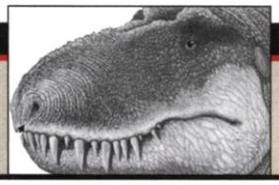
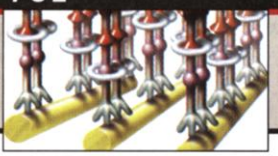
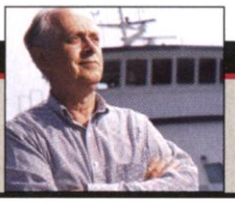


779
Dino nostrils to the fore

LEAD STORY 782
Special News Focus: Nanocomputing





790
Peter Brewer and the CO_2 solution

Working in a fine rain of black ash perceptible only from a rustling in the foliage and the way it faintly pricks the skin, Burton measured the absorption of the sun's rays passing through the volcano's gas cloud. From this he could decipher the relative amounts of gases—such as sulfur dioxide, hydrogen chloride, and hydrogen fluoride—venting from the volcano.

Sifting through earlier gas data, Burton has found an intriguing correlation. Just 4 days before the eruption began, the ratio of sulfur dioxide to hydrogen chloride rose more than twofold. It remains to be seen whether such a sign will presage future eruptions.

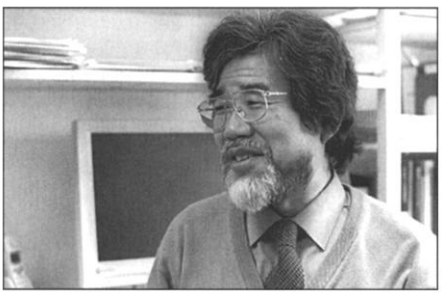
More pressingly, the gas ratios should help researchers gauge the stamina of each of Etna's now five active vents by determining which are drawing from the main magma reservoir. "It's difficult to tell if the main central system is feeding all these vents," says geologist Renato Cristofolini of the University of Catania. Ebbing sulfur dioxide might suggest less welling up and degassing of magma—and the eruption tapering off. A lengthy eruption—such as Etna's last major one, which lasted from December 1991 to March 1993—would be cause for concern, as it would increase the likelihood of lava tube formation. These hardened lava conduits would funnel molten lava faster and farther down the mountain, perhaps threatening towns. So far, however, all signs point to ample magma—and no end in sight to Etna's latest outburst. Although monitoring tools are getting better, says Oppenheimer, "no one could give you reliable odds on how long the eruption will go." **–RICHARD STONE**

STEM CELLS

Japan Readies Rules That Allow Research

TOKYO—Japanese scientists would be allowed to derive and conduct research on human embryonic stem cells under guidelines expected to be approved this week by a top-level advisory body. Researchers say they are satisfied with the guidelines, which have been drawn up with little of the rancor that has characterized the debate in the United States.

A committee working under Japan's highest science advisory body was set to finalize its recommended guidelines at a meeting scheduled for 1 August. Ultimately the guidelines will have to be approved by the education minister, whose concurrence is widely expected. Barring unforeseen glitches, the guidelines could be put into practice as early as this fall, clearing the way for any researcher in Japan to establish human embryonic stem cell lines and start using them for research. "We can now go ahead in making plans for research in this very exciting field," says Norio Nakatsuji, a developmental biologist at Kyoto University who is likely to be one of the first in Japan to establish such cell lines.



Green light. Norio Nakatsuji is looking forward to creating cell lines under new guidelines.

Human embryonic stem cells, which theoretically can develop into any of the body's cells, may ultimately provide laboratory-grown replacement organs and treatments for such diseases as Parkinson's and Alzheimer's. But embryos are destroyed when stem cells are harvested, making their use ethically controversial. Unlike in the United States, there has been no organized lobbying against their use in Japan, and few politicians have addressed the issue. However, public concern over the possible commercialization of human embryos and potential misuse of the cells has led the panel to recommend tough guidelines. "Strict regulation is necessary to obtain public support," agrees Nakatsuji.

Under the proposed guidelines, all plans to establish embryonic stem cell lines and all research using the cells will have to be approved and monitored by each institution's ethical review board and by a newly established review board under the Ministry of Education, Science, Technology, Sports, and Culture. Researchers must have demonstrated an ability to handle stem cells through prior work with animal stem cells. Stem cells may only be harvested from "spare" embryos resulting from in vitro fertilization. The embryos must be donated, with donors giving written informed consent for their use. Clinics or hospitals planning to gather embryos for the isolation of stem cells must have their own review boards.

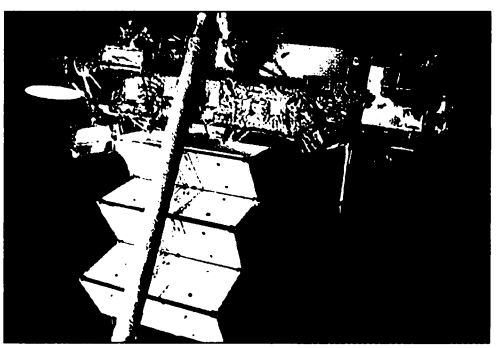
The resulting cell lines are to be used only for basic research. Use of the cells for reproductive purposes, cloning, medical treatment, or drug screening is expressly prohibited. The guidelines apply to both public and private sector research. Public sector violators could lose their funding. Although the guidelines don't carry the force of law, private firms are unlikely to risk the bad publicity that would come with flaunting public policy. As yet, however, the private sector has shown little interest in the field. **–DENNIS NORMILE**

EARTH SCIENCES

Satellite Shutdown Stirs Controversy

NASA last week abruptly decided to shut down a venerable research satellite that has been gathering critical global climate change data for a decade. The decision, made for fiscal reasons, surprised and angered atmospheric researchers, who were planning a festive 10th anniversary celebration next month for the Upper Atmosphere Research Satellite (UARS).

NASA officials say it's probably only the first in a series of similar shutdowns resulting from a decision several years ago to put industry in charge of satellite operations. The planned cost savings never materialized, however, forcing project scientists to make some tough decisions. "It's not a pleasant situation," says Paul Ondrus, project manager for operational missions at NASA's Goddard Space Flight Center in Greenbelt, Maryland. Now, NASA managers are faced with another



Heads up. The massive UARS satellite, here being placed in orbit, must either be brought back by the shuttle or be left to an uncontrolled descent.

CREDITS: (TOP TO BOTTOM) COURTESY OF NORIO NAKATSUJI; JSC/NASA