caretaker of the lab until a new director is found, acknowledges there was a high turnover rate that "probably reflected some negative interactions." In many cases, Spangler said, "the question of independence was very strong," adding that "people who think highly of themselves have a limited capacity to be controlled by others."

Smith denies that projects were frequently changed, though she does say that focusing on some projects and abandoning others is part of successful science. Frustration among the staff, she says, was caused partly by the fact that slow setup of the LBL lab required Cantor's Columbia group to move to Berkeley in two parts, with those who moved first having their work disrupted by the arrival of the second group. It was largely those in the first group who were unhappy, she says. By comparison, those in her separate campus lab, which was set up without disruption, had no complaints.

Cantor springs to Smith's defense. He acknowledges that he did count on associates, including Smith, to run much of the lab's daily operation, but adds "it is completely unfair to point the finger at Dr. Smith as the person responsible for the difficulties of running the day-to-day lab."

Many of the problems in management, in science, and in recruiting, Cantor says, stem from LBL's slowness in getting lab space ready for him and his group. "To transport an active and working group across the country into a situation where labs are being renovated, making equipment impossible to install, and facilities aren't available—the group naturally gets very frustrated." And, Cantor adds, "it is very difficult to recruit people if you don't have space to offer them." Some of the promised space, he says, wasn't ready until this April.

But Cantor acknowledges that space problems were only "part of it. The other part, I was personally overwhelmed between responsibilities at Berkeley . . . and international and national responsibilities I was carrying out." In his role as spokesperson, a role for which many say he is well qualified, Cantor will be able to concentrate on those national and international responsibilities.

That leaves the question of whether LBL can find someone to get the genome lab back on track—a top scientist and a good organizer. One candidate being considered by Shank's search committee is Caltech's Leroy Hood. But whoever the replacement is, his task will be to concentrate on the science. ■ **PAUL SELVIN**

Paul Selvin, a 1990 AAAS Media Fellow, is a graduate student in physics at UC Berkeley.

NSF Peer Review: Under Pressure

For years, researchers have been complaining that top-flight research proposals are going unfunded because there are too many applicants chasing too few funds. Now comes a plea from the other side of the fence. Senior staff members of the National Science Foundation, in a bluntly worded report,* warn that NSF's peer-review system is groaning under the weight of record numbers of proposals and that project officers are so swamped they can no longer do their jobs properly. The proposed remedy: In the near term, simplify and shorten grant proposals; in the long term, increase the size and duration of the average award and reduce the variety of grants the foundation provides—in part by incorporating into the regular awards system politically popular programs that currently support women, minorities, and other specific sectors of the community.

Part of the problem is easily explained: The number of NSF project officers has remained constant over the past decade, but the number of proposals reviewed each year has increased by about 40%, notes the report, which was written by a task force established by former director Erich Bloch. Not only are there more researchers submitting proposals, but a growing proportion of individual investigators are sending in multiple submissions. These include quick resubmission of proposals that have been turned down—as much as 30% of all reviewed proposals are resubmissions—and requests for small, short-term grants to maintain an adequate level of funding. And initiatives launched in the early 1980s—such as programs of special grants designed to increase opportunities for women, minorities, young investigators, and researchers in undergraduate schools—have added to the burden. Last year, some 18% of all the proposals submitted to the foundation sought funds through these programs.

As most researchers are painfully aware, NSF's budget has not kept pace with this flood of applications: Only 31% of the proposals reviewed between 1987 and 1989 were funded, compared with 38% at the beginning of the decade. Moreover, average grant sizes have remained essentially unchanged for a decade at $65,000 and they last on average only 2 years.

The task force did come up with one slightly less gloomy statistic—42% of principal investigators who applied for funds in 1987–89 succeeded in getting at least one proposal funded. That's only a slight drop from 45% in 1980–82. The reason, of course, is all those multiple submissions.

This increased workload is having a predictable impact on NSF staffers. "Many of the very best NSF program directors . . . admitted that they no longer have enough time to read and study proposals carefully," the report states. Moreover, "The growth in the number of [principal investigators] conducting research, coupled with federal funding constraints, is leading to a system that supports only 'safe proposals.' "

The task force offers some Band-aids to improve matters in the short term. These include a requirement that proposals for individual investigator research projects should be no longer than ten pages and that budgets submitted with proposals include only an estimate of total costs. Budget details should be provided only after a project officer has decided to recommend funding.

For the longer term, the task force floats some more radical proposals:

■ There should be only three types of research grants for individual investigators: Standard Research Grants that would be awarded for 3 years with an option to renew once without additional external review; Starter Research Grants for investigators with no prior federal research funding; and Strategic Research Grants, lasting 1 year at a maximum of $50,000, for feasibility studies and exploratory research.

■ Programs that currently span several directorates, such as Presidential Young Investigator Awards and Research Opportunities for Women, should be "mainstreamed." They would be subsumed into the three types of individual investigator awards, and project officers would be responsible for ensuring that the objectives currently served by these programs are met.

■ The distribution of resources between the three types of individual investigator awards should be reassessed every 3 years to ensure that all contenders for NSF funds are being well served. ■ **COLIN NORMAN**

*"Report of the Merit Review Task Force" (National Science Foundation, Washington, D.C., 20550).