A. boisei*, a large-boned, "robust" australopithecine dated at 1.2 million to 2.2 million years old.

Other researchers, however, say that WT 17000 supports their previous contentions that the Hadar fossils represent two different species: a slender, "gracile" type exemplified by Lucy, which was an early member of the *Homo* line, and a robust type. The appearance of a 2.5-million-year-old robust australopithecine with some features of *A. afarensis* increases the likelihood that Lucy coexisted with a robust species, say anatomist Todd R. Olson of the City University of New York Medical School and Dean Falk of Purdue University in West Lafayette, Ind. Therefore, they argue that the common ancestor of hominids appeared sometime before 3.7 million years ago.

Johanson and White say that WT 17000 provides no basis for this contention. "When you look at its mosaic of characteristics," says White, "the new cranium is intermediate between *A. afarensis* and the robust australopithecines. This thing is distinct from *A. boisei*, and the only other species to which it might belong is *A. aethiopicus*."

The latter species is controversial and based on a single lower jaw found in Ethiopia 20 years ago. Many scientists have held that one jaw does not a species make. Although WT 17000 is missing the corresponding jaw area, White and Johanson say it would need one like the original *A. aethiopicus* specimen, only larger.

In their initial report, Walker and Leakey suggested the new skull might be an example of *A. aethiopicus*, but said it was more likely an early *A. boisei*

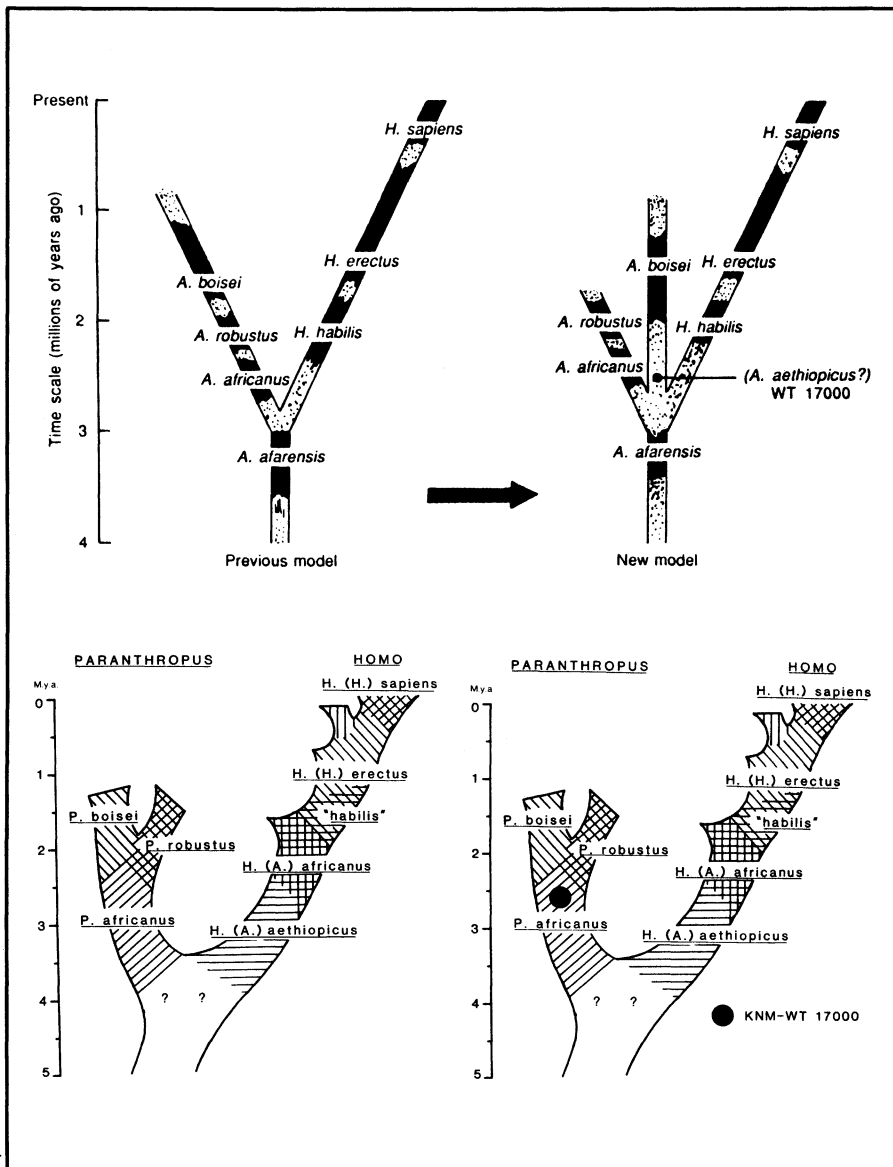
specimen. They argued, therefore, that *A. boisei* was a separate line evolving in parallel with an *africanus-robustus* line. All robust forms, whether they evolved on one or more lines, eventually became extinct.

White, however, sees a clear link to *A. aethiopicus*. "The size difference between the original [*aethiopicus*] jaw and that required for the new skull is analogous to the size differences between *A. afarensis* specimens," he says. Just as Lucy was a female and her considerably larger contemporaries were males, contends White, the *A. aethiopicus* jaw is from a female and the black skull represents a male of the same species.

Johanson and White previously held that *A. africanus*, found only in southern Africa and estimated to have appeared between 2.5 million and 3 million years ago, linked *A. afarensis* to the progressively larger robust forms, *robustus* and *boisei*. The new skull suggests that *A. aethiopicus* may have led to *boisei*, say the researchers, while *africanus* may have led either to *robustus* or to the human line.

Nevertheless, adds White, "there was a lot of hype about the black skull when it was first announced and it has been used as an inappropriate vehicle to attack *afarensis*."

Olson and Falk are at the forefront of the *afarensis* attack. Evidence from a number of features on Hadar specimens, including the base of the skull, teeth and cranial sinuses used for blood drainage, has led them to conclude independently that this was not a unified species. At this point, though, it becomes difficult to follow the hominid players without a scorecard.



Top: ©1986 SCIENCE. Bottom: Olson

Above left, Johanson and White's former hominid family tree. Above right, their new version inspired by the black skull. Below left, Olson's former hominid family tree into which he inserts, at right, the WT 17000 fossil.

Lucy and her ilk, says Olson, were the earliest members of the human line. He assigns them to another species of *aethiopicus* based on a distinction in the Hadar fossils made several years ago by Phillip V. Tobias of the University of the Witwatersrand in Johannesburg, South Africa. Tobias, however, classified Lucy-sized creatures as a subspecies of *A. africanus* (*A. africanus aethiopicus*). Olson says they were a full-fledged species, *Homo aethiopicus*, linked to later members of the human lineage by *A. africanus*, which in his scheme were actually *Homo africanus*.

Lucy's larger cohorts at Hadar were, in Olson's view, the most primitive members of the robust australopithecine lineage, which he prefers to call *Paranthropus*. He labels the initial robust Hadar species *Paranthropus africanus* (not to be confused with *Homo africanus*), based on terminology used in 1950 by a German an-

thropologist who, according to Olson, studied East African fossils of the same species. He concludes that the black skull links *P. africanus* to later *boisei* and *robustus* forms.

"Prior to the new find, the oldest robust skull was around 2 million years old," says Olson. WT 17000 "puts into further question the argument that the Hadar material represents one species." He estimates that the early *Homo* and *Paranthropus* lines split from a common ancestor around 4 million years ago.

Johanson and White's assignment of the black skull to *A. aethiopicus*, adds Olson, is unjustified, at least until more hominid material from the same time period is discovered. "The original *aethiopicus* jaw has no crowns on its teeth, only roots," he says, "and there is no basis for a [structural] comparison to WT 17000. The two specimens are from the same time period, but that's not

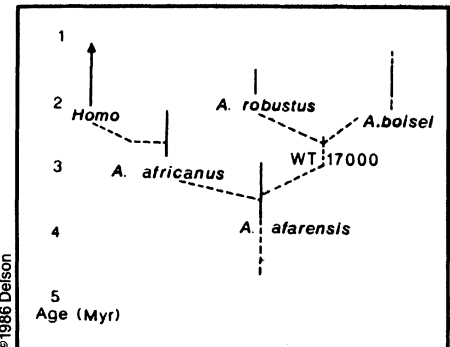
enough to show that they're the same species."

Johanson and White's colleague William Kimbel agrees that it may be too early to label the new skull as *A. aethiopicus*. Only the discovery of more fossils from the period between 2 million and 3 million years ago will help to resolve the issue, he says.

On the other hand, Kimbel says he is "mystified" by efforts to use WT 17000 in the debate over whether the Hadar remains represent one species or two species. "You can't make conclusions about 3- to 3½-million-year-old fossils from a 2½-million-year-old skull," he contends. "It's irrelevant."

Frederick Grine of the State University of New York at Stony Brook also sees no reason to use WT 17000 in the "*afarensis* attack." But, he adds, "I've told Johanson and White that calling it *A. aethiopicus* is a silly interpretation. Based on its differences from other known specimens, if this isn't a new species, we're in serious trouble as far as identifying any new species."

Grine supports a family tree drawn up by Eric Delson of the City University of New York. In that scheme, *A. afarensis* is accepted as a single species that split into two lines, one becoming *A. africanus* and evolving into modern humans, the other becoming the species represented by the black skull, which then split to form the now-extinct *A. robustus* and *A. boisei*.



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A third family tree based on the skull, proposed by Delson and Grine.

Grine hopes some kind of consensus can be hashed out at a major workshop on robust australopithecines that will be held, under his direction, at Stony Brook toward the end of March.

At about the same time, an announcement will be made concerning a partial hominid skeleton discovered by Johanson, White and their colleagues at Olduvai Gorge in Tanzania last summer. The fossils were unearthed in sediments that have been dated at 1.8 million years old. "The partial skeleton is very fragmentary and at the moment somewhat enigmatic," says Johanson.

So, it might be added, is the significance of the black skull for the hominid family tree. □