

# SCIENCE NEWS of the week

## AIDS Blood Screen Approved

The Food and Drug Administration (FDA) last week approved a test intended to limit blood-product-related cases of acquired immune deficiency syndrome (AIDS). The test, which flags AIDS antibodies in blood samples (SN: 1/19/85, p. 36), "adds to our present safeguards and will make our blood supplies even safer," says Health and Human Services Secretary Margaret M. Heckler. But there's a lot the test won't do.

It is not a diagnostic tool; it identifies antibodies to the virus associated with AIDS, not whether a person has the condition or is carrying the virus itself. It does not reveal whether an antibody-positive person is capable of transmitting AIDS. The test is also not 100 percent accurate.

Screening donated blood for evidence of AIDS will eliminate only a small percentage of cases. According to the Centers for Disease Control (CDC) in Atlanta, as of Feb. 25 there were 8,597 cases of AIDS, only 165 of them related to the receipt of blood products. Nevertheless, because of the grim prospect for AIDS victims, the screen has become a top priority for the federal government and blood banks. FDA Commissioner Frank E. Young estimates that screening all blood collected in the United States will prevent about 50 to 100 cases of AIDS this year.

The test approved last week, a product of Abbott Laboratories of North Chicago,

Ill., is called an ELISA (enzyme-linked immunosorbent assay). Approval is imminent for other companies' ELISAs.

In an ELISA, broken-up pieces of the AIDS-related virus are stuck on a solid surface and washed with blood. If AIDS antibodies are in the blood, they'll stick to the virus. Then another antibody that attaches to human antibodies is introduced; this second antibody has been saddled with an enzyme. If the initial antibody is present, the second antibody and its enzyme will become part of the sandwich. The enzyme's target chemical, when added, will change color and that blood will be pulled from the donor pool.

Recent research has shown that while the majority of the people who harbor the AIDS-associated virus in their blood have antibodies to it, some don't—meaning the screen will miss a few cases. And, Young estimates, of the 1 in 100 samples that test positive, about 17 percent will be false positive—a result of the inexactness of the test. What to tell people whose blood is deemed truly positive (after a repeat ELISA is confirmed with another test) is problematical.

A positive test "does not mean that an individual has the disease or is destined to get the disease," Young says. "The significance in healthy people is not known at this time. It's true a percentage may later develop the disease, but most who have

the antibody will not experience any ill effects." The CDC has issued recommendations stating that while most antibody-positive people will not get AIDS, at least in the first few years after infection, these people should nevertheless be told they may transmit the virus to others.

The American Red Cross, which collects and distributes about half the blood used in the United States, plans to begin testing immediately, but will wait for a few weeks to gain experience with the test before telling donors if they are antibody-positive. The test is expected to add about \$6 to the cost of a unit of blood. The federal government and blood banks are setting up laboratories to handle high-risk people who want their blood screened.

Data generated by the screen are going to keep AIDS researchers busy. "The availability of serological tests to antibodies raises a whole series of questions for epidemiological studies," says the CDC's Harold Jaffee. "How many people are already infected? By what route? What are the differences between noninfected and infected people? And what will happen to infected people?"

And as epidemiologists ponder these questions, second-generation tests are being developed.

—J. Silberman

## Mixed decision in gene-splice trial

This spring's plantings once again will probably not include a field test of genetically engineered microbes. In its decision on a case heard last December (SN: 12/22 & 29/84, p. 397), the U.S. Court of Appeals has refused to lift the injunction against an experiment in which University of California scientists plan to spray crops with bacteria genetically engineered to prevent frost damage. However, the court did lift the injunction against approval by the National Institutes of Health (NIH) of other experiments involving deliberate release of gene-spliced organisms—providing that NIH give "appropriate environmental consideration... as it failed to do with the University of California experiment."

The appellate court earlier rejected NIH's most recent request, accompanied by an environmental assessment document, that the court lift the injunction against the frost-free bacteria experiment (SN: 3/2/85, p. 135). The court provided no explanation, but both the plaintiffs and defendants suggest that the rejection merely indicated that the court was about to release a fuller decision.

Both plaintiffs and defendants are claiming victory. "This ruling is a victory for the American people. The court has made it clear that no government agency can wantonly ignore the environment and public health," says plaintiff Jeremy Rifkin of the Washington, D.C.-based Foundation

## TV images suggest a TMI core melt

New television pictures from inside the crippled Three Mile Island (TMI) reactor—the first ever taken from the bottom of its reactor vessel—suggest that fuel did melt in a 1979 accident there. The pictures indicate that a 3-foot-deep deposit of debris has accumulated beneath the reactor core. In contrast to a statement issued after the preceding video survey in July 1982 (SN: 7/31/82, p. 68), GPU Nuclear Corp. now says, "Apparently, some of the debris was once molten." GPU Nuclear, which is directing the cleanup of the TMI unit-2 reactor damaged in the accident, is a subsidiary of the Parsippany, N.J.-based General Public Utilities, the plant's operator.

Unlike the first survey, made by inserting a camera 5 feet into the core area, the latest pictures were made possible by feeding the pencil-like 9-inch-long camera down the narrow passage between the side wall of the reactor vessel and the core's fuel assembly. What the fist-sized rocklike fragments (imaged in the center of photo) are made of is still unknown, according to Lisa Robinson, a GPU Nu-



clear spokesperson. However, she says, "Components that look like that don't exist in a normal reactor." Along with reactor-accident core-temperature estimates made by the Department of Energy last year during its examination of fragments of core rubble, Robinson says there is now evidence suggesting "that fuel melting did occur."

On the basis of this video survey, GPU Nuclear now estimates that some 20 tons of debris litter the reactor vessel floor. As part of the cleanup effort, initial removal of fuel from the reactor is expected to begin sometime this summer.

on Economic Trends.

"The court's decision basically came out as NIH argued at the appeals hearing," says Bernard Talbot of NIH. At that time, NIH agreed to prepare environmental assessment statements on individual experiments, but opposed Rifkin's argument that statements were necessary on a 1978 revision of the NIH guidelines regulating recombinant DNA research and on NIH's overall program for approving experiments involving environmental release of genetically engineered organisms. The other defendant, the University of California, opposed all three points.

The impact of the decision still rests on future court decisions. The district court must rule on what constitutes an adequate environmental assessment, and on whether any individual assessment is satisfactory if NIH does not prepare a "programmatic" environmental impact statement (EIS), covering its entire policy regarding deliberate-release experiments.

The court's opinion is critical of NIH. "NIH, no less than any other federal agency, must ensure that its decisions meet the standards of environmental concern and reasoned decision-making re-

quired by law," the court says. "The complexity and uncertainty of the issues before NIH do not diminish these responsibilities one iota."

The court decision states that in NIH's consideration of the proposed University of California experiment, the agency "completely failed to consider the possible environmental impact from dispersion of genetically altered bacteria, however small the number and however subject to procedures limiting survival."

NIH will probably submit its environmental assessment document on the frost-free bacteria experiment to the district court as soon as possible, according to Talbot. But Rifkin says, "We will challenge the assessment in the district court."

In the decision regarding a programmatic EIS, the appeals court says such a document would be "helpful," but the court is not prepared to argue it is essential if "NIH gives adequate environmental consideration to each deliberate release experiment..." The court follows this statement with a stronger opinion: "...if NIH does not at least consider the advisability of a programmatic EIS, its approval of individual deliberate release experiments is likely to

violate established principles of reasoned decision-making."

One of the three appeals court judges disagrees on the advisability of a programmatic statement. Judge George E. MacKinnon says, in a concurring opinion, "...because the possibilities of genetic engineering, an industry still in its infancy, extend to so many areas, and because the development of a programmatic EIS would be vulnerable to delaying tactics, composing a programmatic EIS at this time would be neither justified, practical nor prudent."

MacKinnon also admonishes the Foundation on Economic Trends for not presenting its arguments to NIH at the time the agency invited public comment on the deliberate-release experiments. "The use of delaying tactics by those who fear and oppose scientific progress is nothing new," he says. Rifkin responds that it is NIH's disregard for environmental law that has delayed the experiment.

"I think this [appeals court] decision ought to be read closely by the EPA, FDA and the other agencies," Rifkin says. "It will set guidelines for the genetic age."

—J. A. Miller

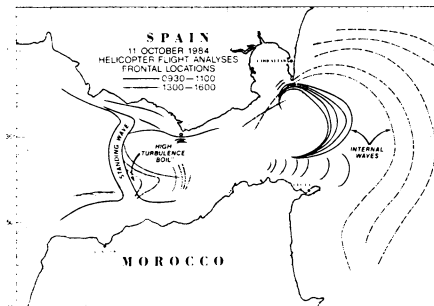
## New wave at the Rock: Standing in the Strait of Gibraltar

There's a particular section of the Strait of Gibraltar — the 15-mile-wide channel linking the Atlantic Ocean to the Mediterranean Sea — where strange things sometimes happen to ships. Even when the waters appear innocuous and smooth, ships can lose their heading, swing around or heave to one side, inviting water to rush over their decks. "For 50 or 60 years, something has been occurring there but no one has really documented it to see exactly what is going on," says Robert A. Arnone at the Naval Ocean Research and Development Activity (NORDA) near Bay St. Louis, Miss.

But now, with the help of a helicopter, satellites and the space shuttle, Arnone and fellow NORDA oceanographer Paul E. La Violette are developing a picture of the deep circulation patterns that not only may aid ship navigators but also will increase understanding of the hydrology of the strait. They plan to present their data in May at the American Geophysical Union meeting in Baltimore.

While astronaut Paul Scully-Powers photographed the strait early last October from the space shuttle, La Violette and Arnone went up in a helicopter to look in detail at some of the patterns on the surface of the strait. In particular, they tracked the movement of "internal waves," subsurface changes in the temperature profile of the water.

At the surface, these internal waves show up as alternating rough and slick areas on otherwise smooth water. The researchers discovered packets of about



A space shuttle view of the Strait of Gibraltar and a corresponding map of the region show the location of the standing and moving internal waves.

13 crescent-shaped, kilometer-wide internal waves that periodically migrated east through the strait at about 3 knots. And at the spot where these crescent waves began, they found a standing, or stationary, internal wave spanning the western end of the channel in a north-south direction. According to Arnone, internal waves have been noted before in other parts of the world where the land chokes the sea, but this is the first observation of internal waves springing off from a standing internal wave.

La Violette and Arnone have also collected data on the thermal structure of the water in the strait and on the distribution of phytoplankton and chlorophyll. These data differ slightly from what the recent photographs show, and the oceanographers are currently working on a model that explains these differences. So far, however, they think they have a partial handle on what causes the

internal waves.

The Mediterranean loses a lot of water to evaporation, says Arnone, leaving behind extra-salty water that sinks to the bottom. This heavy water flows out of the Mediterranean through the strait. At one point, it encounters a sill, or sudden rise in the seafloor, which deflects the water up to the surface. There it meets Atlantic surface water coming into the strait.

The interaction between the incoming and outgoing water over the sill, the researchers believe, sets up the standing wave. At one stage in the tidal cycle, the movement of the outgoing salty water causes fluctuations in the position of the temperature gradient of the water, releasing the series of internal waves that move to the east. Still to be worked out, say the researchers, is how the semi-diurnal tides influence the strength and size of both the standing and moving internal waves.

—S. Weisburd