"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.

things. What message does this [demand] send to other institutions?"

Officials respond that the National Institutes of Health, of which NCI is part, states in its grant policy that awards may have to be returned if they're misspent. Kalt adds that NCI has previously recovered research grants in "a small number of [misconduct] cases"—although they are the exception. Although ORI doesn't track recovered grants, Lawrence Rhoades, director of ORI's Division of Policy and Education, says he's aware of only a few cases among the 100 or so misconduct findings by ORI since 1992. "Figuring out how much money the government should get back is not always easy to do," explains Rhoades. Often the scientist found guilty played a small role in a study, or the overall conclusions are still valid.

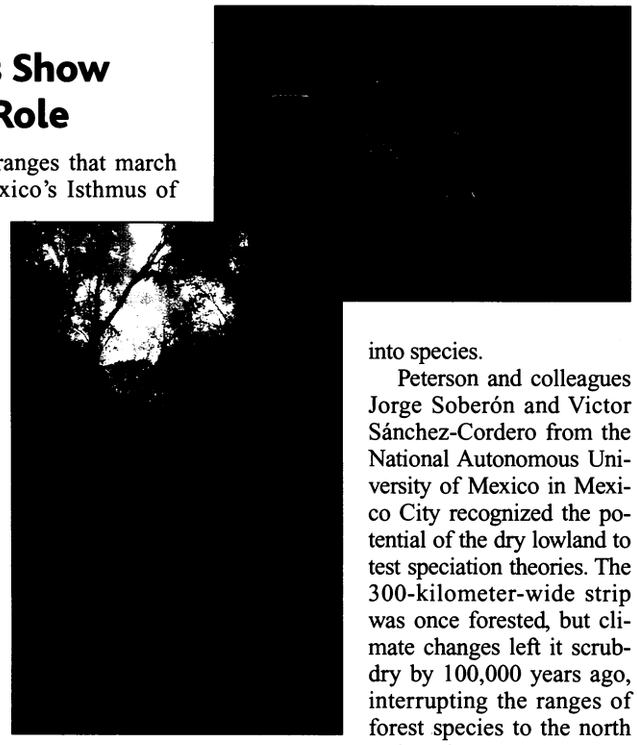
To Bissell this inconsistency adds to the unfairness of NCI's demand. The NCI letter gives LBNL 30 days to either pay or appeal the decision. Kolb says the lab plans to appeal.

–MARCIA BARINAGA AND JOCELYN KAISER

SPECIATION

## Mexican Pairs Show Geography's Role

The forested mountain ranges that march across each side of Mexico's Isthmus of Tehuantepec are a naturalist's paradise, full of rare birds, mammals, and butterflies. They are a playground for evolutionary biologists too, because these nearly identical habitats were separated relatively recently, when climate change created an arid strip between them. Now, researchers who examined pairs of species on either side of the lowland report on page 1265 that they have new evidence that such geographic barriers are the major force driving the formation of new species.



**Where species are born.** This hummingbird and many other species arose in the cloud forests of the Isthmus of Tehuantepec.

Biologists since Darwin have analyzed—and argued about—how species are born. Recently researchers have looked favorably on a version of Darwin's own idea: that populations of a single species can separate when they change their ecology, adapting to different temperatures, food resources, or other environmental conditions (*Science*, 25 June, p. 2106). But after examining 37 pairs of closely related species, one from each side of the arid Tehuantepec barrier, a team led by ornithologist A. Townsend Peterson of the Natural History Museum of the University of Kansas, Lawrence, found that members of each pair had similar ecological niches. In every case it appears that the geographic barrier, rather than any difference in ecology, was the critical factor in speciation, isolating the original populations so that they accumulated genetic differences and eventually became unable to interbreed, says Peterson. "Speciation is taking place simply because of geographic isolation," not through ecological adaptation, he says.

The idea of geographical speciation is well understood, but unambiguous examples are rare. "Showing it the way they did ... is pretty clever," says Robert Zink, curator of birds at the Bell Museum in St. Paul, Minnesota. Even so, he and others warn against dismissing the role of ecology in speciation, because the method needs refinement and there are counterexamples in which ecological differences have driven populations apart into species.

Peterson and colleagues Jorge Soberón and Victor Sánchez-Cordero from the National Autonomous University of Mexico in Mexico City recognized the potential of the dry lowland to test speciation theories. The 300-kilometer-wide strip was once forested, but climate changes left it scrub-dry by 100,000 years ago, interrupting the ranges of forest species to the north and south.

To carry out their test, the team used published literature to identify 37 pairs of sister species on either side of the isthmus and searched museum records to find out where specimens of each species were collected. They used these location data to define each species' ecological niche based on four conditions: temperature, precipitation, elevation, and vegetation. They then plugged these parameters into a computer program to determine the potential geographic range of each species.

Peterson tested whether the observed ecological niche of one species could predict the niche and range of its sister. For all 37 species pairs, the answer was yes. For instance, the ecological parameters favored by a blue mockingbird also predicted the range of its counterpart south of the barrier, a blue-and-white mockingbird. This means that each species' niche remained stable throughout the speciation process. Such conservatism makes it "pretty clear that speciation did not take place in an ecological dimension," says Peterson.

The work offers "an intriguing contribution" to the speciation debate, says biologist Thomas Lovejoy of the Smithsonian Institution. However, Trevor Price, an ornithologist at the University of California, San Diego, says he and others don't doubt that geography can create new species; what they want to know is when and how ecology plays a role, too. "We are now asking what is the role of ecology over and above geographic isolation," he says. And he thinks Peterson's study may have overlooked some complexities. An ecological niche is much more than just four physical parameters, he notes. Herpetologist David Wake of the Museum of Vertebrate Zoology in Berkeley, California, adds that the literature identifying species as sisters may or may not be accurate, nor is it certain that all of the supposed sisters were born when the barrier appeared.

Nonetheless, Wake and other researchers agree that Peterson's method of predicting geographic ranges from ecological data holds great promise. Peterson is now improving his method to incorporate dozens of ecological parameters and applying it to predict the potential distribution of invasive species. "If their analysis holds ... they'll have the ability to predict where species will and won't occur as habitat changes," says Zink. "[They could] forecast the fate of species"—a valuable power indeed.

–BERNICE WUETHRICH

Bernice Wuethrich is an exhibit writer at the Smithsonian's National Museum of Natural History in Washington, D.C.

ANIMAL TESTING

## One Mouse's Meat Is Another One's Poison

Just as government labs are gearing up for a major campaign to ferret out industrial chemicals and pollutants that mimic sex hormones, scientists have discovered that some of their favorite test subjects—lab mice—vary greatly from strain to strain in their sensitivity to the hormone estrogen. According to a report on page 1259, estrogen injected into young male mice sharply curtails testis growth and sperm production in some strains, while leaving a

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