tectonic processes formed the Namibian Basin, and assumed that it filled with sediment as it formed. They concluded that the isotopic excursion took at least 10 million years.

This long duration "pretty well destroys" another explanation for the isotopic spike, says Hoffman—that the ocean overturned suddenly. That idea was proposed in 1996 by paleontologist Andrew Knoll, also of Harvard, and his colleagues, who suggested that the cap carbonate was deposited from carbonate-rich waters welling up from the deep sea. But such upwelling would have lasted less than 100,000 years.

Not everyone is ready to accept the idea of a frozen Earth. Prolonged isotopic excursions are unlikely, says Knoll colleague Dick Bambach of Virginia Polytechnic Institute and State University in Blacksburg, and require unusually strong data to back them up. And geochemist Martin Kennedy of the University of California, Los Angeles, also has carbon isotopic data from Namibia, but they show no deep productivity decline before the Namibian glacial deposits. His evidence "is very different than theirs," he says. Snowball Earth "is a novel and creative idea, but I don't think the data support it."

Furthermore, Kennedy argues that if Earth really was a snowball, strontium isotopes should respond too. The ratio of strontium-87 to strontium-86 in the oceans should have dropped as the glaciation cut off rivers enriched in strontium-87 by weathering of the continents, he says. But his unpublished data show that during the carbon excursion, the strontium ratio rose sharply, indicating more continental erosion, not less. "It's one of the greatest shifts in history," he says.

Hoffman offers a rebuttal on all points. Their carbon isotope data resemble other published records, he says. And Schrag says the strontium ratio would have been kept high, first by acid from undersea volcanoes dissolving strontium-bearing carbonate sediments, and later, after the glaciation, by greenhouse-induced weathering of continental rock. But Derry, who has worked with members of both groups, says that if the strontium data hold up, snowball Earth "has a problem." It remains to be seen whether this snowball can take the heat.

—RICHARD A. KERR

RICK KOZAK; FAR RIGHT: AP PHOTO/KOJI SASAHARA

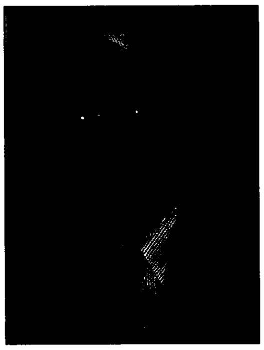
JADAVPUR UNIVERSITY

SHARING REAGENTS

NIH, DuPont Declare Truce in Mouse War

A contentious, 2-year legal wrangle that set molecular biologists against company lawyers ended last week when the DuPont Pharmaceuticals Co. of Wilmington, Delaware, agreed to relax the terms under which it allows scientists to share a popular type of laboratory mouse.

On 19 August, Harold Varmus, director of the National Institutes of Health (NIH), announced at a scientific meeting that NIH has hammered out a memorandum of understanding with DuPont that will make it easier to transfer genetically engineered mice from NIH labs to other nonprofit institutions. (The text is available on the Web at http://www.nih.gov/od/ott/cre-lox.htm.) The agreement lifts several restrictions DuPont had placed on the use of mice created with the company's patented "cre-lox" system—an efficient method of editing DNA at a specific site on the mouse genome. It is used chiefly to explore gene function. Varmus describes the pact as "a milestone in the cooperative relationship between academia and industry." And NIH staffers say they hope other companies will use the model to make patented research tools more accessible.



Just say no. Harold Varmus resisted DuPont's terms.

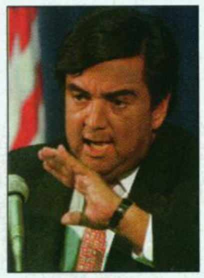
The flap over cre-lox mice began about 3 years ago. In an effort to tighten control over products on which it holds patents, DuPont began contacting researchers, asking them to sign an agreement that would limit their freedom to use and share the cre-lox technique (*Science*, 4 July 1997, p. 24, and 1 July 1994, p. 26). DuPont asked that anyone using cre-lox methods send the company prepublication copies of their scientific reports. The company also tried to acquire commercial rights to future inventions that might arise from experiments involving a cre-lox animal. In addition, DuPont's lawyers warned researchers not to share cre-lox mice with colleagues unless the recipient agreed in advance to DuPont's terms.

Many scientists balked. For example, Jackson Laboratories of Bar Harbor, Maine, a nonprofit research center that breeds and distributes mice to scientists around the world, negotiated for 2 years, but failed to reach an agreement with DuPont. The impasse prevented Jackson from distributing cre-lox mice, making it difficult for some scientists to acquire animals. Varmus, who had pushed for making new genetic tools widely accessible before coming to NIH, sided with Jackson in 1997 and joined in boycotting DuPont's terms. But after more than a year of negotiations, NIH and the president of DuPont's research labs, Paul Friedman, found common ground in June, according to NIH's director of technology

ScienceScope

NEXT STOP, LOS ALAMOS

New U.S. Department of Energy (DOE) Secretary Bill Richardson is taking scientific touring seriously. On 11 August, after just one day on the job, Richardson departed Washington on the first of several planned barnstorming tours partly designed to familiarize him with DOE's far-flung, $6 billion research empire, which includes dozens of labs. Early stops will include California's Lawrence Livermore National Laboratory and the Los Alamos lab in Richardson's home state of New Mexico.

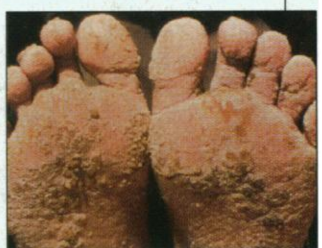


Richardson is hitting the road.

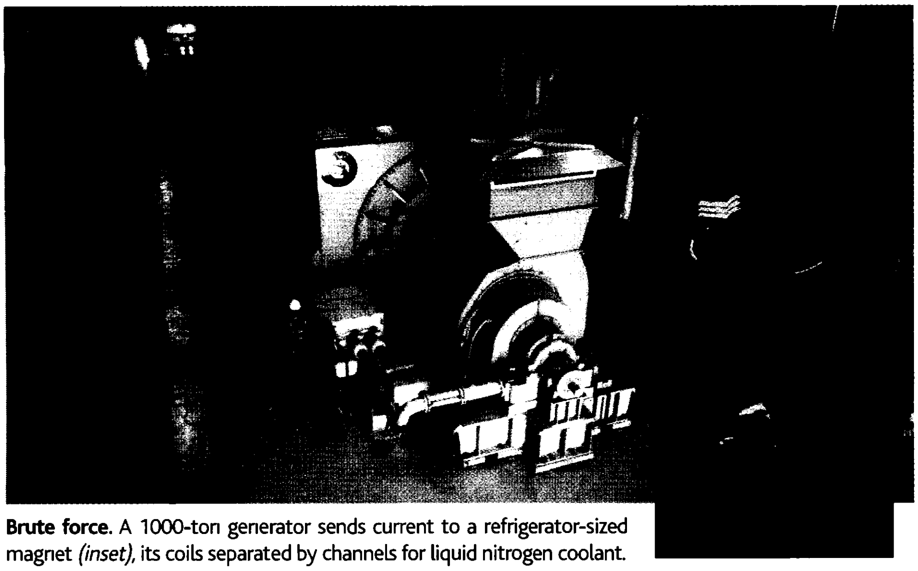
Richardson said he wants the public to learn more about "the remarkable research" being done by department scientists and wants DOE to become the government's leader in studying climate change. He admits, however, to being "weak in the science and technology area," and says he will welcome advice from DOE's top science guru, Undersecretary Ernest Moniz, a physicist.

GETTING A GRIP ON ARSENIC

Bangladesh's arsenic pollution problem, which threatens the drinking water of more than 70 million people, will soon have the undivided attention of a new research center. The National Arsenic Mitigation Information Center (NAMIC), to open in Dhaka on 1 October with help from the World Bank and the Swiss government, will spend $1.5 million over 4 years to inform researchers and the public about the problem, which was first detected in 1993 after Bangladesh drilled thousands of deep wells in an effort to tap cleaner water (*Science*, 11 October 1996, p. 174). NAMIC will also fund scientists working to trace arsenic sources and develop new purification methods, efforts that could be key to a planned $44 million program to blunt the threat. The center, says World Bank hydrogeologist Babar N. Kabir, "is going to be critical for tackling the arsenic epidemic."



Arsenic poisoning victim



J. FLOWER, CIC9/LOS ALAMOS; *FAR RIGHT:* J. R. SIMS; J. B. SCHILLIG; J. VAN ANNE/LOS ALAMOS

Brute force. A 1000-ton generator sends current to a refrigerator-sized magnet *(inset),* its coils separated by channels for liquid nitrogen coolant.

capable of generating fields of 60 tesla, about 1 million times stronger than the Earth's own magnetic field.

The new magnet isn't the first to reach such high fields, but what it does have is staying power. The best existing machines create roughly the same field but can hold it for only about 1 millisecond. The new magnet, with a 1000-ton generator capable of powering a modest-sized city, sustains that field for about 100 times longer.

"It's a unique facility that will allow experiments that are impossible to do elsewhere," says Simon Foner, a high-field magnet expert at the Massachusetts Institute of Technology in Cambridge. The magnet is expected to be most useful for looking at the electronic and magnetic behaviors of a variety of materials, such as semiconductors, high-temperature superconductors, and the layered magnetic materials used to make computer disk drives.

In high-temperature superconductors, for example, free-flowing electric current and magnetic field are like oil and water: They don't mix. Hence, researchers can use the new magnet to wipe out the superconductivity of the materials at temperatures at which they would normally work, thereby allowing them to study the transition between the superconducting and nonsuperconducting states.

Los Alamos physicist Scott Crooker and his colleagues became acquainted with the magnet's capabilities this spring, during its testing phase. The researchers looked at the behavior of layered semiconductor materials designed to confine large numbers of electrons in a thin sheet within the device. Crooker and his team are still analyzing the results, but it was instantly clear that the new machine made life easier. "The beauty of the long-pulse magnet is that we have 100 times longer to collect data and get meaningful results," he says. "The machine is a real tour de force."

The brute behind that force is a building-sized generator that arrived at its present role via a circuitous route. It was built in 1980 to convert energy from a steam turbine in a Tennessee nuclear power plant into electricity. When plans for the power plant were scrapped, Los Alamos picked up the generator to power the high-field magnets needed to confine the energetic plasma in a planned nuclear fusion reactor. But when the fusion reactor itself was later cancelled, the pulsed-magnet builders snagged the homeless generator.

Today, the machine has been reengineered to act first as a motor, which slowly takes power from the grid to crank up a giant spinning shaft, and then as a generator to convert that mechanical energy back into an enormous pulse of electricity.

But the magnet designers did a lot more than simply apply an electrical sledgehammer. "From an engineering point of view, it's quite an accomplishment," says Foner. The generator provides some 1.4 billion watts of power, much of which is dumped straight into the metal coils of the refrigerator-sized magnet. That huge amount of current puts an enormous strain on the coils. The magnetic forces essentially try to squash the magnet into a pancake, and the energy dissipating in the coils generates heat that would also melt the metals in seconds if allowed to stick around.

To prevent an implosion of the coils, the magnet's designers made them out of reinforced copper laced with aluminum oxide, surrounded by specially coiled stainless steel supports, says James Sims, a mechanical engineer at Los Alamos and the magnet's chief engineer. And to prevent a meltdown, the researchers take two main precautions. First, they shunt the power out of the magnet as quickly as possible after the pulse has finished to minimize heating in the coils.

Second, Sims and his colleagues designed the magnet with nine separate sets of

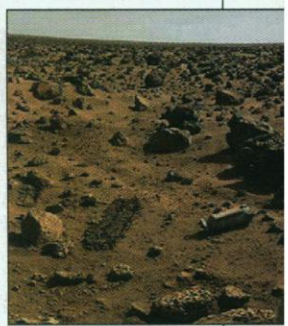
ScienceScope

MARS MAPPER GETS THE HICCUPS

Scientists may have to wait 9 months longer than planned for the Mars Global Surveyor spacecraft, currently orbiting the red planet, to begin delivering an uninterrupted map of the surface.

On 10 August, NASA officials announced that they may need the extra time to fix a potential flaw in a 2-meter-long communications antenna, which was supposed to be deployed in March 1999. But air bubbles in a hydraulic shock absorber could cause the unfolding arm to swing wildly and perhaps break.

The 9-month delay "would reduce the flow of imagery and science data somewhat," says NASA's Glenn Cunningham, because Surveyor won't be able to scan the planet's surface and send data home simultaneously. Instead, the spacecraft will store information, then pivot away from Mars to transmit data back to Earth. The pauses will produce gaps in the Mars maps Surveyor is assembling, but NASA officials hope to fill them in after the problem is solved.



NASA

Mars surface

PAYDAY IN CANADA

Some of Canada's young scientists will soon be sprucing up their labs. On 13 August, the federal government handed out the first 214 checks—totaling $23.4 million—from a long-awaited 5-year, $520 million initiative to improve aging research facilities (*Science*, 13 February, p. 979). The grants to 26 universities are intended to help launch the careers of more than 400 young researchers.

While 71% of applicants in this first competition were successful, grant seekers shouldn't expect such high odds in the main funding round this fall, says Canada Foundation for Innovation (CFI) president Denis Gagnon. Institutions have flooded the CFI with 465 requests totaling $735 million to bring workbenches up to snuff and create new national laboratories, but the foundation will dish out less than $260 million.

David Malakoff, Pallava Bagla, and Wayne Kondro