give more weight to the Kola claims. "The Kola well and our own have shown that a deep crust of dense, hot rock is definitely not the case," says Kehrer. "There are large amounts of highly saline brine in the crust that migrate, carrying metals around and depositing them as minerals."

A minority of geophysicists, including Lawrence Cathles of Cornell University, had suspected that at least some permeability would remain at great depths, enough to allow fluids to circulate. But the large volumes flowing into the KTB hole are welcome confirmation. "It's beginning to look like the lower parts of the crust can be fairly permeable," Cathles says, making room at relatively great depths for ore formation.

The hole shows the potential for settling another debate about the lower crust—specifically, about the role it plays in transmitting the forces that shift tectonic plates. Theory and experiments on rocks in the lab suggested that down to about 10 kilometers, increasing pressures strengthen rock. At greater depths, the weakening effects of increasing temperatures should overwhelm the effect of pressure. Thus, the thinking went, the strong top 10 kilometers of crust should carry most of the stress that moves the entire 100-kilometer thickness of a plate. In recent years, however, some investigators have argued that the upper crust weakens so rapidly with depth that the lower crust and the mantle beneath drive plate motions. If so, surface motions, including earthquakes, would simply reflect whatever the underlying rock was doing. As Mark Zoback of Stanford University puts it: "Does the top drive the bottom or the bottom the top?"

Stress measurements in shallower wells down to 3 kilometers had showed that, at least to that depth, the strength of the upper crust increases with depth, supporting Zoback's expectations, but he saw an opportunity for a more convincing test at KTB. With colleagues at the University of Karlsruhe and the KTB project, Zoback measured the stress at the bottom of the hole when it was 6 kilometers deep—halfway through the upper crust—and found that the strength of the rock was still increasing, just as he predicted.

The KTB drillers are hoping that the hole starts defying predictions again as it approaches 8 kilometers. If not, the drilling may end prematurely. The reason: A seismic reflector at about that depth, which Ewald Lüschen and his colleagues at the University of Karlsruhe suspect could be a reservoir of fluids, might spell trouble. If the fluids are voluminous and highly pressurized, the drill rig could find them hard to contain—and the resulting delays might be enough to end the money-strapped project. KTB officials find all this highly speculative, but any sort of problem could fatal. "If all goes well, we will reach 10 kilometers in October of next year," says Kehrer. "If any larger unknown things happen, this could be the end of it." Making one more wish at his deep, deep well, he adds, "We have to have luck from now to the end."

–Richard A. Kerr

PALEOANTHROPOLOGY

'Java Man' Gains (and Loses) a Consort

All fields of science are moving very quickly these days, but in few fields are remarkable claims made and retracted within 2 weeks. But that's just what happened recently in paleoanthropology, where a skull from Java made its scientific debut at a conference in the Netherlands. The skull, its two discoverers claimed, was a female specimen of *Homo erectus*, the immediate ancestor of Homo sapiens. At 1.4 million years old, it could definitively push the timing of African migrations into East Asia by human ancestors back by about half a million years.

Ten days later, after one of the researchers had threatened to withdraw his name from the paper presented at the conference, both authors agreed that the skull was a relative stripling of 500,000 to 700,000 years. And others were doubting that the skull really had the "African" features that had initially made it of such interest.

Yet interest in the skull is still high, for the specimen is more complete than most other fossils from the region. "This has opened a real window for us," physical anthropologist C. Loring Brace of the University of Michigan noted after the latest round in this dating game.

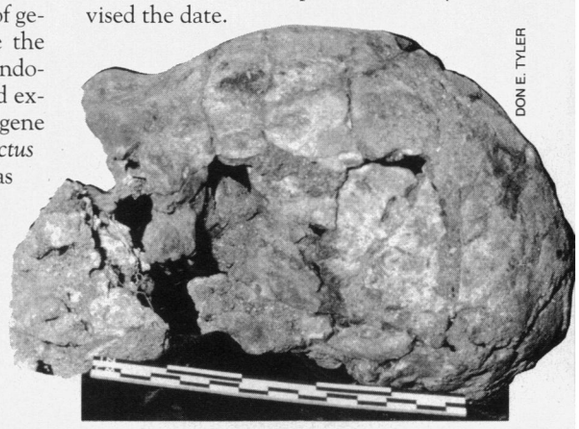
But that's only a pale shadow of the interest that the skull initially aroused because it seemed to throw light on the first migrations of *Homo erectus*. The hominid was moving out of Africa around 1.5 million years ago, according to its fossil trail, yet the oldest *erectus* fossils from East Asia were in the 500,000 to 800,000 range, leaving a sizable gap to be explained.

That was one reason so much excitement arose on 16 May, when peasants found the new skull near the village of Sangiran on Central Java. They alerted Donald Tyler, a physical anthropologist from the University of Idaho, who was nearby conducting an archeological survey with some students of geologist Sastrohamijoyo Sartono of the the Institute of Technology in Bandung, Indonesia. Coincidentally, the skull surfaced exactly 100 years after Dutch physician Eugene Dubois discovered the first *Homo erectus* remains, also in Java, a find known as "Java Man."

The University of Leiden was holding a conference to commemorate Dubois' discovery from 26 June to 1 July, which gave Tyler and Sartono just enough time to write a paper introducing the new find. The paper, presented by Tyler in Leiden, reported that the skull was from a layer "approximately 1.2 to 1.5 million years old". And as it came from the lower part of the layer, Tyler was confident that the skull was about 1.4 million years old.

What is more, said Tyler, the skull showed a marked similarity to two *Homo erectus* specimens from east Lake Turkana in Kenya, which are about 1.6 million years old. The "African" features and the antiquity of the Java skull pointed to an earlier migration of *Homo erectus* to Asia, filling in that large gap.

But a week after the meeting, Sartono, back home in Bandung, faxed organizers in Leiden stating that he wished to withdraw as co-author of the paper. The date of the skull, he insisted, was wrong. The true age of the sediment layer that held the fossil was between 500,000 and 700,000 years. One of his students had misdated the layer, said Sartono. Tyler retorts that Sartono never pointed out the mistake, though he had ample opportunity to do so. Nevertheless, after a round of phone calls, Tyler revised the date.



DON E. TYLER

A woman of a certain age? Anthropologists had trouble dating Java Woman.

The revisionism hasn't stopped there. Brace has doubts about the skull's African morphology. "I'm not sure it does look more African," he says. Tyler, however, still maintains that it does. And if he is correct, then he's created another puzzle for his colleagues: How can a skull so young still have such pronounced African features?

–Felix Eijgenraam

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