

along with possible scientific misconduct on the part of Gallo.

A Dingell staffer says that the congressional report "is more necessary than ever," now that ORI has dropped its case. The Inspector General of HHS has also been investigating allegedly false statements made by Gallo and others in documents supporting the patent application for the virus.

At ORI, morale has plummeted as investigators confront the loss of a case that has taken more than a year to assemble. "It's

certainly a setback for this office," says ORI director Lyle Bivens, "but it doesn't put us back to square one." He points out that 13 of the 22 cases in which the office has concluded misconduct since its formation 18 months ago were not appealed, and that in three of the nine remaining cases the accused scientists abandoned their defense before the appeals board hearing. "The ones where we have really strong evidence don't get contested," Bivens says.

ORI hopes to improve its chances of

success next year by changing the rules to allow the introduction of evidence purporting to show patterns of behavior that are not explicitly misconduct. Such evidence would help it to prove intent. It also wants to add one or more scientists to the appeals board, now made up of three lawyers. But ORI doesn't intend to give up altogether on the court-like hearings process. Scientific misconduct cases "are so adversarial that you're driven to a legalistic model," Bivens says.

—Christopher Anderson

RESEARCH ETHICS

Survey Tracks Misconduct, to an Extent

Those who study scientific misconduct face a daunting obstacle: Nobody knows exactly how much of it there is. Critics claim that recent, high-profile cases are just the tip of a misconduct iceberg that pervades academia, while defenders of the scientific enterprise say such cases are the exception, and the enterprise is sound. So a comprehensive study on the issue is likely to attract a lot of attention. That's what happened last week, when researchers at the Acadia Institute in Bar Harbor, Maine, announced results of a survey of 4000 faculty and graduate students at 99 U.S. academic institutions. But some experts in the field say that, as an attempt to get at the question of how prevalent scientific misconduct is, the study's conclusions may not mean anything at all.

Writing in this month's *American Scientist*, social scientist Judith Swazey and her colleagues say that 9% of the 2600 students and faculty who responded to a questionnaire reported having "direct knowledge" of faculty who have plagiarized, and 6% of faculty respondents said they knew of another faculty member who had falsified data. From those numbers, the authors infer that incidents of serious misconduct are "not rare." As for questionable research practices in general, 44% of the students and 50% of faculty in four disciplines—microbiology, chemistry, civil engineering, and sociology—say they had observed or had direct evidence of incidents of two or more types. In addition to falsification of data and plagiarism, these practices include inappropriate assignment of authorship credit, overlooking others' use of flawed data, use of university resources for inappropriate purposes, sexual harassment, racial discrimination, misuse of research funds, ignoring animal care, human subject and biosafety regulations, and financial conflict of interest. Civil engineering fac-

ulty reported the highest observed rates of data falsification and plagiarism in their colleagues: 10% and 18%, respectively.

Case closed? Not quite. For one thing, the survey does not attempt to measure actual misconduct, a point Swazey herself emphasizes. Instead, the survey records observations of perceived misconduct. That's quite a different matter, says David Goodstein, a physicist and vice provost at Caltech who reviews all his university's cases of alleged misconduct.

"By looking at perceptions of misconduct, you distort the picture very badly," says Goodstein. "I can tell you from actual experience that the vast majority of allegations turn out to be groundless. Perceptions are often wrong, and you only find out that they're wrong after you go through the proper procedures."

Furthermore, the Acadia researchers note that many of the respondents from a particular institution or academic department may be reporting the same alleged incident. Researchers and experts in scientific mis-

conduct say that ambiguity on this point, along with the fact that 41% of the 2000 faculty members who were queried did not respond, makes it hard to draw firm conclusions about the prevalence of misconduct. Due to the constraints of confidentiality, the authors were not able to conduct follow-up interviews or use others techniques to reduce self-selection bias.

"I'm strongly in favor of getting some figures on this—our policy response has to be related to the prevalence of the problem," says Drummond Rennie, West Coast editor of the *Journal of the American Medical Association*: "But there

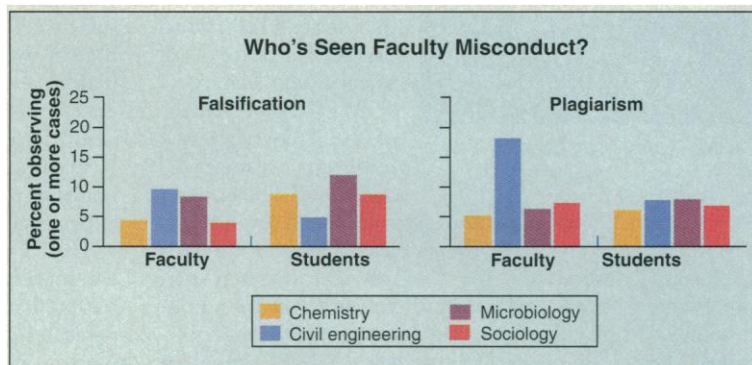
"I'm strongly in favor of getting some figures on this....But there are huge holes in how they did it."

—Drummond Rennie

are huge holes in how they did it. They don't even pretend to measure the actual frequency of misconduct, but then they state that it's not rare. That's the curious thing."

Last week, *The New York Times* reported that the study was rejected by *Science* before it was submitted to *American Scientist*, an unrefereed journal. *Science*'s editor-in-chief, Daniel Koshland, says that the manuscript was handled in routine fashion and was rejected because "it did not have the scientific content and methodology appropriate" for this journal. "The subject matter is appropriate for *Science*," says Koshland, who was not personally involved in the initial editorial decision. "If it had been a better paper it would have been accepted."

Despite the criticism, many in the field say the study is the best attempt yet to provide some answers about the community's perceptions of misconduct. Marcel LaFollette, a science policy analyst at George Washington University who reviewed the authors' grant application to the Na-



Uncivil behavior. Civil engineering faculty are the most likely to come across abuses among their colleagues in two areas that the National Academy of Sciences considers to be scientific misconduct. Students in microbiology are most likely to observe such behavior among their professors.

tional Science Foundation, which funded the study, says the work contains "some good, careful social science. This is good data, and it's troubling data." In particular, LaFollette believes the differences between disciplines warrant further study. "Up till now, it's been biology getting all the flak," she says. Yet the Acadia study's findings about civil engineering raise the question, she says, "Are they just more honest than the others, or do they really have more misconduct? These are, after all, the people who design bridges."

Swazey also argues that the fact that half the scientists report observing what they considered unethical conduct is worrisome

on its face. "If graduate students are being exposed to various types of what most people consider misconduct," she says, "we're going to be turning out a generation with a great deal of uncertainty about how to respond to misconduct."

Although there is debate about the absolute numbers, few observers are surprised by the study's overall finding that uncollegial and inappropriate conduct such as sexual harassment and improper assignment of authorship credit are more common than outright fraud and plagiarism. "It's commonsensical that the incidence of jerkery is higher than crookery," says Rennie. If one nevertheless assumes that "jerkery" can lead

to "crookery"—as the Acadia authors do—the study could play an important role in helping define the dimensions of the ethics problem on campus, he says. "But I just wish they'd made a stronger case."

Rennie believes the questions of prevalence will remain unanswered until scientists themselves conduct a one-time, confidential audit of the research community. Although the idea was roundly condemned as overly intrusive when he first proposed it several years ago, there seems to be growing interest in using something better than a survey to obtain reliable data on this slippery question.

—Christopher Anderson

SCIENCE EDUCATION

Europeans Get Into Festival Spirit

PARIS—When 350 schoolchildren spend the night in London's Science Museum next week, they will be striking a blow for democracy. At least that is the way Antonio Ruberti, the European Commission's (EC) vice president in charge of science and education sees it. The mass "sleep-over"—during which kids from all over Europe will participate in workshops, demonstrations, competitions, trail games, and mimeshows—is just one of 22 events making up the European Week for Scientific Culture (*Science*, 8 October 1993, p. 183), the latest manifestation of an epidemic of science festivals spreading across Europe.

The European Week is aimed at raising

science festival, offers a similar rationale: "When people vote or make decisions on science issues, they need to be more independent and informed." Adds Bruce Durie, organizer of the Edinburgh International Festival of Science, "It's what science festivals are all about."

Durie should know. His Edinburgh Science Festival—3 weeks of events all over the city each April—has been growing rapidly since its beginnings 6 years ago, and it seems to have spawned offspring across Europe. The French held their third La Science en Fête in June, with about 1500 events in museums, schools, and laboratories throughout the country. At the same time, Italy ran its fourth Week of Scientific Culture with 1000 events, while Belgium and Portugal also joined the festive spirit. The Netherlands are just now winding down from their festival, and in September the U.K. science minister gave the British Association for the Advancement of Science \$120,000 to organize a festival of science next March.

Marie-Noël Favier of the French science ministry, organizer of last year's La Science en Fête, thinks the festivals meet a genuine demand from the public. "They are anxious about the speed of advance of science in areas that affect them: artificial insemination, genetic engineering, AIDS, the environment." Durie agrees: Books like Stephen Hawking's *A Brief History of Time*, he says, have caused "an effervescence of science issues" in the general public. To Denis Sergent, of the communications department

of France's largest scientific research organization, CNRS, the festivals show science can be fun—a big plus at a time when European governments want to encourage more young people to study science. La Science en Fête, he says, was started as an attempt to capture the street-party spirit of the country's annual music festival and bring it to the scientific arena.

Compared to the national festivals, the European Week for Scientific Culture will be a dry affair of conferences, debates, open days, and films. The main requirement for the events—all funded by the EC—was that they should be transnational. Few of them are specially aimed at schoolchildren, however. This may simply reflect lack of time for planning: Ruberti only sprang the idea on national coordinators in April, and many of them see this year's European Week as a dry run. Even Ruberti refers to it as "year zero."

For Durie, the event is more pump-priming than anything: "The major beneficiaries of the European week should be those countries which haven't done anything before." As a result of this year's efforts, he says, the coordinators have set up a network, called the Galileo Club, to keep the momentum going. But some organizers of national festivals would prefer to move them all to the same week, rather than put on an extra "European" week. "This could be difficult," says Galuzzi, especially because of national differences in school term dates. He expects the next European week to be very different. "Our concern is to find a formula to allow national partners to expand their national experience, not just organize a new week....The question is how to produce a common European outcome of the different national styles." This, however, is Europe's perennial crisis of identity, so it is not surprising that it should crop up for science (and democracy), too.

—Peter Coles

Peter Coles is a science writer based in Paris.



Sleep learning. Organized museum "sleep-overs" have become a popular way to turn kids on to science.

public understanding of science—and producing better informed voters. "Without expecting the citizens to become experts," said Ruberti when he launched the event, "a certain level of knowledge and comprehension of scientific matters should be granted, in order to allow them to express opinions." Paulo Galuzzi, of the Italian Institute and Museum of History of Science in Florence, who organized this year's Italian

NATIONAL MUSEUM OF SCIENCE AND INDUSTRY