allowed Cao and Zhu to claim "the first written account of a complete proof of the Poincaré conjecture and the geometrization conjecture of Thurston."

In June, Bruce Kleiner and John Lott of the University of Michigan, Ann Arbor, released a manuscript that had evolved publicly online since Perelman's visit. Its gradually increasing detail helped cement the community's acceptance of Perelman's work. "They were the main people who carried the torch forward over the last 3 years," says Michael Anderson of Stony Brook University. Finally, last month, John Morgan of Columbia University and Gang Tian of MIT completed a manuscript that will be published as a book. Their work, like Kleiner and Lott's, sticks closely to Perelman's outline.

Perelman's exegetes have played a crucial role in making his work accessible to other researchers, says James Carlson, president of CMI. "Like a program written in open-source code, many eyes will be looking at it," he says. "Instead of having to work out the arguments by themselves, mathematicians will be left with the much easier task of verifying that the worked-out details are correct."

The wait begins

According to CMI's rules, the $1 million for each Millennium Prize can be presented 2 years after the proof is published in a refereed journal. Even though Perelman's own papers have never been formally published, Carlson confirms that the clock is now ticking toward awarding the first prize. "Close to 2 years from now, we will form a committee to study the issue," Carlson says.

Shing-Tung Yau of Harvard University thinks that Hamilton deserves a share. "For 20 years, he worked on this problem alone, with some help from me. The part he proved is absolutely nontrivial, and it was devised purposely to solve this problem," says Yau. At present, however, Yau's seems to be a minority view. "Perelman broke through the barriers," says Robert Greene of the University of California, Los Angeles. "If Perelman's papers didn't exist, I think we would still be stuck. It's the unsticking that counts."

Some mathematicians who know him, however, think Perelman would simply decline the Millennium Prize as well. "When I talked with him at Stony Brook [in 2003], I had the impression that he's not interested in it at all," Anderson says. If Perelman refuses the award, Carlson says, CMI may consider other uses for the $1 million, such as contributing it to Russian mathematics or to the International Mathematics Olympiad, which Perelman won with a perfect score in 1982. **–DANA MACKENZIE**

Dana Mackenzie is a writer in Santa Cruz, California.

PALEOANTHROPOLOGY

Skeptics Seek to Slay the 'Hobbit,' Calling Flores Skeleton a Modern Human

Strange new hominid or just another modern human? That's still an open question for the "hobbit" bones unearthed in Liang Bua cave on the Indonesian island of Flores. Their discoverers described them 2 years ago as a new species, *Homo floresiensis*, but critics have insisted from the start that the leading specimen, a 1-meter-tall, 18,000-year-old skeleton with a brain the size of a grapefruit, was that of a diseased *Homo sapiens*.

Hobbit critic. Teuku Jacob and Etty Indriati argue that the tiny Flores skull (different skull pictured here) is that of a diseased modern human.

This week, the skeptics laid out their most detailed case yet in the *Proceedings of the National Academy of Sciences* (*PNAS*). The paper argues that living people have some of the traits claimed to be unique to *H. floresiensis*, and that the lone skull is simply deformed. "This is not a new species," says co-author Robert Eckhardt of Pennsylvania State University in State College. "This is a developmentally abnormal individual."

But the hobbit's discoverers and others who have also studied the original specimens are unimpressed. "Complete nonsense," snaps Peter Brown of the University of New England in Armidale, Australia, who did the original anatomical analyses. The paper "cherry-picked features and ignored counterevidence," adds Susan Larson of Stony Brook University in New York, who has linked the hobbit shoulder to an ancient human species, *H. erectus* (*Science*, 19 May, p. 983). "Nothing they say has caused me to question my assessment."

The new paper is the first full-length critique in a high-profile journal, and researchers on both sides have long awaited the data in it. The authors include Teuku Jacob of Gadjah Mada University in Yogyakarta, who in a contentious incident borrowed the Flores bones for study in November 2004 (*Science*, 25 March 2005, p. 1848). In 2005, Jacob and others, including Gadjah Mada colleague Etty Indriati, also studied 76 modern Rampasasa pygmies living only a few kilometers from Liang Bua cave.

The team uses several lines of evidence to challenge the hobbit's novelty. One new argument is that a hominid could not have evolved in isolation on Flores because fossils show that elephants reached the island twice, and so humans probably also arrived more than once; lack of isolation would have prevented the evolution of a new dwarf species, they say.

The team further argues that the skull, part of the specimen labeled LB1, is so asymmetrical that it must have suffered from a developmental deformity. Mirror imaging the left side of LB1's skull and putting those halves together creates a distinctly different face than two right halves put together in the same way.

The paper also reports new data showing that some Rampasasa pygmies lack chins and have odd premolar teeth, features identified as distinctive in *H. floresiensis*. The original work on the Liang Bua bones "largely looked for 'otherness'—finding reasons to believe that this population is entirely different from anything that has been seen before," says Indriati. "That simply isn't true." The Rampasasa results are "relevant and revealing," agrees Robert D. Martin of the Field Museum in Chicago, Illinois, who has argued in print that LB1 suffered from microcephaly, a genetic disorder marked by a puny brain.

But other experts are fiercely critical of the *PNAS* paper. "My first reaction was, 'How did this get published? Was there any peer review?' " says brain evolution expert Ralph Holloway of Columbia University. (Eckhardt reports that there were five ▶

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external reviewers, chosen by the team in accordance with *PNAS* guidelines.) Holloway adds that he thinks the brain of LB1 shows "possible pathologies" but not for the reasons cited by Jacob and his co-authors.

Others are ready to rebut each point in the paper. The first elephant colonization was too early to have any bearing on the hobbit debate, says Russell Ciochon of the University of Iowa in Iowa City. And the paper's focus on skull distortion is misplaced, adds Brown, because it happened after death, when the specimen was buried deeply in the cave.

As for the treatment of chins, which relies on a photo of a living Rampasasa, it is "superficial indeed," because one must look at a jaw without its covering of flesh to see whether a chin is present, says Colin Groves of Australian National University in Canberra. (Groves and colleagues compare the hobbit to microcephalics and modern humans, including those from Asia, and conclude in a paper in press in the *Journal of Human Evolution* that it is indeed a new species.) Other details, such as claimed signs of pathology in LB1's leg bones, constitute "a flimsy house of cards," says Bill Jungers of Stony Brook University, who studied the bones last year in Jakarta.

Given these flatly contradictory statements, it's likely to take some time for the field to settle on a coherent view of ancient hobbits. "We have a ways to go before the controversy is resolved," says Indriati. The battle of the shire is far from over.

–ELIZABETH CULOTTA

ARCHAEOLOGY

After 2 Millennia on Ice, a Nomad Resurfaces

BERLIN—Decked in a magnificent fur mantle and gilded wooden headdress, a nomad—probably a fierce warrior—was buried more than 2200 years ago in the icy highlands of Mongolia. This week, a team of archaeologists, led by Hermann Parzinger, director of the German Archaeological Institute in Berlin, announced that they had found his partially mummified remains. The finding will reveal more about the culture and conditions that preserved the body. It is urgent work, observers say, because a warmer environment could destroy specimens like this.

In 2004, the 30-member team from Germany, Russia, and Mongolia surveyed more than a dozen stone-covered burial mounds in northwestern Mongolia. Last year, they returned to the 2600-meter-high plateau in the Altai region, a remote mountain range that borders Russia, China, and Mongolia, with electromagnetic sensors, temperature probes, and other instruments to look for ice layers that might indicate intact burials.

Parzinger has made spectacular finds before. In 2001, he pulled nearly 20 kilograms of artfully worked jewelry out of a similar grave mound in the Russian republic of Tuva. Archaeologists say the Altai plateaus are the burial grounds of the Pazyryk, members of a larger Scythian culture that occupied Central Asia as early as the 9th century B.C.E. and struck fear into the hearts of the ancient Greeks and Persians.

Scythians used a distinctive type of embalming, says Esther Jacobson-Tepfer, an archaeologist and art historian at the University of Oregon, Eugene. "They removed the innards and filled the body with sweet-smelling grasses." High-status individuals were dressed, surrounded by goods, and buried under earth and stone mounds, or kurgans.

Shortly after burial, water sometimes seeped through the stones and froze, forming ice lenses insulated by the stone mounds above and permafrost underneath. The body found this summer was surrounded by slain horses and dressed in felt boots. Fantastical animal tattoos were visible on the man's skin. "Instead of archaeology, the material culture is so well preserved it's almost a kind of ethnography," Parzinger says.

Well preserved. A Scythian buried with fur, felt boots, and horses.

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Parzinger's success comes as the Altai's permafrost is melting fast. "The warming up of the general climate is a danger for these kurgans," Parzinger says. As rising temperatures threaten to bring the mummies out of deep freeze, the Scythian royalty may face decay and disintegration for the first time in millennia.

–ANDREW CURRY

Andrew Curry is a writer in Berlin.

Controls Sought …

AIDS researchers have known for years that a small percentage of people infected with HIV do not show symptoms of the disease, but they have yet to understand why. Now immunologist Bruce Walker of Massachusetts General Hospital in Boston has identified about 100 so-called elite controllers in the Boston area and says that dozens of investigators want to join an international consortium he's organizing to uncover genetic or immunological clues to this group's good health.

Elite controllers—thought to number about 3000 in the United States—by definition show no immune damage and have unusually low levels of the AIDS virus in their blood 1 year after being infected, despite taking no anti-HIV drugs. Walker says a consortium could perform haplotype mapping of the controllers, comparing their genes with those of uninfected people. One key difference encoded within the controllers' DNA, for example, may be high levels of so-called PD-1 receptors; these immune cell surface proteins, Walker's lab reported online 20 August in *Nature*, appear to play a key role in controlling HIV replication.

The proposed effort, for which Walker has received $2.5 million from the Mark and Lisa Schwartz Foundation to launch, "could provide important insights into what's important to intervene with prevention strategies," says virologist Douglas Richman of the University of California, San Diego, who has joined the consortium.

–JON COHEN

… Controls Eased

The U.S. Department of Defense (DOD) has abandoned a controversial proposal that would have required universities to keep a watchful eye on foreign nationals involved in defense research. DOD proposed the rules 13 months ago to prevent the transfer of sensitive technologies to countries seen as security threats. Under the proposal, universities not only had to supplement the normal export licenses for the researchers with new "unique badging requirements" but also with "segregated work areas" for foreigners (*Science*, 22 July 2005, p. 544). Academic lobbyists said that a tougher regime would scare off needed foreign expertise and that existing rules were sufficient.

Now the Pentagon has removed the badging and separate work area requirements, bringing its rules in line with those at the Commerce and State departments. "We're pleased," says Toby Smith of the Association of American Universities of the plan, for which comments will be accepted until 13 October.

–YUDHIJIT BHATTACHARJEE

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