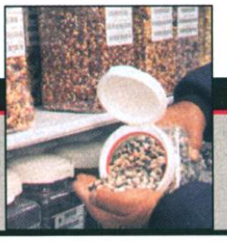
Islamic science projects on hold
An all-species census?
Easing a threat to seed banks



landing of the innovative Mars Pathfinder—was called into question after the 1999 failures of the Mars Polar Lander and Mars Climate Orbiter, mishaps that many blamed on hasty attempts to cut corners on costs. Goldin also tried to cancel the $3 billion Cassini mission to Saturn in favor of less massive approaches, but he lost out to congressional and scientific pressure to spare the program.

Despite those defeats, Goldin is credited with a successful reformulation of NASA's scientific goals. "He raised the level of space science in the agency," says Huntress. Adds John Logsdon, a political scientist at George Washington University, "He made the science program conceptually interesting, and now it has a strategic vision."

Goldin's most ambitious attempt to rethink the agency's scientific mission built upon the discovery of purported evidence of ancient fossil life in a Mars meteorite found in Antarctica (*Science*, 16 August 1996, pp. 864 and 924). That announcement, although controversial, invigorated efforts at NASA to find extrasolar planets and explore bodies within the solar system, such as Jupiter's moon Europa, where conditions may be conducive to life. The approach, using the Hubble Space Telescope and future missions, won strong backing from the Clinton White House.

But other pieces of Goldin's science legacy shine less brightly. He was late in revamping the agency's troubled life and microgravity sciences program, which remains stymied by a lack of leadership, flight opportunities, and respect from the larger biological and physical sciences communities. The space station's voracious appetite for construction funds has put planned scientific facilities on the back burner. And recent moves to scale back crew size on the station may limit the number and scope of life and microgravity experiments that can be performed there.

Goldin's proclivity to use and discard managers could cause problems for his successor. "He left no disciples, no legacy within the ranks," says one senior government official who worked closely with him. His abrasiveness and the fact that he was a holdover from the Clinton Administration left him without support in the new White House, placing him in limbo since January, aides say. But even without friends or a following in the Bush Administration, Goldin's revolution may now be so deeply rooted that it cannot be reversed. **–ANDREW LAWLER**

CREDIT: STEVEN E. FRISCHLING/CORBIS SYGMA

BIOTERRORISM

Researchers Question Obsession With Cipro

Everybody loves Cipro. In the aftermath of deadly bioterrorist attacks on U.S. soil, the first line of defense against anthrax has reached Viagra-like status: Many people are suspected of hoarding it, or even gulping it, and supplies at pharmacies are running out. Some have urged the government to break Bayer's patent on ciprofloxacin, as the compound is officially known. As NBC news anchor Tom Brokaw—himself the target of one of the mail attacks—put it: "In Cipro we trust."

But some scientists warn that the current obsession with Cipro is unwarranted and may backfire. Other, cheaper antibiotics can treat anthrax, they argue, and popping too much of the drug may create resistance in other pathogens. It might also tempt future bioterrorists to produce Cipro-resistant strains of *Bacillus anthracis*—which a recent study by U.S. scientists shows is possible.

So what exactly catapulted Cipro to drug manufacturer's heaven? The roots of Cipro's popularity go back to the Gulf War, says C. J. Peters, a former deputy commander of the U.S. Army Medical Research Institute of Infectious Diseases (USAMRIID) in Fort Detrick, Maryland. When Operation Desert Shield was launched in 1990, the U.S. suspected Saddam Hussein of having a biological warfare program that included anthrax, and vaccines were in short supply. Peters—who is now director of the Center for Biodefense at the University of Texas Medical Branch in Galveston—says he and other experts had a "little huddle" to choose the best antibiotic out of dozens available to counter the threat. Their biggest concern, he says, was that Iraq would develop resistant strains. So the group focused on ciprofloxacin, which not only killed anthrax readily in the test tube but was also relatively new, minimizing the chance that Iraq had figured out how to elude it. A quick experiment by USAMRIID's anthrax expert Arthur Friedlander showed that the drug worked well in monkeys, says Peters. "So we said: Go with Cipro!"

As a result, Bayer supplied the government with 30 million tablets of Cipro during the war, according to a company slide show posted at the U.S. Food and Drug Administration's (FDA's) Web site. That marked the beginning of the drug's ascent. In 1998, it appeared as the drug of choice in the Army's *Medical Management of Biological Casualties Handbook*. In 1999, a group of experts published a so-called "consensus statement" about anthrax biowarfare in *The Journal of the American Medical Association*. Their conclusion: As long as the anthrax strain is unknown, Cipro is the best bet, because there have been no published reports about resistance.

But the group, headed by Thomas Inglesby of the Johns Hopkins Center for Civilian Biodefense Studies in Baltimore, Maryland, also concluded that once researchers find out that the strain is vulnerable to other antibiotics, doctors should just go with "the most widely available, efficacious, and least toxic" one. Cipro can cause a series of side effects, which some believe may be especially serious in children.

Drug of the day. Overreliance on Cipro may tempt future terrorists to create resistant strains; a recent study shows that it can be done.

In August 2000, the FDA added Cipro to the list of antibiotics approved for use in victims of anthrax inhalation. But it's not better than other antibiotics, says Peters; the edge that it had 10 years ago—its newness—is long gone. Besides, "if you rely too much on Cipro, you're inviting people to create resistant strains," says Paul Keim of Northern Arizona University in Flagstaff.

In fact, Keim and his colleagues have already done just that, they reported at a recent meeting. Their goal was to find the mutations that make *B. anthracis* invulnerable to the drug, which could help quickly detect other Cipro-resistant strains in the future. To

minimize the risk, the team used a weakened anthrax strain, but for microbiologists who know the literature, Keim says, producing a virulent Cipro-resistant anthrax might be feasible. Keim's team is not going to add to that literature, at least for now. "We have a paper ready to go," says Keim, "but I think I'm going to sit on it."

Meanwhile, two papers published online by *Nature* this week record progress in battling *B. anthracis* on another front. Although antibiotics readily kill the bacteria, patients with inhalation anthrax often succumb to bacterial toxins circulating in their blood (*Science*, 19 October, p. 490). In one study, researchers at Harvard University and the University of Wisconsin, Madison, report finding a receptor that the toxin uses to enter macrophages, the cells it kills. A soluble version of the receptor added to macrophages grown in a test tube could bind the toxin and prevent its entry into the cells—thus offering hope of a drug that could "mop up" the toxin.

In the second paper, researchers from six institutions in the United Kingdom and the United States announce having solved the three-dimensional structure of a component of the toxin called the lethal factor. The structure may give researchers new leads to block its main effect: killing patients in the advanced stage of anthrax. –MARTIN ENSERINK

COUNTERTERRORISM

U.S. Science Agencies Begin to Lend a Hand

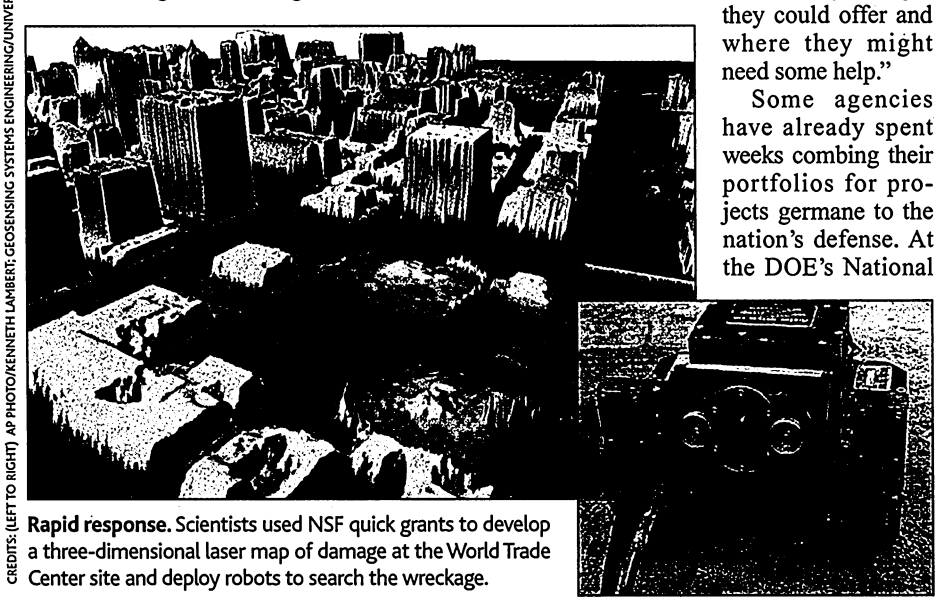
The U.S. government last week took the first steps toward developing a coordinated scientific effort to combat terrorism. Despite an official blackout on the event, *Science* has learned that White House science adviser Jack Marburger called together the Bush Administration's top scientists on 19 October to discuss how their research programs can contribute to the antiterrorism campaign. At the same time, the National Academy of Sciences (NAS) has begun its own effort to shape government research plans in the wake of 11 September and the continuing anthrax attacks.

The White House meeting marked the first time that research managers from across the government gathered en masse to take stock and begin shaping a coordinated response. The federal mobilization has been hampered by the unofficial status of the government's top scientist: Marburger hadn't been confirmed by the full Senate at the time of the meeting, although lawmakers were expected to approve his appointment this week.

Many government science agencies did swing into action within hours of the assaults, but until now, there has been little coordination or long-term planning. The Department of Energy's (DOE's) national laboratories have loaned experts in biological and chemical weapons to intelligence and investigation agencies, for instance, and the National Science Foundation (NSF) has funded several shoebox-sized experimental robots that searched for survivors and remains in the wreckage of the World Trade Center in New York City.

The lengthy White House meeting attracted more than a dozen federal officials who oversee the nation's $90 billion R&D portfolio, according to several participants. It focused primarily on briefing Marburger and his staff at the Office of Science and Technology Policy (OSTP) on the strengths and weaknesses of relevant research programs. OSTP would not comment on the meeting, citing Marburger's status as a consultant, but an aide to one participant said that officials "laid out what they thought they could offer and where they might need some help."

Some agencies have already spent weeks combing their portfolios for projects germane to the nation's defense. At the DOE's National



CREDITS: (LEFT TO RIGHT) AP PHOTO/KENNETH LAMBERT; GEOSENSING SYSTEMS ENGINEERING/UNIVERSITY OF FLORIDA

Rapid response. Scientists used NSF quick grants to develop a three-dimensional laser map of damage at the World Trade Center site and deploy robots to search the wreckage.

ScienceScope

Research or Proliferation? Science and university groups are keeping a close eye on antiterrorism legislation that could hamper research involving biological and chemical toxins. Earlier this month, the American Society for Microbiology and the Association of American Universities, which represents 63 top research universities, successfully lobbied the Senate to exempt "bona fide research" from stiff criminal penalties for possession of potential bioweapons. A version of the bill passed by the House of Representatives, however, doesn't deal with bioweapons, and it's not clear whether such a provision will be included in the final bill, expected to be completed soon.

Meanwhile, science advocates are also tracking a proposal (HR 3016) by Representative Billy Tauzin (R–LA) to bar non-U.S. citizens who are not permanent residents from possessing potential bioweapons. They say the bill would prevent many foreign-born students and researchers from working in the field. They are also awaiting a separate set of bioterror prevention proposals from the Department of Health and Human Services, due next month.

Science Stimulus Some science lobbyists are asking Congress to spend money on new university lab equipment as part of a larger legislative effort to revive the economy. Science groups have proposed including up to $2 billion for such purchases in a $100 billion economic stimulus package that is whizzing through Congress.

A science tool-buying spree would pack a triple punch, says American Physical Society lobbyist Michael Lubell, one of the authors of the idea. It would give struggling computer and equipment makers an immediate cash infusion, help university researchers make discoveries that will produce future economic returns, and reduce a hefty backlog of equipment-funding requests. The National Science Foundation alone, he says, leaves $1 billion in equipment pleas on the table each year.

It's not clear if lawmakers will bite, however. Republican leaders have argued that the package should emphasize tax cuts, whereas Democrats favor spending on an array of public works projects.