

for the best people doing relevant work, and then we'll see if we can mold something coherent out of that," says Rubin. "This is not a radical departure from how some of the best academic departments have been built—but it is radically different for a government lab." The new gameplan doesn't preclude the possibility of hiring a director from the outside. Shank emphasizes that this is a temporary arrangement, though he says it will continue "until we find exactly the right person."

In the hallways at the genome center at Livermore, where word of the new plan has been leaking out, some people at least are openly skeptical. As Anthony Carrano, who runs the genome center there, puts it: "It is a concept I would never ascribe to. Rule by committee is always difficult. But I wish them luck." Indeed, several others, who asked not to be named, say that LBL has a number of administrative problems that could tie the hands of anyone but a seasoned pro. "You really need a Lee Hood," says one.

But *Science* spoke with numerous others, including James Watson, who heads the genome effort at NIH, and Eric Lander, who directs a new NIH-funded genome center at MIT, who are optimistic about the new plan. Says Lander: "It sounds like the instincts are right. A committee to run it may be unwieldy, but if that is what it takes to bring in good people, OK." Adds Branscomb, another fan: "It should make the job of director more attractive." And at LBL, where opinion perhaps matters most, "We are hopeful about the future in a way we weren't before," reports Nina Bissell, director of the lab's cell and molecular biology division.

The new steering committee, which meets for the first time on 17 May, is just now placing ads and hopes to hire several investigators this summer, if not sooner. "I think that in 2 years LBL and Berkeley could be recognized as far and away the best government lab working on the genome project and could be the equal of the NIH genome centers, even starting from this dismal state," predicts Rubin. But, he admits, LBL had few options. "It was this or give up." ■ L.R.

will lose its money. I think the labs understand that now."

As Galas ventures into these and other areas, the question many people are asking is simply, Will he stay? He went to DOE on loan from USC with the announced intention of returning. Speculation to the contrary, Galas is emphatic: "I am returning to science." But, he adds, "if sufficient progress is made, DOE won't have any trouble attracting someone to do the job well."

■ LESLIE ROBERTS

Deaths In Vaccine Trials Trigger French Inquiry

Two AIDS patients treated with an experimental vaccine may have died from vaccine-related complications

THE FRENCH MINISTER OF HEALTH, BRUNO Durieux, announced last week that he will order a new investigation of experiments conducted by AIDS researcher Daniel Zagury. Durieux's announcement, which came just days after a Paris hospital inquiry cleared Zagury of violating French research ethics regulations (*Science*, 12 April, p. 203), was prompted by articles in both the *Chicago Tribune* and the French newspaper *Le Monde* reporting that trials of Zagury's controversial AIDS immunotherapy treatment may have caused the deaths of two patients at the Saint-Antoine Hospital in Paris. Zagury's work was conducted in collaboration with researchers at the U.S. National Institutes of Health, including Robert C. Gallo.

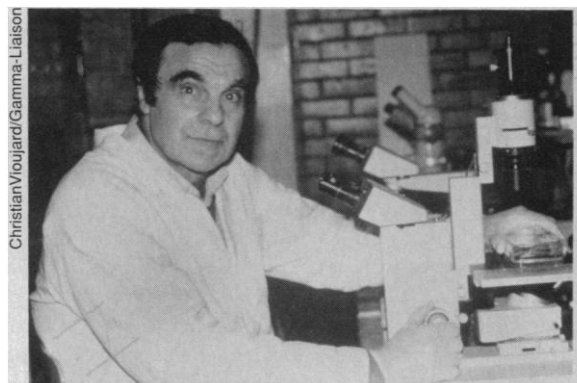
Behind the accusations is evidence gathered by a French dermatologist, Jean-Claude Guillaume, that suggests that two of Zagury's AIDS patients developed a fatal vaccinia infection after being treated with a vaccinia virus preparation. The virus, which had been inactivated and should not have been capable of producing an infection, had been genetically engineered to express AIDS virus proteins. The researchers hoped these proteins would help stimulate the immune system to fight AIDS. Neither of the deaths was mentioned in an account of the experiment published by Zagury last July in the British medical journal *The Lancet*.

Although Guillaume's work has not yet been published—it too has been sent to *The Lancet* and may appear as early as next week—Zagury has already counterattacked with an article in the French medical weekly *Impact Médecine* disputing the scientific basis of Guillaume's diagnosis.

According to Guillaume, a remarkable series of coincidences led him to conclude that the two patients died from vaccinia necrosis. Guillaume works at the Henri-Mondor Hospital in Créteil and the Gustave-Roussy Institute in Villejuif, both large hospital and research centers in the suburbs of Paris. Last September, he was asked to see an AIDS patient, referred from the Saint-Antoine Hospital, who had developed unusual skin lesions. Guillaume had

seen nothing like it before and could make no diagnosis. But he made sure that photographs and samples of tissue were taken; soon after, the patient died.

The mystery deepened the following month when Guillaume ran into a colleague who told him that in June he had seen an almost identical case: a patient referred from Saint-Antoine with unusual skin necroses that soon proved fatal. Neither physician could pinpoint the origin of the lesions. A few weeks later, fate intervened again when Guillaume picked up a copy of *The Lancet* in which Zagury described treating his patients at Saint-Antoine with inactivated



Misplaced blame? Daniel Zagury contends that herpes, not vaccinia, caused the deaths.

vaccinia virus. "I dashed for a dermatology textbook and immediately realized that the lesions were typical of gangrenous vaccinia," says Guillaume.

Guillaume then telephoned Odile Picard, the Saint-Antoine physician in charge of administering the experimental vaccine, to warn her that two of her patients had probably contracted gangrenous vaccinia. A few minutes later, Guillaume recalls, he received a telephone call from Zagury who argued that vaccinia infection could not be the cause of the skin lesions because viruses used in the experiments had been inactivated.

But Guillaume did not let matters rest there. He obtained antivaccinia monoclonal antibody to test the skin samples that he and his colleague had taken from the now dead patients. The results, he says, show the presence of vaccinia virus in the skin cells of the patients.

Zagury disputes the significance of this

key piece of evidence. In his *Impact Médecine* article, he repeats the original Saint-Antoine Hospital diagnosis that the two patients died from herpes virus lesions, a condition common in AIDS patients. The immunological reaction to the vaccinia virus, he writes, can be explained by the presence of inactivated vaccinia virus in the area of skin where the patient was injected.

Although Zagury appears confident that his treatment is safe, changes were made to ensure that it was safer, according to Picard. In a radio interview on Europe 1, she conceded that the vaccine may be "dangerous to a patient who no longer has immune defenses.... This is the reason why as soon as the first accident occurred, we stopped all intramuscular and subcutaneous injections." Patients instead received the preparation by intravenous perfusion, while researchers sought to improve vaccinia inactivation methods.

Luc Montagnier, the Pasteur Institute researcher who discovered the AIDS virus, is worried by the research. He kept out of the controversy over Zagury's experiments in the past, but after hearing about the possible vaccinia infection he says he now believes that the experiments should be "interrupted forthwith." "We have carried out in vitro experiments that demonstrate the potential harmfulness of this virus when it is not opposed by the immune system," Montagnier told *Science*.

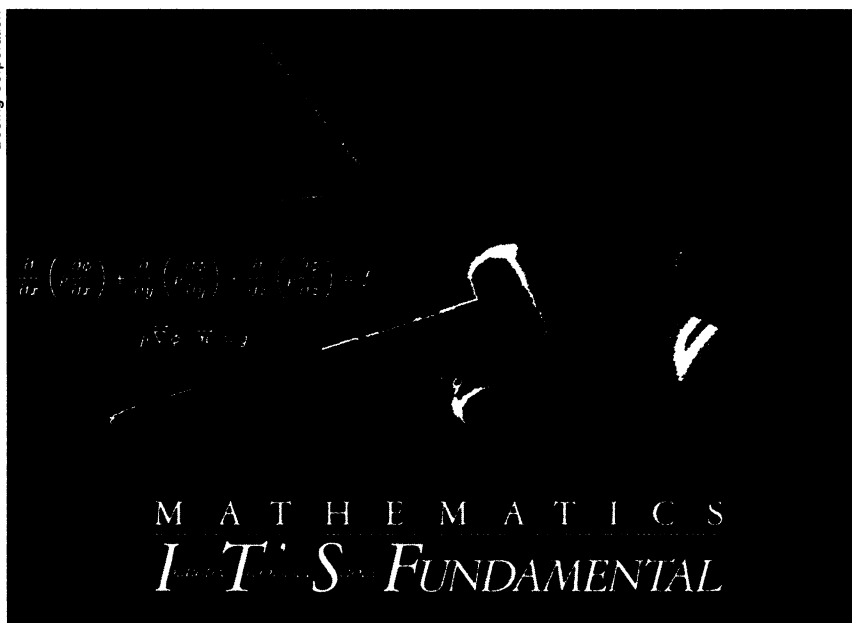
Montagnier stressed that his concerns are not influenced by past disputes between himself and Gallo, who coauthored the *Lancet* article with Zagury. Gallo's lab at NIH provided some reagents for Zagury's experiments and the genetically engineered virus was supplied by Bernard Moss of the National Institute for Allergy and Infectious Diseases. Moss, who says he had not been informed of the deaths by Zagury, had no part in planning or monitoring the experiments. For that reason, he says, he agreed to supply the vaccinia virus only on condition that "it was an official request from the French government and if the [NIH] Office for Protection from Research Risks would take responsibility."

The dangers of giving live vaccinia to immunodeficient individuals were recognized when the virus was used in the smallpox vaccination campaign, says Moss, and Zagury had assured him that his technique inactivated the virus. But "if Zagury's patients really have developed vaccinia necrosis," says Moss, "you can surmise that Zagury's method of killing the virus was not effective."

■ ALEXANDER DOROZYNSKI
AND ALUN ANDERSON

Alexander Dorozynski is a free-lance science writer based in Paris.

Boeing Corporation



Math problem. Part of a poster to promote Mathematics Awareness Week, which is taking place this week; mathematicians with new Ph.D.s are most aware of the tight job market.

Math Ph.D.s: Bleak Picture

MATHEMATICIANS ARE USING WORDS LIKE "disaster" and "catastrophe" to describe the academic job market this year for Ph.D.s in mathematics. Political and economic factors have conspired to create an apparent glut of applicants for a sharply reduced number of jobs. Departments have been flooded with applications, and some mathematicians are worried that hundreds of those job seekers may not find employment. And for a field in which fewer than 1000 new Ph.D.s and a comparable number of recent doctorates go on the job market each year, unemployment figures like that could be calamitous.

"It looks really bad," says Sheldon Axler of Michigan State University. In telephone interviews with *Science*, Axler and others paint a bleak picture of well-qualified Ph.D.s who would normally have had several offers by now but who have yet to get so much as an interview. "There are many, many people out there who are extremely talented... and aren't getting a nibble," says Paul Sally of the University of Chicago.

To be fair, the picture is somewhat clouded by a lack of hard information. Nearly all the news is anecdotal, spread by word of mouth. Even the American Mathematical Society (AMS), which collects retrospective data on the employment of new Ph.D.s, has no hard evidence. "It's hard to get the data," admits executive director William Jaco, who adds that his organization is scrambling to survey the current market.

But the anecdotes are at least consistent. While there are pockets of hiring—the Berkeley math department, for example, is do-

ing a normal amount of hiring—many other schools that would ordinarily be looking to fill several positions have only one or two, and some have none at all. Much of this is due to budget crises that have put a damper on hiring at state universities from Massachusetts to California. Many private schools also find themselves financially strapped by the current recession and reduced enrollments.

On top of this is an unexpected influx of mathematicians from the Soviet Union and Eastern Europe, as well as a large number of Chinese students now looking to remain in the United States. The Russians are a special strain on the market. As many as 300 have sought employment in the United States in the last 2 years. Many are at the very top of their profession, making them too attractive for math departments to resist. Some schools have hired one senior Soviet at the cost of two junior positions.

Another part of the problem is carry-over from last year. Although nearly everyone on the market then wound up with a job—the AMS survey of the 1989-90 crop of Ph.D.s shows a normal unemployment rate of approximately 2%—many took less-than-desirable 1-year positions, putting that many more people on the market this year.

Some students have simply opted not to graduate this year. "We quite deliberately allowed a number of our students who could have finished this year to take a sixth year rather than go on the market," says Peter May, chairman of the mathematics department at the University of Chicago. "We