"He wasn't there, and these are guesstimates at best."

Others, while accepting the Coon Creek study, caution against extrapolating the numbers too far. "I could not support that as a national average," says Marty Bender, a research associate at the Land Institute in Salina, Kansas. "I think it helps confirm, in an indirect manner, that soil erosion has been decreasing to some extent." "I think [this] is probably a really good study," says John Reganold, a soil scientist at Washington State University in Pullman. "But the problem is, it's just one area." In the wheat-farming Palouse area of the Pacific Northwest, Reganold points out, the soil and climate are not only entirely different, but farmers have been much slower to adopt conservation practices on their fields.

Trimble acknowledges that the comparison probably works only for the humid Midwest and eastern United States, and concedes that even in those regions there are probably exceptions where poor farming practices or higher intrinsic erodability come into play. And a second major conclusion from the study suggests that some of the benefits of slower erosion may be slow in coming. Trimble found that no matter what happens to erosion rates, the basin tends to store and release sediment in such a way that the amount delivered to the Mississippi River remains roughly constant over the decades. Sediment eroded from upland areas is in effect stored around Coon Creek tributaries and other geographic features and released later. Trimble mapped out in detail, for example, how the cutbanks and floodplains around the oxbows of the tributaries could change in shape and size over time and be transformed from sediment sources to sinks and back again.

The constancy "is a big surprise," says Olav Slaymaker, president of the International Association of Geomorphologists, who is at the University of British Columbia in Vancouver. And it could have major implications for controlling off-site damage by sediments and the pollutants that cling to them, says M. Gordon Wolman of the department of geography and environmental engineering at Johns Hopkins University. "It means that if I control the materials coming off a field or group of fields," says Wolman, "it may be some time before I see the results of that—if I do within decades." From a policy standpoint, he says, "this could be, to some people, very disturbing." Environmentalists will long be debating the significance of that finding.

Whatever the outcome of that debate, Slaymaker says that the scientific significance of the new study is clear: "It's the most comprehensive study of its kind anywhere in the world." —JAMES GLANZ

MISCONDUCT

Fraud Finding Triggers Payback Demand

Officials at Lawrence Berkeley National Laboratory (LBNL) in California thought they were setting a positive example when they exposed allegedly fraudulent research conducted by one of their scientists on the effect of electromagnetic fields (EMFs) on living cells. Now they feel they are being punished for their forthrightness: The National Cancer Institute (NCI) has demanded that the lab repay more than $800,000 in grant money that was awarded to the researcher.

"We think that to require us to pay back the money would set a very dangerous precedent," says LBNL spokesperson Ron Kolb. "It discourages institutions from behaving responsibly." But Marvin Kalt, director of NCI's Division of Extramural Activities, argues that the agency is only doing its job: "We're obligated to review whether we should recover" misused funds. Indeed, LBNL is not the first institution that funding agencies have dunned for repayment after a misconduct finding, although such cases seem to be relatively rare.

The accused biologist, Robert P. Liburdy, published a pair of papers in 1992 that appeared to provide evidence that EMFs at the low strengths found in homes could have a physiological effect on cells by increasing the influx of calcium. His findings were taken as support for the hypothesis that EMFs could cause cancer. But a co-worker questioned the work, and in 1995, after a yearlong investigation, LBNL concluded that Liburdy had deliberately published fraudulent findings. The federal Office of Research Integrity (ORI) agreed in June that Liburdy's data did not support the claims in his papers (*Science*, 2 July, p. 23). Liburdy has denied wrongdoing (*Science*, 16 July, p. 337).

ORI's conclusions apparently triggered NCI's demand that the lab return $804,000 in grants for Liburdy's research from 1991 until March 1994. The letter from NCI, dated 3 August 1999, says that "the rationale for this decision is that the misconduct that occurred affected the validity of the entire grant project." All costs incurred by Liburdy "are unallowable," the letter says, because the funds "were expended to support falsified research or obtained on the basis of falsified research."

The NCI demand has angered Mina Bissell, chair of the LBNL Life Sciences Division in which Liburdy worked. Bissell notes that the lab is returning the unspent portion of the funds, but to demand repayment of money that has been spent, she says, is punitive. "We have shown a lot of courage, more than most universities," says Bissell of LBNL's handling of the case. "We did all the right

ScienceScope

Freedom! Pledging to work in "a legal way," South Korean mathematician and political activist Ahn Jae-Ku is savoring his release after 5 years of solitary confinement in Taegu prison (*Science*, 30 July, p. 649). The 65-year-old former professor at Kyoungbuk University was convicted in 1994 of violating the country's notorious National Security Law after forming a discussion group that allegedly was helping North Korea. He was also jailed in the 1980s for criticizing the then-military government.

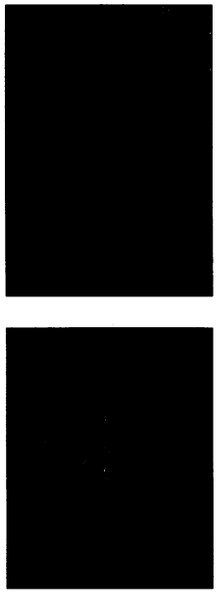
Ahn was pardoned with 1742 other prisoners as part of the country's annual Liberation Day on 15 August. He says he won't return to his work on differential geometry because it would take him too long to catch up with new developments after being denied scientific literature in prison. But he plans to continue talking with like-minded people on issues of national reunification and says that he is looking forward "to another chance to work for Korean society." He also expressed his gratitude to the scientific and human rights groups around the world who lobbied Korean President Kim Dae Jung for his release.

Data Rule, Round Two Scientific groups seem to be pleased with the White House's latest version of a proposal that would require researchers to give the public access to raw data that federal agencies use to develop regulations. This second attempt (www.whitehouse.gov/OMB/fedreg/2ndnotice-a110.html) is similar to but more detailed than a July draft (*Science*, 23 July, p. 511), defining data in a way that rules out, for instance, public access to lab samples. It also says the rule applies only to studies published in a "scientific or technical" journal or cited in a regulation.

But even this proposal may not be the final word. Louis Renjel of the U.S. Chamber of Commerce says his group is unhappy that researchers—and not just government officials—could withhold information that they think threatens privacy, and that the law would apply only to regulations with an economic impact of at least $100 million. "Completely unacceptable," Renjel says about the new version, which is open for comments until 10 September. To counter the critics, George Leventhal of the Association of American Universities says it's "very important that the academic community weigh in" on the proposal. The final rule is expected to be out by 1 October.

widely used lab strain—designated CD-1—essentially unperturbed.

The findings raise concern about whether current animal tests adequately gauge the human health risks that hormone mimics may pose. The new findings "may have significant implications," says reproductive biologist Earl Gray of the Environmental Protection Agency's (EPA's) health effects lab at Research Triangle Park, North Carolina. CD-1 has been the mouse of choice, he says, for studying hormone mimics. If CD-1 mice prove insensitive to such compounds, adds reproductive biologist Frederick vom Saal of the University of Missouri, Columbia, then "these are the last animals you'd want to use" for testing. Researchers caution, however, that they have not yet determined whether the animals show the same range of sensitivity to hormonelike chemicals as they do to the real McCoy.



Impervious to estrogen. Sperm flourish at center of tubule in testis of CD-1 mice *(bottom)*, but not in other strains *(top)*.

Jimmy Spearow, a reproductive geneticist at the University of California, Davis, says he first uncovered strain-to-strain differences in hormone sensitivity in the late 1980s. Then a few years ago, he got a surprise when reading papers on the physiological effects of hormonelike chemicals in mice. "I said, 'Oh my God, they're using the most resistant strains!' " Spearow recalls. To probe further, he and colleagues implanted estrogen plugs under the skin of juvenile male mice from four strains. The capsules released doses of 17β-estradiol ranging from 0.2 to 2.0 micrograms per gram of body weight for 3 weeks.

At the lowest dose, mice from the most sensitive strain, B6, developed testes that weighed 60% less than those of control animals. In CD-1 mice, however, the same dose reduced average testis weight by just 10%. Similarly, the numbers of maturing sperm dropped precipitously at the lowest doses in sensitive strains. CD-1 mice implanted with twice the amount of estrogen necessary to stop sperm production in other strains still produced roughly 90% of normal levels of maturing sperm. Overall, the researchers report, other strains are about 16 times more sensitive to estrogen than CD-1 mice.

The findings are intriguing in part because CD-1 mice have been bred to produce large litters. Spearow speculates that the physiological factors responsible for fruitful parenthood have rendered the mice relatively impervious to outside estrogens. Indeed, after breeding two strains—S15/Jls and C17/Jls—over some 70 generations, the one Spearow selected for large litter size, S15/Jls, was less sensitive to estrogen than was the other strain. "It's a biologically plausible hypothesis," says Gray, who thinks breeding for litter size "is certainly going to affect the reproductive system somewhere."

The new data suggest to vom Saal at least that "the risk assessment process substantially underestimates variability in animal populations." Wild variation could undermine the fudge factor built into animal tests to protect human health: When setting safe exposure levels for people, researchers take the dose found to be safe in lab animals and divide it by a factor of 10—to account for variability from person to person—before setting a permissible exposure level. But the gulf between CD-1 and the most estrogen-sensitive strains is so great, vom Saal says, that it overwhelms the safety factor. "If mice have a substantial potential [genetic] variation in response to estrogen," he asks, "why shouldn't one assume an equal amount of variability in response to hormones in humans?"

Regulatory agencies plan to take no chances. The EPA is now standardizing a test battery and screening procedures that its labs, starting in about 2 years, by law must use to evaluate tens of thousands of chemicals for hormonelike activity. Says Gary Timm, senior technical adviser in EPA's office of science coordination and policy, "Certainly we're interested in using the most sensitive species or strains." –LAURA HELMUTH

CREDITS: (LEFT PAIR) SPEAROW *ET AL.*; (RIGHT) K. OSF RINGLAND/ANIMALS, ANIMALS

ASTRONOMY

A World With Two Suns

Buried in the unusual twinkling of a star near the center of our galaxy, an international team of astronomers has uncovered the first evidence of a planet orbiting two stars at once. If other observers can confirm it, the Jupiter-sized planet will be more than an astronomical novelty. Its detection, which the Microlensing Planet Search collaboration describes in a paper posted on the e-print server at Los Alamos National Laboratory (xxx.lanl.gov/abs/astro-ph/9908038), will become a triumph for a new and potentially powerful technique for finding planets around other stars.

Extrasolar planets are too dim to be seen directly. The several dozen detected so far have betrayed themselves by tugging their

ScienceScope

Mongrel Salmon? Salmon genes are back in the spotlight. Two conservation groups last week filed suit in Washington, D.C., to force the federal government to list Maine's few remaining Atlantic salmon as endangered, charging that a 2-year-old voluntary plan to protect the fish doesn't go far enough. Less than 100 salmon returned to seven Maine rivers last year to spawn, down from at least 20,000 a century ago.

The suit—which joins similar complaints filed earlier by other groups—could force a replay of a scientific tussle. In 1997, federal officials declined to list the Maine fish, in part because genetic studies suggested that they were not "distinct" enough from nearby Canadian runs to merit protection under the Endangered Species Act (*Science*, 6 February 1998, p. 800). State officials—who fear listing could force restrictions on timber harvesting and farming—insist the fish are mongrels produced by inbreeding with stocked fish and don't deserve listing.

But new studies "undermine the state's position," says Steve Moyer of Trout Unlimited in Washington, D.C., which is suing along with the Atlantic Salmon Federation. Salmon science is expected to go on trial this fall.

Compelling Enough? Scientists have come up with 10 reasons for restarting the Fast Flux Test Facility, which has been idle since 1993 (*Science*, 4 April 1997, p. 28). But politicians hope the arguments won't sway Energy Secretary Bill Richardson, who must decide by next month whether to spend as much as $400 million to bring the nuclear research reactor back to life.

Earlier this month, a DOE advisory panel said the Hanford, Washington, facility—part of Pacific Northwest National Lab—had 10 potential uses, including fusion and materials research, and urged Richardson to begin an environmental study of its restart. But opponents, including lawmakers from nearby Oregon, are concerned that it might add to Hanford's serious environmental problems. Heartened by Richardson's rejection last year of a plan to use the reactor to produce tritium gas for nuclear weapons, they now hope "he kills it once and for all," says an aide to one Oregon senator.

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