Advisory Committee Urges Changes at OSI

Specifically: More protection for accused scientists and a narrowing of the definition of scientific misconduct

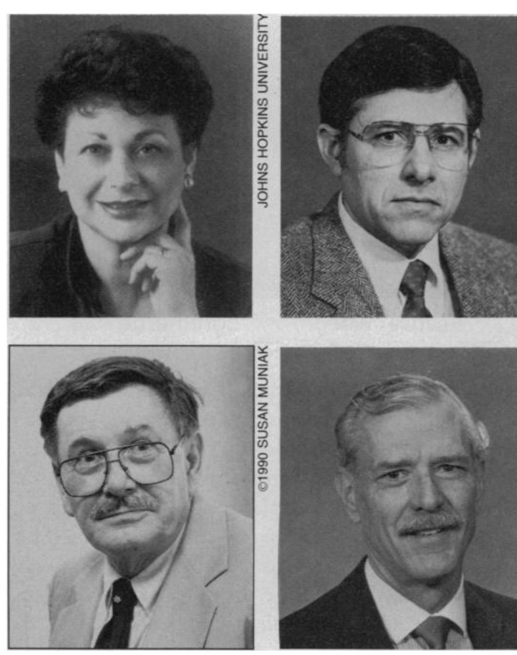
Cambridge, Massachusetts—FOR MONTHS the NIH Office of Scientific Integrity (OSI) has been under siege. NIH director Bernadine Healy has come down hard on OSI from above, criticizing it as an amateur operation that should rethink the way it conducts its business. And out in the trenches, many researchers argue that the agency is a scientific Star Chamber—with far too broad a definition of scientific misconduct and far too little attention paid to the rights of the accused. Things have gotten so bad OSI director Jules Hallum said recently that "OSI-bashing has become America's second favorite sport." Well, some of the complaints are getting through. Last week, a new NIH advisory committee urged OSI to tighten its definition of misconduct and allow scientists under investigation a hearing to defend themselves, as well as the right to know more about the charges and evidence against them.

These changes certainly won't resolve all the troubles OSI faces. They won't help the agency to a successful conclusion of its biggest and most controversial cases: those involving David Baltimore and Robert Gallo. Yet the changes could lead the way to a detente between the office and its critics in the scientific community. "The advisory committee is doing a lot of things that need to be done," says University of California, Berkeley, biologist Howard Schachman, chair of the American Society for Biochemistry and Molecular Biology's public affairs committee, and a longtime OSI critic. And it looks as if the gumshoes at OSI can accept the changes—at least so far they have not opposed them. But final approval, which is up to the Public Health Service (PHS), could be a long time in coming while attorneys and senior staff review the changes.

The advisory committee's recommendations came at the conclusion of a recent one-day meeting here. The committee, whose nine members were appointed in January by Health and Human Services (HHS) Secretary Louis Sullivan to advise the department on scientific misconduct, found it far easier to reach agreement on a new definition of misconduct than on the trickier question of due process and the rights of the accused—partly because there is general agreement that the previous definition was too loose.

The way was opened for the new round of criticisms of the definition of misconduct last December, when a federal district judge in Wisconsin ruled that the OSI guidelines for investigating misconduct had not been drawn up in accordance with federal law (*Science*, 11 January, p. 152). The Office of Scientific Integrity Review (OSIR)—an office within PHS that reviews the findings of the OSI—responded by publishing the office's policies and procedures in the 13 June issue of the *Federal Register*.

And that provoked a volley of criticism.



Advisers and advisees. *Committee member Estelle Fishbein and chair Nicholas Steneck; OSI's Hallum and OSIR's Bivens.*

More than 2000 scientists wrote letters, 1659 coming from the Federation of American Societies for Experimental Biology (FASEB). None of the letter writers quibbled with the backbone of the misconduct definition: "Misconduct is defined as fabrication, falsification, plagiarism." The contention centered on other language stating that misconduct also includes "other practices that seriously deviate from those that are commonly accepted with the scientific community for proposing, conducting, or reporting research." Says Schachman: "That stupid phrase is the source of all their troubles. It's so vague it encompasses everything under the kitchen sink."

The phrase, say scientists, gives OSI investigators so much latitude that they could act like Big Brother, working on anonymous tips to crack down on cases of sloppy science and unorthodox research—not just activities that are fraudulent. Says Brandeis University president Samuel Thier, who spoke at an earlier meeting* on misconduct: "There's a sense of randomness and darkness in the process."

The critics say that it's better to let the universities solve low-level problems that may indicate poor judgment or incompetence—but are not science fraud. But Hallum argued at both meetings that the universities don't always do a good job of investigating this sort of thing and that the OSI needs a broad authority to investigate other "sins of science" that aren't fabrication, falsification, or plagiarism. These sins, including corruption of the peer-review system and theft of intellectual property, constitute some 40% of the 170 cases ever investigated by the OSI.

But in the end, the advisory committee proposed narrowing the boundaries of what OSI can investigate. The committee unanimously approved a new definition of scientific misconduct as "the intentional fabrication or falsification of data, research procedures, or data analysis; plagiarism; or other fraudulent activities in proposing, conducting, reporting, or reviewing research."

Scientists are pleased that the new definition makes clear that misconduct must be intentional. The staffs of OSI and OSIR also say they have no serious objections, since the new definition will still allow them to investigate most of the 40% of cases that are not straightforward falsification, forgery, or plagiarism. Says OSIR director Lyle Bivens: "I like it."

But the person who had the most influential role in shaping the way OSI does its job—psychologist Suzanne Hadley, who was deputy director of OSI from its inception in May 1989 until early April—says it is her personal opinion that it will be difficult for the OSI to prove intent—even in some instances where there was clearcut fraud. "I predict that the requirement that intention be proven will diminish the frequency of findings of scientific misconduct. You can just bet good money on it," says Hadley, who is special assistant for education at NIH.

The other issue—that of due process and protecting the rights of accused scientists—featured most prominently in the Baltimore

* HHS Advisory Committee on Scientific Integrity met 17 Nov., following a conference on "Misconduct in Science," 15-16 Nov., cosponsored by AAAS, OSI.

case, where many have argued that Baltimore's accused colleague, Thereza Imanishi-Kari of Tufts University, was treated unfairly. In June 143 scientists, including some eminent immunologists, wrote to OSI complaining that the agency had done serious harm to Imanishi-Kari's right to defend herself by failing to give her an opportunity to confront witnesses and review evidence against her and by withdrawing her funding before issuing a verdict.

"It is fundamental—you have to know what you're accused of and the details," says University of Massachusetts Medical School geneticist David Parker, a co-organizer of the letter-writing campaign on Imanishi-Kari's behalf. "Otherwise it gets very Kafkaesque." At the least, Parker argues, scientists are entitled to the same rights that they would have in the criminal court system—the right to an attorney, to know details of the charges, to confront the accuser during the "trial" or before it.

The OSI, however, has taken on a model based on academic committees that investigate misconduct or review tenure disputes—where the aim is to get at the truth of the scientific dispute without letting the accused confront the accusers or even necessarily examine the entire body of incriminating evidence. After a long debate, the advisory committee recommended retaining the current system, but modifying it slightly to allow scientists a hearing before a final judgment is made on their cases.

Those actions left scientists encouraged. "We're very pleased the committee has shown they're sensitive to these issues," says University of Florida biochemist Robert Cousins, who is director of FASEB. But he noted that the committee stopped short of allowing scientists to learn the identity of the witness who made the accusations. And it postponed discussion until its next meeting of another sore point for researchers—the "Alert" system at NIH that prevents accused scientists from obtaining public funds while they are under investigation.

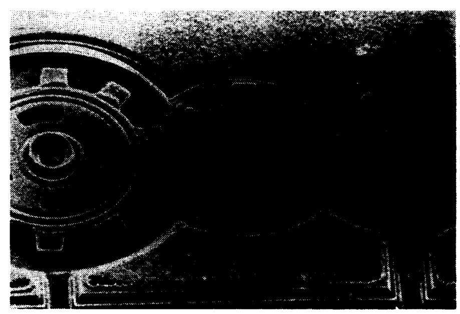
Which leads to the burning question on most peoples' minds: Will these recommendations be adopted by the PHS? And if so, when? Bivens says a draft report on OSIR's decision about the new recommendations should be ready by the committee's next meeting in March. "The downer is it looks like some of this is going to drag on for a long time," says Cousins. ■ ANN GIBBONS

Seeing Big Things in Miniaturization

The wave of miniaturization that swept over the electronics industry over the past 30 years transformed the technology and opened vast new markets—worth $70 billion annually in the case of personal computers alone. Now a second wave of miniaturization is getting ready to break, and it's likely to spill into a host of entirely new and potentially vast commercial arenas, according to an Office of Technology Assessment (OTA) report released to Congress last week.*

Unlike the first wave, which was almost entirely restricted to ways of fashioning circuitry on the surfaces of silicon wafers, this second wave will include methods for sculpting more complicated three-dimensional microstructures into silicon and other materials. The report envisions a menagerie of minuscule optoelectronic devices, micromechanical widgets, and wee sensors (*Science*, 26 July, p. 387), with uses ranging from shrinking the size and cost of spacecraft to delivering drugs to optimizing manufacturing efficiency and product quality. Even in the electronics industry, where the shrinking has been proceeding for decades, the report notes that this second wave of miniaturization will be welcome—indeed, it will take on new urgency as old technologies approach physical barriers.

Engineers believe that soon after the year 2000 they will be making silicon-based transistors with features as narrow as .1 micrometer. At that point, silicon-based microcircuitry will butt against forms of electrical resistance and quantum effects that would make still smaller transistors unreliable in their most basic function as electronic on-off switches. To push miniaturization even further, engineers are looking for ways to exploit research in exotic fields such as quantum and molecular electronics (see this week's special section on nanotechnology, beginning on page 1300). The question that runs throughout the OTA report: Who will be the first to capitalize on these and other miniaturization efforts?


AT&T BELL LABORATORIES

Future wheels of commerce? *Micrometer-scale turbines.*

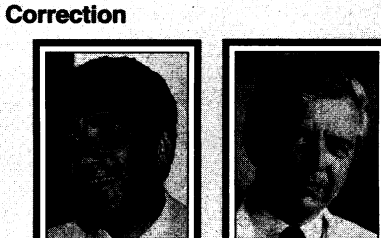
The stakes are high, says the report: "Those companies and nations that can successfully develop and capitalize on miniaturization developments will reap handsome rewards." If the United States fails to realize that promise, the fault will not lie with its basic science community. "On the whole, United States researchers lead [the world] in miniaturization technology R&D," the report says, though in the recent past the United States has often lagged behind other nations, especially Japan, in translating R&D advances in microelectronics into hot-selling commodities like VCRs, computer memory chips, and display technology.

In writing the report, the OTA's charge didn't include making policy recommendations, so the document doesn't say how the Capitol Hill tribe should help U.S. industry capture as much of the economic spoils of miniaturization as possible. But, says Representative Tim Valentine (D–NC), chairman of the recently formed House subcommittee on technology and competitiveness, the survey "will help us to identify areas of commercial promise."

Karl Hess, an electrical engineer at the University of Illinois, hopes the report will serve as a general wakeup call to the field's potential. Hess, who chaired an OTA-convened workshop on miniaturization this February, wants to turn the attention of policymakers from big science projects like the Superconducting Super Collider and the space station to the less flashy, but more commercially promising, brew of miniaturization technologies the report describes. "Even far-out concepts in nanotechnology will have greater economic impact than if I go work on the super collider and hope for spinoffs," says Hess. ■ IVAN AMATO

Miniaturization Technologies, Office of Technology Assessment; available from the U.S. Government Printing Office (GPO stock number 052-003-01267-7).

Correction



Because of a production error, the photographs of Pierre Chambon and Harald zur Hausen, which appeared on pages 1116 and 1117 of last week's issue (22 November), were transposed. Here's what you should have seen: Chambon is on the left, zur Hausen on the right.