PALEOANTHROPOLOGY

Java Skull Offers New View Of *Homo erectus*

Since the first fossil of the long-legged human ancestor called *Homo erectus* was found on the island of Java in 1891, researchers have studied several dozen *H. erectus* skulls from all over Africa and Asia. But this ancient human species is still capable of springing surprises.

On page 1384, a team of Japanese and Indonesian researchers presents another find from Java—a beautifully preserved skull that offers researchers their first glimpse of the base of the cranium in *H. erectus*. The unexpectedly modern anatomy disproves one hypothesis about the development of the large brains of our own species.

"This is an important find because it is the first *H. erectus* with a reasonably complete cranial base, and it looks modern," says paleoanthropologist Dan Lieberman of Harvard University. The new skull also links the early and late forms of *H. erectus* on Java, suggesting that the species lived continuously on this remote outpost for about a million years, rather than arriving in distinct, successive migrations, as some researchers had proposed.



Heads up. Modern anatomy in the interior of this skull surprised researchers.

CREDIT: H. BABA AND F. AZIZ

Java has yielded an unusual wealth of human fossils, including 23 skulls and teeth and bones from more than 100 individuals. Most of the skulls come from two different areas, with the oldest from sites in central Java and the youngest from east Java.

The new find was made on 1 October 2001, when an Indonesian construction worker collected sand and a skull from the Solo River at Sambungmacan in central Java. The construction company alerted paleontologist Fachroel Aziz of the Geological Research and Development Centre in Java, who contacted the paper's lead author, Hisao Baba, of the National Science Museum in Tokyo and the University of Tokyo.

Because the skull was found underwater, there is no associated sediment with which to date it. But the skull's anatomy looks intermediate between ancient and recent Javanese *H. erectus* in central and eastern Java. "We have some kind of missing link," says Baba.

The new skull is flat on top, like skulls from central Java dated at 1 million to 1.5 million years ago or even older. Yet it also shares features (such as the shape of an opening for a nerve near the temple) with the youngest fossils from eastern Java, dated anywhere from 50,000 to 400,000 years ago.

"This is important because it takes away the suggestion that the later *H. erectus* in Java are something substantially different from earlier *H. erectus*," says paleoanthropologist Susan Anton of Rutgers University in New Brunswick, New Jersey. Baba adds that the Java people probably were an isolated population, not ancestral to modern humans, based on several idiosyncratic features found only on Javanese skulls.

But the skull does possess one strikingly modern feature: the delicate bony platform behind the eyes on which the brain rests, called the cranial base. In modern humans, the cranial base is bent, or flexed, at a much sharper angle than it is in Neandertals and other archaic *Homo* fossils. This was thought to allow the face to grow tucked under the braincase during development, rather than jutting forward as in chimpanzees or *H. erectus*.

Lieberman proposed that this change might also have allowed a shift from the oblong, American football–like head shape seen in both *H. erectus* and Neandertals to the characteristic globular or volleyball shape of the modern human skull. Thus, he proposed that cranial base flexion was developmentally linked to the unique expansion of the modern human brain (*Science*, 15 February 2002, p. 1219.)

But the new skull does not support that view. When the researchers used computerized tomography scans to peer inside its head, they found a strongly flexed cranial base and a "teeny" brain, as Lieberman puts it. Even he says that if the flexion is verified in other *H. erectus* fossils, his hypothesis may prove baseless. In that case, researchers will have to find a new angle on the developmental changes that led to the modern human brain.

–ANN GIBBONS

ScienceScope

New Policy Reaffirms Pledge to Share Genome Data

After much agonizing, most recently at a closed meeting in Florida, human genome sequencers have "enthusiastically reaffirmed" their commitment to immediate data release. Fears of being scooped by unscrupulous colleagues had led to some backsliding—and pleas for special exemptions—from this near-sacred policy, codified in the 1996 Bermuda Principles (*Science*, 24 January, p. 487).

The new draft policy of the National Human Genome Research Institute (www.genome.gov/page.cfm?pageID=10506376) calls for "tripartite responsibility." Big sequencing centers must bite the bullet and release their data immediately. Users should show "respect" and give proper credit. And funders should guarantee the quality of "community resources," provide enough money for sequencers to perform initial analyses, and generally ensure that everyone behaves themselves. The draft policy, which is open for public comment through 23 April, extends to "shotgun" and other large sequence data sets not covered by the original Bermuda rules. –LESLIE ROBERTS

U.S. Needs Bigger R&D Effort to Detect Mines, Says Report

The U.S. government should launch a 5-year, $50 million research program if it wants to develop better ways to detect deadly land mines, according to a report released last week. No existing technology can reliably spot the millions of abandoned mines that kill and maim thousands of people each year around the world, according to the study, done by the RAND think tank for the White House's Office of Science and Technology Policy.

Current U.S. spending on mine detector R&D amounts to just several million dollars per year, the report notes. As a result, most deminers still rely on World War II–era devices that can't distinguish metal debris from live mines and have trouble detecting new, mostly plastic mines. Those failings have further slowed demining efforts; RAND estimates that it would take nearly 500 years to find currently buried mines.

"There is a desperate need for better equipment," says RAND engineer Jacqueline MacDonald, a co-author of the report. "But nothing will be developed," she warns, "unless there is investment in a well-organized, focused research program." The next step is up to the White House and Congress, which this week began reviewing the proposed 2004 budget.

–DAVID MALAKOFF