Ancient bones: From simians to *sapiens*

You could call it the ultimate family tree. This painstaking investigation of ancestral roots, however, does not revolve around a founding father such as Kunta Kinte; it evolves through species representatives such as the Taung child and Java man.

These two specimens and about 50 other fossils that form the backbone of evolutionary theory will be brought together for the first time in an exhibit called "Ancestors: Four Million Years of Humanity" at the American Museum of Natural History in New York City. It will run from April 13 through September 9.

Since most of the fossils have never left their home institutions and are usually kept under lock and key, this will also be the first time scientists can compare originals side-by-side. At least 60 paleoanthropologists from around the world will study the bones in early April before they are installed in their exhibit cases. The scientists will present their preliminary findings in a symposium several days before the exhibition opens.

Up until now, the delicate fossil remains have been compared by using plastic replicas, photographs, drawings and notes.

When American Museum officials first discussed organizing the exhibition in 1980, they did not know if they could pull it off. The specimens are fragile and are considered national treasures in their home countries. Most have never been publicly displayed.

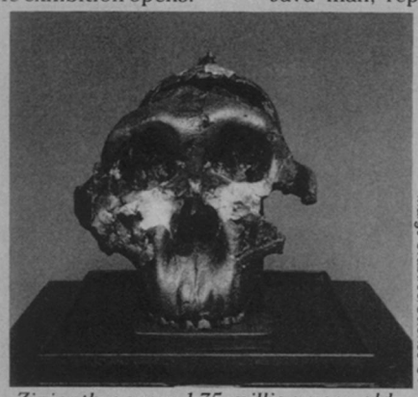
At present, the curators of 25 institutions in 13 countries have agreed to transport their fossils to the exhibition. They were persuaded, in large part, by the American Museum's careful plans for packing the specimens and for security in New York. Display cases will be designed using casts of each fossil. The curators will bring the originals over and supervise their installment just prior to the exhibition opening.

The American Museum estimates it will cost $500,000 to set up the fossil display.

The bones stretch back in time to a 30-million-year-old primate that is close to the common ancestry of humans and apes. Each major period of human development is represented: early humans or *australopithecines,* early advanced humans such as *Homo habilis* and *Homo erectus,* later advanced humans usually placed in *Homo sapiens,* Neanderthals and modern humans or *Homo sapiens sapiens.*

The collection of human ancestors includes:

- The Taung child, a 2-million-year-old partial skull of a 6-year-old child that belongs to the species *Australopithecus africanus.* Anthropologist Raymond Dart saw this fossil on the desk of a South African lime-mining supervisor in 1924 and realized it was an early human, not an ape.
- The Zinjanthropus skull, uncovered 25 years ago at Olduvai Gorge in Tanzania by Louis and Mary Leakey. The layers of earth in which it was found were dated at 1.75 million years old, doubling the known time scale of human evolution. The fossil is an *Australopithecus boisei,* younger than *A. africanus* and more heavily built with larger chewing teeth. *A. boisei* became extinct about 1.6 million years ago.
- Java man, represented by a skull cap and leg bone, and thought by its discoverer, Eugene Dubois, to be the missing link between humans and apes. This specimen was found in Indonesia in 1894 and is now known to be an early advanced human called *Homo erectus.*
- Neanderthal specimens from France, Germany, Yugoslavia and Israel. Generally regarded as an archaic form of *Homo sapiens,* they lived from 150,000 to 30,000 years ago. The exhibit includes the first Neanderthal specimen, unearthed in Germany's Neander Valley in 1856.



Margo Crabtree/Science '84

Zinjanthropus, a 1.75-million-year-old skull discovered in 1959.

Conspicuous in its absence is "Lucy," the partial skeleton uncovered in Ethiopia in 1977 by Donald C. Johanson, now of the Institute of Human Origins in Berkeley, Calif., and co-workers. Richard Leakey, curator of the National Museum of Kenya, decided not to ship his fossils, which include Lucy, to New York. The exhibition will include, however, a plastic replica of the controversial remains, says an American Museum spokesperson.

Scientific debate continues over whether Lucy and related fossils are a single species of early humans called *Australopithecus afarensis,* are two distinct species, or are members of *A. Africanus* (SN: 7/2/83, p. 8). —*B. Bower*

Hemoglobin bridge boosts O_2 delivery

By slightly altering the chemistry of hemoglobin, the oxygen-carrying workhorse of red blood cells, scientists at Columbia University in New York City have developed a substance they think could boost oxygen delivery to patients after major injury, or during low-temperature heart surgery. The substance might also be useful in preserving organs that are being prepared for transplantation, they say.

Ruth and Reinhold Benesch, in collaboration with Lubos Triner, pumped their modified hemoglobin through rabbit hearts and found that the protein relinquished 10 times more oxygen to the tissue than normal hemoglobin, thereby helping to preserve the functioning of the heart as measured by the muscle's ability to contract. The key to the success of their compound is a specific chemical bridge they created between two of hemoglobin's four subunits. The finding in rabbits, soon to be published in the PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES, confirms a decade of test tube experiments. The results might prove valuable as a temporary "blood substitute," in some surgery or trauma patients, Reinhold Benesch told SCIENCE NEWS. In contrast to whole blood, the modified hemoglobin continues to unload significant amounts of oxygen even at low temperature (10°C), prompting the researchers to suggest their substance could be valuable in major heart surgery when the body is substantially cooled temporarily to stop the pumping organ.

The term "blood substitute" can be misleading; blood is made up of many components that play a variety of important roles in the body, from fighting infection to conveying chemical messages from organ to organ, and no artificial substance can substitute in all those roles. But during acute bouts of heavy bleeding, a substitute liquid that can transport oxygen from lungs to outlying limbs can temporarily stretch a limited blood supply. Emulsions of fluorocarbons in saline have been shown to be effective in patients in Japan and the United States (SN: 8/28/82, p. 137), but such solutions are not problem-free, says blood researcher Anthony Hunt of the University of California at San Francisco. Recent research has indicated that the fluorocarbon solutions may depress a transfused patient's immune system, increasing susceptibility to infection, Hunt says.

Pure hemoglobin molecules, extracted from red blood cells, might seem an ideal transport alternative because they lack the troublesome proteins that trigger transfusion reactions in patients receiving the wrong type of whole blood. They also are smaller than red blood cells, the better to glide quickly through tiny capillaries.