siders. "We have strict rules that, until data is analyzed and we make sure it is sensible and correct, we don't pass data to people outside the groups."

This concept is by no means unique to Fermilab: Many other large collaborations consider the rule essential for getting anything done, says Jean-Pierre Revol, who worked on particle searches at the European laboratory CERN. Tollestrup cites the example of the NASA collaboration that recently came forward with evidence for the first seeds of structure in the universe, based on observations by the Cosmic Background Explorer (COBE) satellite. The COBE team had worked in airtight secrecy for more than a year, he notes, as they checked and rechecked their observations. Imagine the chaos that would have resulted, Tollestrup says, if the investigators had just thrown out the data, saying, "There's a great discovery here, go make it."

Warty data. Nor would such open access advance science, he and Shochet say, because outsiders are incapable of drawing trustworthy conclusions from the raw data gathered in a complex experiment. Even with Sliwa's help, Goldstein and Dalitz were prey to the pitfalls in the CDF data, says Tollestrup. "There is an enormous correction process. You have to understand all the quirks of the detector to go from the 10,000 words on a magnetic tape to the reconstruction of a burst of particles." Adds Shochet: "When we present data to convince people of something, that data has been corrected for all subtle systematic effects and statistical uncertainties involved in detection and analysis. Raw data has all these warts."

Sliwa chose not to comment to *Science* about his decision to share the data. But Goldstein says he sees no problem with working on someone else's unpublished data. He argues that these 3-year-old runs aren't "hot data"; the CDF group has had ample time to analyze it—though Tollestrup responds that people in the group are far from through with it. Besides, Goldstein adds, he and Dalitz never planned to make claims without first appealing to the Fermilab group for approval. But he's for opening the whole process of data analysis to the community at large. "If CDF decides our work is not significant enough, the fair thing would be for that data to be published" for the rest of the community to evaluate. "It would be nice if everyone could have a chance to look at this."

For now, the top quark flap seems to have revealed more about the uneasy relationship between large collaborations and outside scientists than about the particle itself. But Tollestrup says the CDF group may soon be capturing top-quark signatures that everyone can agree on. The Tevatron is starting a new series of runs, in which it will deliver five times as much data as before to CDF. It will also have a new detector called D0. With two detectors, investigators will be able to cross-check their results. And the CDF group has just equipped their experiment with a "silicon vertex detector" that will enable the investigators to detect bottom quarks in the collision debris. Bottom quarks, says Tollestrup, should distinguish the decay of a top quark from some of the most misleading background events.

Then again, the top quark may be too massive to form at the energies now attainable at Fermilab. In that case, it may take the extra boost from the proposed "main injector," a $185 million addition to the Tevatron that is slated for 1996, to dispel any doubts.

–Faye Flam

BIOMEDICAL RESEARCH

NIH Strategic Plan Nears Its Final Form

The strategic plan roadshow that began last February in San Antonio, Texas, is finally winding down. At a day-and-a-half retreat last week on the Bethesda campus of the National Institutes of Health, NIH Director Bernadine Healy unveiled the latest—and what must be the near-to-final—draft of her strategic plan, a blueprint for the future of her $9 billion agency. And while the scientists who depend on NIH for research support can take some satisfaction that their ideas have helped shape the plan, now dubbed "Advantage America," it was clear from last week's meeting that its final form will not please them all. Indeed, the scientific community appears to be losing one of its most cherished prerogatives: the plan makes it clear that individual-investigator grants, once the force driving budget requests and planning decisions, will take a back seat to the research priorities the NIH hierarchy thinks are necessary to foster the country's physical and economic health.

Not that NIH is abandoning investigator-initiated research: The draft plan states that such research "is at the heart of scientific inquiry in which discoveries arise in unexpected places, from improbable insights and through leaps of imagination." But at the same time the plan says that research grants are an important means to a broader end—"the achievement of scientific goals and programs." Healy's NIH, it is clear, won't make dispensing research grants a goal by itself.

But if grants are no longer the center of the NIH universe, Healy has at least invited scientists to participate in her new, priority-setting exercise: During the nearly 5 months the plan has been on tour, nearly 2000 scientists from around the country attended meetings to discuss the plan, including nearly 3 dozen at last week's retreat. Healy has also issued an open invitation to the scientific community to send her any additional ideas or comments they might have (*Science*, 17 July, p. 312). And even after the current plan is made final, NIH officials say, they will hold a meeting with extramural scientists in a year's time to review how the plan is working and make course adjustments as needed.

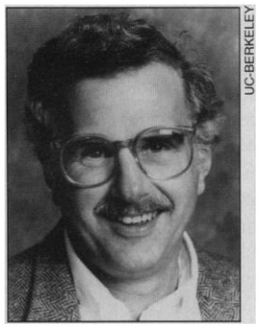
But for all the work that has gone into bringing the plan to its near-final state, scientists attending last week's retreat felt there was still a way to go. Although the NIH staff has done a fine job of analyzing their agency's needs, Upjohn chief executive officer Ted Cooper told the assembly, "your challenge is to convert [the analysis] into programs." That process has at least been started. Accompanying a slender, 9-page document sketching out the plan's outline were some 400 pages of supporting documents that spelled out specific programs. The whole package is expected to be whittled down to 100 pages by the end of the summer. With no more meetings scheduled, scientists will have to trust this critical task to NIH staffers.

As things now stand, the plan consists of four basic elements: a mission statement accompanied by four specific agency goals (see box); a two-and-a-half page statement of philosophy; a series of six "trans-NIH objectives"—topics that cut across the individual institutes' disease-oriented focuses—and a "statement of means" describing the role of the NIH director, the institute directors, and the scientific community in implementing the plan. But it is the trans-NIH objectives that form the meat of the plan, spelling out the science and policy areas that NIH intends to emphasize.

■ **Critical science and technology.** For the past 6 months, Healy has been persistently promoting critical technologies—techniques and methods that will make it easier for both academic and industrial researchers to capitalize on innovative scientific ideas—as the most important strategic emphasis for her agency. The plan originally identified four broad areas as deserving the most support: molecular medicine, biotechnology, molecular immunology and vaccine development, and structural biology. But scientists worried that research areas not included in this list will receive short shrift at budget time. In fact, that was a major topic in the hallways during the last stop on the strategic plan's tour, at a hotel near Dulles Airport outside Washington, D.C. from 24 to 26 June (*Science*, 3 July, p. 20). This fear was partly allayed, however, when NIH officials added cellular and integrative biology to the

list of areas for which critical technologies should be developed.

Among the dozen or so science and technology areas targeted for emphasis are human gene therapy, a second generation human genome program designed to take advantage of the mapping and sequencing efforts now under way, development of transgenic animal models, biomaterials, bioengineering, and a vaccine project for human diseases. Despite the controversy surrounding the strategic plan as a whole, there was remarkably little dissent about these choices for research emphasis at the retreat.



UC-BERKELEY

Bruce M. Alberts. Berkeley researcher is unhappy about the plan's peer-review report.

■ **Critical health needs.** If scientists succeeded in getting cellular and integrative biology on the list, they were dismayed to find that epidemiological and behavioral research based on large human populations had been removed as one of the areas of emphasis under the critical health needs category. Healy tried to put the decision to remove these population-based studies at the feet of the scientists who met last month at Dulles. But this didn't wash with Richard Carleton, physician in chief at Memorial Hospital of Rhode Island, who chaired the panel on population based studies at the Dulles meeting. "That was not the message that was intended at that time," he told Healy last week.

■ **Intellectual capital.** Although the number of specific traineeships NIH has offered has remained unusually stable over the past 5 years, the agency has committed itself to doing a better job of attracting top students into science. To that end, NIH is considering a "Junior R01" grant, named after the code for NIH's principal investigator-initiated award. These grants would be aimed at young researchers who need to gather some pilot data in order to prepare an effective full-R01 grant application. The award would be worth up to $100,000 over 2 years, would pay full indirect costs, and would be transportable so researchers could easily move their grants from the institution where they trained to their first full-time job. Under the same heading of "intellectual capital," NIH is also developing plans for improving science education and professional standards of conduct for scientific researchers.

■ **Research capacity.** Under this objective, NIH intends to widen the availability of research resources—and make sure existing ones are used as efficiently as possible. To do so, NIH is proposing new initiatives in three areas: research facilities and instrumentation, intramural research, and computational biology research.

■ **Stewardship of public resources.** Upset with wild fluctuations in the number of research grants NIH has awarded over the past few years, Congress urged the agency to come up with some long-range plans for stabilizing its grant portfolio.

To that end, NIH has added economic analysis and budget policy as one of its planning priorities. The idea is to create long-term models for budget planning and begin turning the agency away from mechanism-based budgets—such as those based on the number of grants or the number of research centers—to budgets based on scientific priorities. For NIH centers that don't specialize in awarding grants to individual investigators, this is a long-awaited change. "Our budget keeps being eroded by R01s," says Robert Whitney, director of the National Center for Research Resources, which provides necessary infrastructure to the scientific community.

A far more contentious topic in this category is peer review. While scientists are nearly unanimous that peer review is a basically sound mechanism for awarding research grants, the participants in the Dulles meeting still saw room for improvement—and now they feel their suggestions have been ignored.

At the Dulles meeting, for example, Bruce Alberts, a biochemist from the University of California, San Francisco, chaired a panel that recommended three specific reforms in the peer-review process: making certain that top scientists were recruited for review panels, especially for the chairs of those panels; narrowing the scope of large project grants so they would not compete directly with large investigator-initiated grants; and giving extramural scientists a stronger voice in determining how many review panels a particular discipline might need. As it works now, the more review panels in an area, the more likely a grant assigned to a particular panel will be funded. But the document NIH presented at last week's retreat gave these suggestions short shrift. Of the strategic plan's current peer-review report, Alberts says: "The people on my panel will be outraged if this goes through." He and several other extramural scientists attending the retreat urged NIH to adopt the Dulles panel's suggestions.

■ **Public trust.** Virtually everyone attending last week's retreat felt that the public is not giving NIH the credit it deserves for the work it supports. The agency has not yet devised specific plans for increasing its public profile, but many participants felt NIH should emulate the National Aeronautics and Space Administration (NASA), based on the belief that NASA's ample public relations budget was in part responsible for its traditionally strong public support. Other steps the plan recommends to improve NIH's public image: examining social, legal, and ethical issues in biomedical and behavioral research, and exploring the role of NIH in the nation's economy.

In spite of all the new initiatives in the plan and all the anxiety it has generated in the scientific community, Upjohn's Cooper told those attending the retreat that the current plan—and the concerns accompanying it—closely resembles a planning exercise he was involved in when he was at NIH in the late 1970s. "If I read it to you, you'd be astounded at how little has changed over 15 years." But if the issues remain the same, the planning exercise is nonetheless a valuable one, he maintains. "A good plan is a valuable asset for resource allocation irrespective of what the financial climate might be."

This time around, though, the climate may be chillier than usual. According to rumors emanating from the House appropriations committee, this year's budget increase for NIH may barely keep up with inflation. And that will make the strategic plan all the more important for charting NIH's future course, if and when it wins approval from Healy's bosses at the Department of Health and Human Services.

–Joseph Palca

THE STRATEGIC PLAN'S MISSION STATEMENT

MISSION	GOALS
Science in pursuit of fundamental knowledge about the nature and behavior of living systems and the application of that knowledge to extend healthy life and reduce the burdens of illness and disability.	1. To foster fundamental creative discoveries, innovative research strategies, and their applications as a basis to advance significantly the Nation's capacity to protect and improve health. 2. To develop, maintain, and renew scientific human physical resources that will assure the Nation's capability to prevent disease, improve health, and enhance the quality of life. 3. To expand the knowledge base in biomedical and associated sciences in order to enhance the Nation's economic well-being and ensure a continued high return on the public investment in research. 4. To exemplify and promote the highest level of scientific integrity, public accountability, and social responsibility in the conduct of science.