now under way, processes will be in place to correct any problems by 23 April. "I suspect the total suspension may not be lifted at that time," predicted Feussner, but he said that by then it may be limited to human studies.

–JON COHEN

EXPERT WITNESSES

Court Views Engineers As Scientists

When engineers seek to testify in court as expert witnesses, judges should hold them to the same standards as scientists, the U.S. Supreme Court ruled last week. The 23 March decision, in a case called *Kumho* v. *Carmichael*, says judges may disallow testimony from engineers that doesn't meet broad scientific standards for reliability. The ruling was applauded by the National Academy of Engineering (NAE) and other organizations that had submitted briefs urging the high court to recognize the scientific basis of engineering. However, legal experts say that it leaves plenty of leeway—and uncertainty—in judging the validity of expert testimony in fields, including clinical medicine and forensics, that often rely on experience rather than scientific practices such as publication and peer review.

> **"[The ruling] should reinforce the obligation of trial judges to serve as gatekeepers."**
>
> **—Richard Meserve**

"I feel good about this decision," says William Wulf, president of NAE, which had argued that although engineering differs from science in trying to modify rather than understand nature, its methods are no less scientific. Adds attorney Richard Meserve, a former physicist who prepared the NAE brief, "It should reinforce the obligation of trial judges to serve as gatekeepers, to look at the background of the expert witnesses and examine how they arrived at their conclusions."

The gatekeeper role was spelled out in a 1993 case, *Daubert* v. *Merrell Dow Pharmaceuticals*, in which the Supreme Court proposed four factors that judges could weigh in deciding whether expert-witness testimony from scientists was relevant and reliable. The court suggested that judges should consider the testability, error rate, and degree of acceptance in the community of the analysis, including whether results had been peer reviewed and published (*Science*, 2 July 1993, p. 22).

The current case (97-1709) began with a suit filed by the Carmichael family of Alabama against Kumho Tire Co. after a blowout in 1993 caused an accident that killed one of their children. The plaintiff's case rested on testimony from a mechanical engineer and tire analyst, Dennis Carlson Jr., who said the blowout resulted from a defect in the tire's design or manufacture rather than from wear or improper care and use. The lower court excluded his testimony, submitted in a deposition, saying the analysis was scientifically flawed. An appellate court reversed the decision, ruling that Carlson's testimony was based on his experience rather than scientific analyses and was therefore not covered under *Daubert*. The company appealed to the high court, which heard the case in December.

Last week's decision, written by Justice Stephen Breyer, reverses the appellate court and extends *Daubert* to engineering. But legal experts say that it still gives judges great discretion to accept or reject expert testimony. "It does not knock out experience [as a basis for expert knowledge], but it emphasizes reliability and relevance," says Margaret Berger of the Brooklyn (NY) Law School. "I suspect that the way it's applied will vary from circuit to circuit."

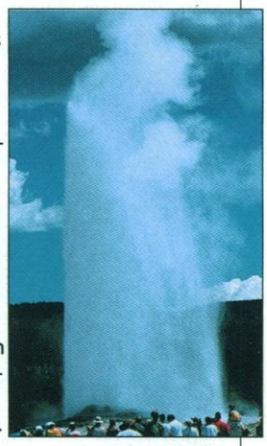
That variability worries some scholars. "When Justice [Harry] Blackmun wrote the *Daubert* decision, he was clearly thinking of what it is that scientists do," says law professor Michael Green of the University of Iowa, Iowa City. "But what about accident reconstructionists? They wouldn't think of publishing their work in a journal or having it peer reviewed. What Breyer did is invite trial judges to look carefully at an expert's methods and reasoning and to throw it out if it's flawed. But what's acceptable to one judge may be unacceptable to another judge. And uncertainty means more litigation."

Meserve and others disagree. "I think the ruling sends a message to judges that [weighing expert witnesses] is an important job that they must take seriously," he says. Berger says she's "amazed" at the detailed discussion of tire composition and tread wear in Breyer's decision and speculates that he may have wanted to show trial judges how to approach such questions. Meserve also hopes the decision may weed out frivolous suits by raising the stakes for plaintiffs' lawyers and experts themselves. "After *Kumho*," he says, "they ought to be embarrassed if a judge finds their testimony not acceptable."

–JEFFREY MERVIS

ScienceScope

Delayed ... or Dead? A federal judge has ruled that the National Park Service must complete an environmental review before it can move ahead with a controversial bioprospecting contract. Government analysts say the ruling is a temporary setback for the precedent-setting deal, which allows Diversa, a San Diego biotechnology firm, to harvest plants and microbes from the park's hot springs in exchange for a $175,000 payment and royalties on any products it develops (*Science*, 13 March 1998, p. 1624). But one plaintiff's attorney believes the decision—handed down last week by Judge Royce Lamberth of the U.S. District Court in Washington, D.C.—is a death knell for any arrangement of this kind because Lamberth cast doubt on the government's claim that parks are "outdoor laboratories" available for commercial research. A coalition of nonprofits will soon be back in court seeking to ban such deals outright, promises Andrew Kimbrell of the Washington-based International Center for Technology Assessment. Unless Congress changes the law, he asserts, federal parks should remain off limits to profit-driven bioprospectors.



All Too Human Indian scientists hope emerging guidelines for research on human subjects will help reduce the risk of ethical problems. Jarred by the realization that the government regulates studies using animals more heavily than those involving people, the Indian Council of Medical Research (ICMR) last year began a review of 20-year-old human research guidelines that women's groups and others say need to be updated.

Last week in New Delhi, the council completed a quartet of public meetings on a 100-page draft of the new guidelines, which tackle everything from transplant rules to the thorny problem of obtaining informed consent from subjects in a country where illiteracy is widespread. Finalizing new "clear-cut and mandatory guidelines" would help researchers avoid trouble, says Kamal Hazari of Mumbai's Institute of Research in Reproduction. But guidance alone may not be enough, some researchers say. New national legislation that imposes penalties on violators may be needed to put some teeth into the guidelines, which the ICMR hopes to finalize this summer.

CREDITS: (TOP) DANIEL D. LAMOREUX/VISUALS UNLIMITED; (BOTTOM) RICK BRADY/UNIPHOTO

de Sciences, published by the French Academy of Sciences, comes not from his group but from geneticist Laurent Pouyaud of the French Institute for Development Research (IRD) in Jakarta and colleagues at the Indonesian Institute of Sciences (LIPI) in Cibinong. Erdmann calls the preemptive strike a "dishonorable act of scientific piracy"; Pouyaud says it was aboveboard.

Erdmann, who studies shrimps, was no expert in coelacanths when he moved to Indonesia in 1991. But he is an expert now. After spotting the fish, Erdmann spent the next 10 months interviewing fishers, monitoring catches, and gathering temperature and depth data from fishing sites in an attempt to track down another specimen. He finally succeeded in July 1998 and last September published a report in *Nature* describing the find.

After taking some tissue samples, Erdmann donated the fish to LIPI. But he claims that in an oral "gentleman's agreement" LIPI had agreed that a team led by David Hillis of the University of Texas (UT), Austin, to whom Erdmann had provided samples, would be the first to publish an analysis of the fish's DNA, after which the LIPI scientists could name the new species—if that's what the Indonesian coelacanth turned out to be. Shortly thereafter, LIPI scientists got Pouyaud, who is advising the Indonesian government on aquaculture, to help them with their own analysis. Pouyaud submitted a report to *Nature* last January, just days after the UT group's analysis arrived at the journal (where it is still under review). In February *Nature* rejected the paper from Pouyaud, who then offered a revised version to the *Contes Rendus*, which published it a month later.

New species? Scientists are embroiled in a dispute over the Indonesian coelacanth.

Based on an analysis of two swatches of mitochondrial DNA, which is thought to accrue mutations at a regular pace and thus can be used to time how long two populations have been evolving separately, Pouyaud and his group report that the Indonesian coelacanths diverged from their African cousin, *Latimeria chalumnae*, between 1.2 million and 1.5 million years ago. The genetic and morphological distinctions between the two populations are great enough to merit classifying the Indonesian coelacanth as a new species, they conclude, naming it *L. menadoensis*, after the volcanic island, Manado Tua, where the fish was found. "We have not only found a new population of coelacanths but a new species," Pouyaud told *The London Sunday Times* on 28 March. In a commentary accompanying the *Contes Rendus* report, evolutionary biologist Claude Combes of the University of Perpignan in France agrees that the Indonesian specimen falls "outside the range of measures ... of the Comorian specimens." The naming of a new species "appears justified," he writes.

The Hillis team doesn't go that far. From their analysis of mitochondrial DNA they conclude that the two coelacanth populations began diverging earlier, around 5 million to 7 million years ago. "We think it is a new species," says UC Berkeley's Roy L. Caldwell, a co-author. However, he adds, "we did not name it. ... We feel it's premature to name a new species based on one specimen."

But the fine points of speciation aren't the issue here. "We were unaware there was any other study going on," says Hillis. "The whole publication process apparently involved stealth and subterfuge." LIPI scientists could not be reached for comment. But Erdmann says several LIPI co-authors of the paper told him that "Pouyaud went ahead without their consent." He adds that he would not have complained if the Indonesians had named the fish. But he is outraged that Pouyaud stands to get the lion's share of credit. "All this guy did was stick some meat in a sequencer," Erdmann says. According to Susan Jewett, an ichthyologist at the Smithsonian Institution in Washington, D.C., "for somebody to move in on such a high-profile thing, where everybody knew who all the key players were, is highly unethical."

Pouyaud calls Erdmann's distress sour grapes. "Two scientific research teams were competing," he told *Science*. "At the end, little David beat Goliath." He adds that his group's *Nature* submission contained only the genetic analysis. Senior French scientists, he says, "urged us ... to name the species" in the paper for *Contes Rendus*. Pouyaud's employer is squarely behind him. "We know nothing about any agreement between Dr. Erdmann and the rightful owners of the specimen" at LIPI, says IRD's Patrice Cayre. "LIPI has every right to do whatever it wants with the specimen."

–CONSTANCE HOLDEN

CREDITS: (TOP) SAM KITTNER; (BOTTOM) LAURENT POUYAUD

ScienceScope

Cold War Antidote Russian Prime Minister Evgeny Primakov boycotted a biannual rap session with Vice President Al Gore last week to protest the NATO bombing of Yugoslavia, but his absence didn't stop officials from the two countries from finalizing an agreement to exempt joint research from Russian taxes.

Tithes on scientific equipment imported to Russia have riled both sides. "Once in awhile supplies are confiscated and held for ransom," says a U.S. participant in last week's Gore-Primakov Commission meeting. The border troubles delay projects and force Russian scientists to pay duties or bribes. The new agreement—in principle—should eliminate the problem.

Also laid at the meeting were tentative plans to expand cooperation on emerging disease surveillance, supercomputer research, and high-energy physics. However, a U.S. overture for more bilateral Arctic research got a chilly reception.

No Contest Scientists opposing a controversial data-access proposal appear to be headed for a lopsided win in an unusual skirmish—even as their opponents are raffling off prizes to gain allies.

Acting on legislation pushed by Senator Richard Shelby (R–AL), the White House Office of Management and Budget (OMB) in January released a controversial proposal to require taxpayer-funded researchers to hand over their raw data to anyone who files a request (*Science*, 12 February, p. 914). The agency gave the public until 5 April to comment, sparking a furious letter-writing campaign both for and against the proposal. Last month, rule opponents—including most scientific societies—were alarmed to discover that the other side was ahead in the comment contest, in part because it was offering a creative incentive: People who used the Junk Science Web page (www.junkscience.com) to write to OMB could win a subscription to an environmental policy newsletter or the electronic *Wall Street Journal*. But the tide has turned in the last few weeks: The 1600-and-counting comments OMB has received so far are running 4 to 1 against the rule, says the Washington-based American Association of Universities. Whether the landslide will persuade OMB to rewrite the proposal, however, won't be known until later this year, when it must finalize the rule.

amplified; the powder had become a laser. "You are actually getting stimulated emission," says team member Eric Seelig. "Light travels in those loops, and each of these closed loops forms a cavity."

Righini says it's the first time researchers have demonstrated that laser amplification can take place in a powder. "The paper is rather convincing," he says, predicting "this research will trigger more experiments." One way to exploit the phenomenon, says Cao, might be to shrink the phosphor grains that emit light in flat-panel field-emission displays. In these displays, each pixel consists of a tiny electron emitter placed in front of a tiny screen. The electron emitter, says Cao, excites the atoms of the phosphor; in small enough grains, it might spark laser amplification and brighten the pixels. "We are working on that," she says.

Bright rings. Light scatters into closed loops—potential laser amplifiers—in a thin film of zinc oxide.

CREDITS: (TOP) INGA SPENCE/VISUALS UNLIMITED; (BOTTOM) SEELIG *ET AL., APPLIED PHYSICS LETTERS* 73, P. 3656 (1999)

–ALEXANDER HELLEMANS

Alexander Hellemans is a writer in Naples, Italy.

DENMARK

University Cash Crisis Blocks Career Paths

COPENHAGEN—A bitter row has broken out at the University of Copenhagen, which has been forced to cut its scientific staff to close a yawning budget gap. The university science department decided in January that, instead of assessing who were its least productive researchers and firing them, it would simply not fill any junior tenured positions that became vacant—in effect blocking the career path of young tenure-track researchers. As the consequences of that policy have begun to bite, aspiring young scientists say they now have little prospect of advancement and a whole generation of young researchers will either have to leave academic science or pursue a career abroad. "There is an atmosphere of hopelessness among students and postdocs whose possibilities for embarking on an academic career at the university now seem extremely limited," says plant molecular biologist Lars Østergaard, a postdoctoral fellow.

The crisis was precipitated late last year when the Danish government cut overall funding to Denmark's five universities. The science department at Copenhagen—the country's largest—was hit especially hard because it was already running a budget deficit. Forced to cut 15% of the tenured science positions—which translates into 70 people—the administration eliminated about 12 posts by offering early retirement to older faculty members and will cut the rest over time by not filling junior positions. "[It's] outrageous to prevent the necessary staff renewal and infusion of new ideas by forcing out young, talented, tenure-track scientists," says molecular biologist Olaf Nielsen, an associate professor.

The new policy is likely to exacerbate a simmering age problem in Danish universities. During the 1960s and '70s, the university system expanded rapidly and a large number of tenured positions were created. That generation of scientists is now approaching retirement age. "There will be an acute need for replacements when 30% to 40% of the currently tenured staff retire in 5 to 10 years," says associate professor of zoology Peter Arctander. "But because of what is happening now, there will be a lack of qualified young scientists."

Dean of science Henrik Jeppesen defends the policy. Although "it is sad that a number of young researchers have to leave," he says, "it would have created a very bad atmosphere to fire faculty members who have worked here for many years." This view is supported by university president Kjeld Møllgaard, who says it would be "an unfair personnel policy to simply get rid of the least productive as if it were a horse race." Jeppesen and Møllgaard both acknowledge, however, that the reaction of Denmark's powerful unions was a

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ScienceScope

2010 or Bust With researchers expected to finish sequencing the *Arabidopsis* genome sometime next year, the National Science Foundation (NSF) is already contemplating a more challenging goal for the next decade—understanding the function of every one of the plant's 20,000 to 25,000 genes.

Extracting that information could lead to improved yields for crops and other commercially important plants. But it will cost "at least as much" as NSF's existing plant genome project, currently $50 million a year, says Mary Clutter, the agency's biology chief. And a report due out soon from an NSF-funded workshop held last fall concludes that it will take a decade of research and training to do the job right.

Officials previewed the idea last week before the National Science Board, NSF's oversight body. They have dubbed the effort Project 2010 in preliminary talks on next year's budget request. Says Clutter: "This is something we definitely want to do. The only question is when."

Data Dump A new initiative may soon allow academics to sift through mountains of data collected by Canada's statistics agency. Currently, only employees of Statistics Canada have access to the trove of confidential surveys that the agency conducts in areas like health and education. To share this statistical wealth with university scientists and data-hungry policy-makers, the agency and Canada's Social Sciences and Humanities Research Council want the government to spend up to $10 million a year to set up 10 centers where specially designated researchers could crunch the numbers.

The proposed Social Statistics Research System would give $230,000 annually to interdisciplinary teams to produce reports on everything from health care to immigration. Such quantitative studies could help Canada "restructure our social policy," says J. Douglas Willms of the University of New Brunswick's Atlantic Centre for Policy Research. Before the keys to the data kingdom are handed out, however, the government must approve a funding plan, which will be submitted formally this fall.

Contributors: David Malakoff, Pallava Bagla, Richard Stone, Jeffrey Mervis, Wayne Kondro