than stable nuclei of iron, rather than fewer.

Clayton allows that a star might have blown up in the right place at the right time, supplying key isotopes. Earlier generations of supernovae also may have added to the potpourri. "I think the pendulum has swung toward solar cosmic rays," he says. "But the real answer is likely to include parts of both."

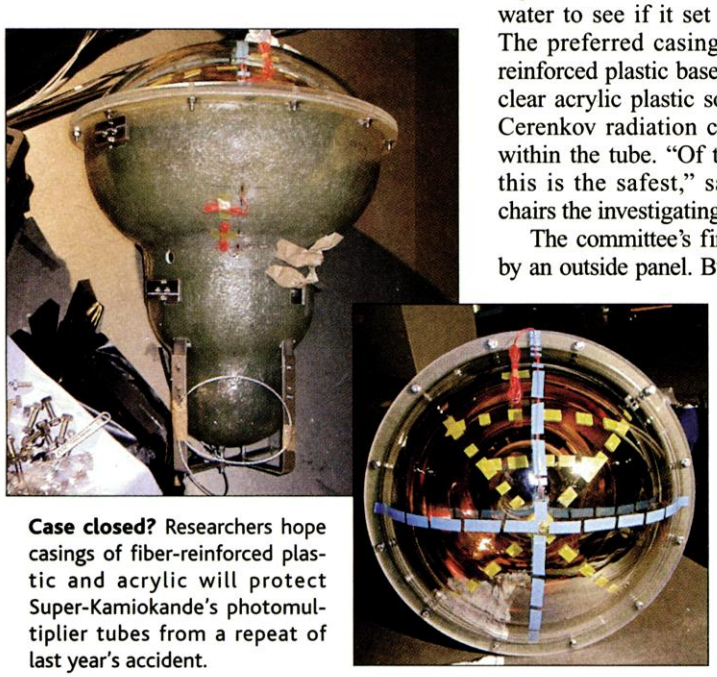
–ROBERT IRION

NEUTRINO DETECTION

Japan Hopes Casings Will Do the Trick

TOKYO—Since the devastating 12 November 2001 accident that shut down the $100 million Super-Kamiokande neutrino observatory, scientists there have been searching for a fail-safe strategy to prevent a recurrence—and get them back to work. Now they think they have one: a protective casing for each of the thousands of tubes that help them spot the elusive neutrinos. But they still need government funding for the repairs.

"I'm doing everything I can to win approval for restarting the experiment," says Motohiko Yoshimura, director of the University of Tokyo's Institute for Cosmic Ray Research, which runs Super-Kamiokande. According to Yoichiro Suzuki, head of the observatory's solar neutrino team, "this is the best solution [that can be] obtained in such a short time."



Case closed? Researchers hope casings of fiber-reinforced plastic and acrylic will protect Super-Kamiokande's photomultiplier tubes from a repeat of last year's accident.

CREDITS: ICRR

Super-Kamiokande is a massive water tank lined with light-detecting photomultiplier tubes that catch the glow of the Cerenkov radiation that results when neutrinos smash into atomic particles in the water. The facility has already earned a place in the science history books by producing the first convincing evidence that neutrinos have mass, a finding that overturned decades of theoretical predictions. But that research has been on hold since November, when a chain reaction of implosions destroyed about 7000 of the 11,000 photomultiplier tubes in the 39-meter-diameter, 41-meter-high tank. The tank was being refilled with water after some of its burned-out tubes had been replaced (*Science*, 23 November 2001, p. 1630).

In January, an investigating committee of scientists involved in the experiment, plus outside experts in fluid shock waves, concluded that workers standing on Styrofoam pads placed atop the tubes on the bottom of the tank probably caused microfractures in the neck of a single tube. Those fractures caused the tube to implode when the water pressure reached a critical limit, setting off the chain reaction throughout the tank (*Science*, 11 January, p. 247).

To prevent a recurrence of such an accident, the Super-Kamiokande team would like to nest each tube within a protective case. Researchers have tested numerous materials and configurations, including breaking one of the encased tubes in 40 meters of water to see if it set off a chain reaction. The preferred casing consists of a fiber-reinforced plastic base topped by a dome of clear acrylic plastic so that the light of the Cerenkov radiation can reach the sensors within the tube. "Of the various proposals, this is the safest," says Yoshimura, who chairs the investigating committee.

The committee's findings must be vetted by an outside panel. But an even bigger hurdle, says Yoshimura, is obtaining the necessary funding from the Ministry of Education, Culture, Sports, Science, and Technology. "The budget would possibly have to be increased" to cover the cost of the cases, he admits, although the price tag is not yet known. The ministry isn't expected to take up the matter before next month.

A green light would enable researchers to wrap the 5200 tubes now available—those that survived, plus a thousand or so spares—in protective cases and redeploy them throughout the tank. Although this arrangement provides reduced sensitivity, it's good enough to resume some research. Getting the facility back to full strength could take 5 years and between $15 million and $25 million.

–DENNIS NORMILE

ScienceScope

Mouse Pact Stanford researchers say they've sealed a knockout deal. The university confirmed earlier this month that it has signed a 3-year pact with Deltagen Inc. that gives its scientists access to the firm's catalog of genetically engineered knockout mice and extensive database of gene function information. In return, the company will get first dibs on discoveries with commercial potential. The deal could become a model for giving academics faster access to knockouts, in which a gene has been removed in a bid to understand its function.

Deltagen typically charges pharmaceutical firms up to $5 million a year for access to its database and up to 250 of its more than 1000 possible mouse models, says William Matthews, president of the Redwood City, California, company. But Stanford and Deltagen agreed to swap intellectual property instead of cash. Stanford cancer researcher Tony Oro says that, although the arrangement still needs road-testing, he is eager to comb through Deltagen's holdings. Creating and working with knockouts once was "like sipping water drop by drop," he says. "This is like opening a fire hydrant."

Rave Review The oft-maligned U.S. anthrax vaccine, suspected of causing everything from tinnitus to fatal anemia, received a vote of confidence this week from a panel at the Institute of Medicine (IOM). Headed by Brian Strom, chair of biostatistics and epidemiology at the University of Pennsylvania in Philadelphia, the panel found "no convincing evidence at this time" of serious negative health effects.

Addressing questions about efficacy, the panel noted that the anthrax bacterium is so dangerous that it would be unethical to test the potency of the vaccine in clinical trials. But the panel concluded that data from animal studies, combined with "reasonable assumptions," show that the vaccine is "effective" and can protect humans against "any known or plausible engineered strains of *Bacillus anthracis*." The vaccine does have faults, according to the report. The six required injections can create swelling and "nodules" at the injection site, fever and malaise, and, in some people, a period of "brief functional impairment." The IOM group urges the military to fund new studies of how the vaccine works, examine ways to reduce the number of injections, and increase its monitoring of possible long-term health effects.

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