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.

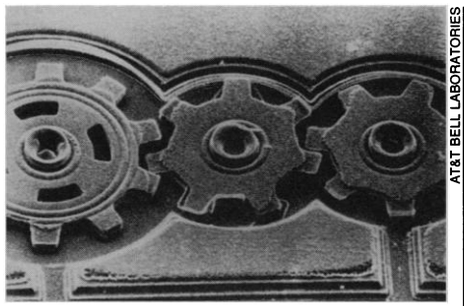
Which leads to the burning question on most peoples' minds: Will these recommendations be adopted by the PHS? And if so, when? Bivens says a draft report on OSIR's decision about the new recommendations should be ready by the committee's next meeting in March. "The downer is it looks like some of this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