

# Fossil Find Fleshes Out Early Human

The record of early human evolution has, for the most part, been pieced together from fossilized fragments and partial skeletons that provide tantalizing but sketchy views of our ancient forerunners. Scientists now report, however, that the most complete skeleton of an early human ancestor ever found has been discovered in Kenya.

"The volume of information we will be able to gather from this skeleton will be quite extraordinary," says Richard Leakey, director of the National Museums of Kenya and one of the discoverers of the remains. Leakey announced the find last week in Nairobi; at the same time, Johns Hopkins University anatomist Alan Walker described it at the National Geographic Society in Washington, D.C., which funded the work along with the National Museums of Kenya.

The bones are those of a surprisingly large young male of the *Homo erectus* species who died about 1.6 million years ago. Walker estimates that the boy was about 12 years old and 5 feet 6 inches tall. As an adult, he might have reached a height of 6 feet, Walker says.

"We used to think of *Homo erectus* as rather puny and fragile," says Leakey. "This strapping youth suggests that they were better built than we imagined."

Previous specimens are too fragmentary or too badly deteriorated to allow accurate estimates of the size and growth of *Homo erectus* and other early human-related species, or hominids. The new skeleton is missing only its left arm and hand, lower right arm and most of both feet. The youth is also one of the earliest



Richard Leakey gets close to his work at a fossil site in Kenya as he digs out a bone of a youth who lived 1.6 million years ago.

known members of the *Homo erectus* species, which lived from 1.7 million to 400,000 years ago.

It is not known how the boy died; there is no sign that he suffered from a disease. This makes the skeleton more valuable for study than the only previous *Homo erectus* found with bones from below the neck, since that specimen had a bone disease that made detailed scientific analysis useless.



Reconstructed skull of a young male *Homo erectus*, who died around the age of 12.

The new find was made in August and September by a fossil-hunting team led by Leakey and Walker. The bones were found scattered in a line about 20 feet long on a slope near the western shore of Lake Turkana in northern Kenya. The remains may have washed away from the place where the youth died, says Walker. A search will be made next year for the rest of the bones.

The skeleton rested between two layers of volcanic ash that have been dated at about 1.6 million years old. Walker and Leakey conclude that the bones belong to one person because no two pieces are duplicates and all of the bones are in the same stage of maturity. The youth's age was estimated on the basis of tooth development; some of the permanent teeth had not yet grown in. The sex was determined from the narrow shape of the pelvis, and the species is characterized by the skull's

high brow ridge.

Detailed analysis of the skeleton must wait until rock and sediment are cleaned from the bones, says Walker.

Nevertheless, he adds, the overall picture appears to confirm *Homo erectus* as a direct ancestor of modern humans. "We'll learn fascinating things about human evolution from this skeleton," notes Walker. "We can now say that we've looked like humans for 1.6 million years."

Even though the youth's skeleton is similar to those of modern humans, Leakey adds that "virtually every piece of bone shows subtle but definite differences between *Homo erectus* and modern man."

—B. Bower

## Rock-filled fossils get a new image

Alan Walker, Richard Leakey and their co-workers now face the arduous task of cleaning rock and hardened sediment off the bones of a 1.6 million-year-old youth (see story above). In some other finds, this solid matter fills delicate fossil skulls and makes cleaning for comprehensive examination impossible — but scientists at Washington University School of Medicine in St. Louis now report that they can see through rock attached to fossils with the help of computer technology.

Glenn C. Conroy and Michael W. Vannier are taking computerized tomography (CT) scans of fossil skulls filled with hardened sediment and other material. They use special computer software to transform the scans into three-dimensional images of the skulls with the rocky filling removed. In this way, any portion of a skull can also be made transparent and precise data can be collected on a fossil's area, volume and shape.

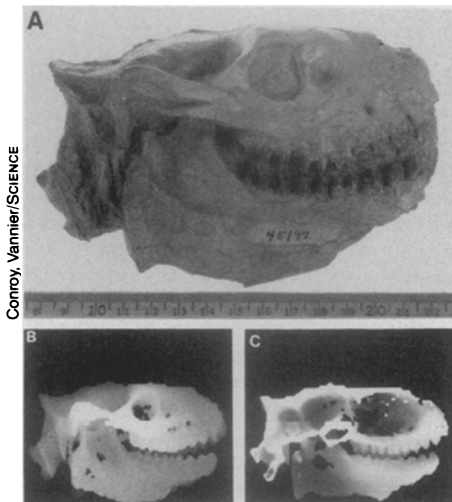
"We've opened up, I think, a whole new world of paleontology," Conroy told SCIENCE NEWS.

In the Oct. 26 SCIENCE, the researchers describe how the technique was used to



Photos: National Geographic Soc.

Alan Walker with bones of early human ancestor laid out before him.



Side view of original fossil skull (A). A three-dimensional computer image of the same specimen eliminates sandstone filling (B). The computer makes part of the skull "transparent" (C).

study the 30 million-year-old skull of a small hooved mammal that was obtained from the American Museum of Natural History in New York City. The fossil is completely filled with sandstone and is too delicate to be cleaned out. Conroy and Vannier produced three-dimensional views of the skull from numerous angles. Selected portions of the skull were made transparent by the computer program to get a better view of the brain case.

Generating three-dimensional images of a skull is relatively simple and takes about two hours, says Conroy. But it cannot be done without the proper software, which so far is used only at Washington University. A West German firm is preparing the software for distribution next year, says Vannier.

Vannier and Washington University surgeon Jeffrey Marsh developed the computer program, which is inserted into a CT scanner's regular computer, about three years ago. Since then, they have used the method to examine almost 600 hospital patients who required skull and facial surgery.

Conroy, an anatomist and anthropologist, saw the potential of the technique for paleontology. In Africa last summer, he presented a paper on three-dimensional imaging to Leakey himself, who expressed great interest in its potential, reports Conroy. "There are important fossil hominid skulls in eastern Africa discovered by Leakey and his colleagues that would be perfect candidates for three-dimensional analysis," he notes.

A stumbling block to the use of CT scanners with fossils is distance: Most ancient remains are not allowed to leave the vaults or cases where they are stored. Fossil curators may decide to risk transporting some skulls to a facility with CT equipment, says Conroy, as they learn more about the imaging method.

—B. Bower

## Chimps infected with AIDS-linked virus

Two independent groups of scientists report this week that they have succeeded in infecting chimpanzees with the virus thought to cause acquired immune deficiency syndrome (AIDS) in humans. The achievement is important, say the researchers, not only in providing a long-sought animal model for vaccine testing but also in giving investigators a detailed view of the various ways the disease can progress in its earliest stages, before clinical symptoms are present. In addition, an animal model provides a chance to test new antiviral drugs and other potential treatments as they arise, according to the researchers, at the National Institutes of Health (NIH) in Bethesda, Md., and the Centers for Disease Control (CDC) in Atlanta.

Harvey J. Alter, Anthony S. Fauci and other NIH colleagues, working with the Southwest Foundation for Biomedical Research in San Antonio, Tex., transfused three chimps with blood plasma from several patients who had either AIDS or AIDS-related syndromes. Within several months, two of the animals showed signs of infection, the scientists report in the Nov. 2 *SCIENCE*, as evidenced by a hike in blood-borne antibodies against the virus and a depletion of the subset of vital immune cells that are known to serve as chief targets for the virus in humans. One of the two chimps also developed extremely swollen lymph nodes—a symptom that occurs frequently among AIDS patients and in others exposed to the AIDS-linked virus.

CDC scientists, collaborating with colleagues at Yerkes Regional Primate Research Center in Atlanta, directly inoculated three chimps with concentrated virus. Although none of the CDC animals has developed disease as yet, all show signs of infection, Donald Francis of the CDC told *SCIENCE NEWS*, and all are producing live virus that triggers further infection when passed along to additional chimps. Antibodies to the virus—one of the first signs of infection—can be detected in the animals less than two months after inoculation, Francis says, and so could enable researchers to determine relatively quickly whether a prototype vaccine that seems promising in protecting cells in culture actually produces complete immunity in live animals. The chimp model "will be very, very useful," he says.

"Some of these animals, I presume, will come down with AIDS," Francis says. "But if it's like [infection with the virus in] humans, it won't be every one." Preliminary evidence described by James W. Curran of the CDC at the recent meeting of the American Society of Microbiology indicates that human infection with the AIDS-associated virus probably occurs 30 to 50 times more frequently than the disease itself. Surveys in the United States now indicate that there are "probably a quarter of a million people who, past or present, have been infected with this virus," Curran said, adding that as many as 10 percent of those infected may go on to develop clinical AIDS.

The virus has been variously identified as HTLV-III, LAV and ARV, among other names, depending on who is reporting the research and on the origin of the viral isolates being described (SN: 4/28/84, p. 260). The chimps in the NIH study were reported to produce antibodies to HTLV-III, while the CDC chimps contracted infections of LAV. At the microbiology meeting, Robert C. Gallo of the National Cancer Institute (NCI), who first published a description of HTLV-III last spring, produced some chuckles among a ballroom packed with scientists when he said that LAV and HTLV-III are "one and the same virus—except they are not identical."

Gallo later explained that the virus is extremely heterogeneous genetically, with close to 100 slightly different variations recorded to date. Moreover, the virus is undergoing genetic change "more rapidly than I would have expected," he said, though the transformation is not nearly as rapid as that of many influenza viruses that have eluded vaccine traps through quick genetic adaptation. There is as yet no evidence, he added, that the relatively mild variation among AIDS-related isolates would necessitate the use of more than one vaccine.

Gallo also said that simian AIDS, or SAIDS—an immune malady that has afflicted several colonies of rhesus monkeys (SN: 1/14/84, p. 21) and was at first postulated to be a possible model for human disease—is now known to be quite different from AIDS, both in etiology and mode of attack. The AIDS virus seems much closer to feline and even bovine leukemia viruses, Gallo said. Except for the two chimp studies, according to the CDC, no efforts to infect primates with virus linked to human AIDS have been successful, despite numerous attempts in several species.

Meanwhile, AIDS in humans continues to increase, according to the most recent CDC figures, which record more than 6,300 cases of the illness to date and nearly 3,000 deaths. But despite recent reports by Gallo and colleagues that HTLV-III virus has now been isolated from semen and saliva, the NCI scientist said he is not postulating saliva exchange as a major mode of AIDS transmission. Judging from epidemiological evidence, Curran agrees. "There's no evidence that eating with people, stepping on saliva on the sidewalk or sneezing" are ways in which AIDS is transmitted, he said. Whether intimate kissing might play a role in transmitting the disease, he said, remains to be seen.

—D. Franklin