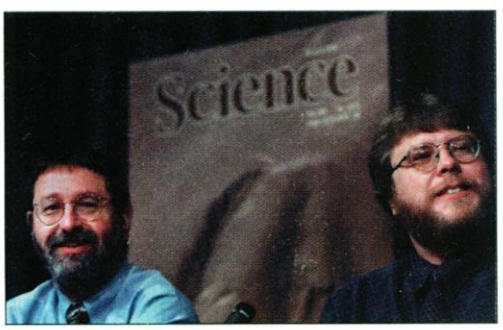
so feeble that any water within 2 or 3 kilometers of the surface should be permanently frozen solid, Clifford notes. Yet the apparent martian seeps spring from rock exposed at the now-frigid surface, and they presumably flowed through layers as little as 150 meters below to get there.

These drawbacks have many researchers reaching for alternatives. Carr, Clifford, and others are considering clathrates. These ices of water and a second component, such as carbon dioxide, form at low temperatures and high pressures but decompose to gas when warmed or depressurized. Clathrates of carbon dioxide, the most abundant gas in the martian atmosphere, may have formed in the crust, Carr noted, and could burst from rock walls to form fluid masses of gas and debris that would flow down like water, the way streams of hot gas and ash flow down from volcanic eruptions.

A less exotic explanation is water ice frozen into rock layers that melts only on geologically rare occasions. Clifford and hydrologist Victor Baker of the University of Arizona, Tucson, each independently suggested the same mechanism to *Science* that Mars geologist Kenneth Tanaka of the USGS in Flagstaff, Arizona, presents in his Perspective on page 2325. All three were struck by how the seeps prefer pole-facing slopes. Although among the coldest spots on Mars today, they note, such slopes would have been among the warmest 4 million or 5 million years ago. Planetary dynamicists calculate that back then a wobbly Mars was temporarily tipped over as far as 45° compared to its current 25° obliquity or inclination of its spin axis. That would have warmed Mars generally by sending part of the water ice in the southern polar cap into the atmosphere, strengthening the greenhouse effect. The tilt would have warmed high-latitude, pole-facing slopes even more, by putting them in full sun through long summers. "I'm more and more persuaded that what they're seeing is a reflection of what happens during high obliquity," says Clifford. "It's the most plausible explanation."



Bleary-eyed pair. Michael Malin (left) and Kenneth Edgett found 200 examples of seeps among 65,000 recent images of Mars.

CREDITS: (LEFT TO RIGHT) H. SMITH GARRISON/AP; DEVERE PATTON

Whatever happened, researchers are excited. Signs of near-surface water, whether liquid or solid or clathrates, "is an important result," says Baker. The muddy rivulets, whether a day or a million years old, "show the ground ice is there today," says Baker. That the water got loose in some way recently calls into question that Mars has been "cold, dry, and inactive since early times." –RICHARD A. KERR

OSTEOPOROSIS

Cholesterol Drugs Show Promise as Bone Builders

For the millions of people worldwide with osteoporosis, one tumble can break a hip, and a hug can crack a rib. Drugs called bisphosphonates can prevent many fractures by stopping the body from breaking down bone. But even today's best drugs prevent only about half the fractures, and none of them do much to spur the body to rebuild healthy bone.

That could soon change. Not only do statins, a group of drugs used by millions to head off heart disease, seem to prevent fractures, but they may also trigger significant bone regrowth in older people, according to four studies reported in the 28 June issue of *The Journal of the American Medical Association* (*JAMA*) and the 24 June issue of *The Lancet*. And another promising treatment, a recombinant fragment of human parathyroid hormone called rhPTH, is even closer to the clinic: Two clinical trials reported at meetings in the past 2 weeks show that the compound builds bone and lowers the risk of fracture by more than half. "These are really quite striking reductions in fractures," says endocrinologist Conrad Johnston of Indiana University School of Medicine in Indianapolis, president of the National Osteoporosis Foundation.

Like a work crew repairing an aging street, the body normally maintains bones by digging holes, then refilling them with fresh material. Osteoporosis, which afflicts 10 million Americans, most of them postmenopausal women, occurs when the body breaks down bone faster than it can replace it, rendering the bones thin and brittle. Bisphosphonates such as alendronate and risedronate, as well as estrogen replacement therapy, all slow bone loss by blocking cells called osteoclasts, which dig the holes. But none of these drugs stimulates the cells, called osteoblasts, that fill in the holes. As a result, treatment works best on people diagnosed early, while they still have most of their bone mass. But because many patients have already lost 20% to 30% of their bone mass by the time of diagnosis, Johnston says, "we want something that will build it back."

In a surprising finding last December, a team led by endocrinologist Greg Mundy of

ScienceScope

Relishing Victory The human genome wasn't the only organism whose sequence earned the spotlight this week. Plant geneticists are hailing the imminent completion of work on the wispy, ankle-high mustard plant called *Arabidopsis* (*below*), a model system for plant biologists.

As of last Saturday, 108 million of the plant's 120 million nucleotide bases had been sequenced and made publicly available, Anthanasios Theologis of the University of California, Berkeley, told the International Conference on *Arabidopsis* Research meeting in Madison, Wisconsin. The five participating international groups hope to finish the job by the end of July, well ahead of the original 2004 target date.

Government funders and sequencers boast that the *Arabidopsis* genome is extremely accurate, with only 1 error in every 20,000 bases, says Theologis, and contains few gaps. "It's probably the best done of all genomes," he adds. And although its completion will mark the first detailed genetic record of a plant, the real value will be as a template for the rice genome, some four times larger. "Nobody eats *Arabidopsis*," notes John Quakenbush, a researcher with the *Arabidopsis* group at The Institute for Genomic Research in Rockville, Maryland.

Hear Our Plea The honeymoon may be over between French scientists and their new research minister, Roger-Gérard Schwartzenberg. Schwartzenberg, who took over in March from sacked predecessor Claude Allègre (*Science*, 31 March, p. 2387), promised to boost several fields, particularly the life sciences. But on 15 June, three leading French biologists decried an "extremely serious" lag in French biology in a letter to Schwartzenberg, Prime Minister Lionel Jospin, and Finance Minister Laurent Fabius. France hasn't kept pace with major budget increases for biological research in the United States and Japan, notes the appeal, which seeks more funds and has been signed by nearly 400 biologists.

"Life sciences have an ambiguous position in France," says Henri Korn of the Pasteur Institute in Paris, who launched the campaign with Pierre Chambon of the Collège de France and Alain Prochiantz of the basic research agency CNRS. "On one hand they are given almost mythical status, [but] on the other no one really cares." The petitioners hope their plea will change things, but so far neither Schwartzenberg, Jospin, nor Fabius has responded.

But some members of the Lyons-based European Center for Research in Virology and Immunology (CERVI)—a federation of teams associated with the BSL-4 facility—are left wondering how their plans will be affected. "None of the directors [of the CERVI research units] were consulted, and we do not know what [Pasteur's] scientific program is going to be," says CERVI member Jean-Luc Darlix, head of a human virology lab run by the biomedical research agency INSERM.

In the hot seat. Europe's premier pathogens lab is about to come online with the Pasteur Institute—not Susan Fisher-Hoch (*right*), it appears—at the helm.

Fisher-Hoch is even less certain about her future at the lab. Confidential documents from CERVI and the foundation obtained by *Science* indicate that Pasteur and foundation officials intend to appoint Pasteur virologist Vincent Deubel as the new director, effective this fall. Deubel has searched in Africa for reservoirs of the deadly Ebola virus, although Darlix and others say that he has no experience in a BSL-4 lab. Deubel declined to comment, but Kourilsky defends the putative appointment of a Pasteur scientist: "If the Pasteur Institute is associated with the [BSL-4 facility]," he says, "it is normal that the scientific direction would be assured by a Pasteurian."

Fisher-Hoch sees darker forces at work. For the past several months, articles in Lyons newspapers and in the national press have suggested that the lab might pose a health threat to the local community. A story in the 30 March issue of the weekly magazine *L'Express*, for example, reported that Fisher-Hoch last fall was given a number of possibly virally infected blood samples from Sierra Leone by her husband, Joseph McCormick, and that she violated safety procedures by putting them in a freezer in a BSL-2 lab, which has fewer safeguards than a BSL-4 lab. (McCormick, also a former CDC virus hunter who works at the Lyons-based drug company Aventis-Pasteur, has had his own troubles with Pasteur; see *Science*, 13 November 1998, p. 1241.) Charles Mérieux refers repeatedly to this alleged incident in letters to the WHO's Heymann this spring, in which he asks for help in replacing Fisher-Hoch. Mérieux also complained about Fisher-Hoch in letters to Kourilsky. (Heymann says he did not respond to the request, and Kourilsky declined to comment, saying the issue is an internal foundation matter.)

Fisher-Hoch and McCormick dispute the press accounts. They say the samples were from healthy Western donors, including themselves, and were drawn during a workshop they conducted in Liberia—not Sierra Leone—to teach medical personnel how to perform diagnostic tests for Lassa fever. Fisher-Hoch says she laid this out in an 11 April letter to Mérieux, explaining that she intended to use the uninfected samples as controls in future work on lethal viruses. Mérieux, 93, told *Science* that whether or not the alleged incidents were true, they "created a bad image of the [BSL-4 facility]" in the press which "I cannot tolerate." Fisher-Hoch's contract to direct the lab runs until February 2002, although foundation officials say she will now be asked to accept a lesser role. But she speculates that once the lab was ready to come online it was too tempting a prize: "As the French say, the cake was too beautiful, everyone wanted to eat it." –MICHAEL BALTER

CREDITS: R. BENALI AND R. GAILLARDE/GAMMA LIAISON

OBESITY

Enzyme Blocker Prompts Mice to Shed Weight

When it comes to body fat, the laws of thermodynamics hold weight: Take in more calories than the body burns to produce energy, and the excess will be shunted into fat. To regulate this thermodynamic system, the body somehow keeps the brain apprised of the energy balance so it can dampen our appetites if we are overeating. Now, a multidisciplinary team from Johns Hopkins University may have discovered an important new clue about how the body performs this feat of calorie—and thus weight—control.

The team, led by pathologist Francis Kuhajda, chemist Craig Townsend, bio-

ScienceScope

Money Trouble Scientists are blasting the South African government for offering expense-paid trips to 45 members of a controversial advisory panel that is revisiting HIV's role in AIDS. South African President Thabo Mbeki—who has said his government can't afford the relatively cheap drugs that prevent mothers from infecting their babies with HIV—was lambasted by critics in May when he expressed doubts that HIV caused AIDS and convened a review panel that includes prominent HIV skeptic Peter Duesberg of the University of California, Berkeley (*Science*, 28 April, p. 590). Now, even some panelists who live outside South Africa are enraged that the government is offering generous per diems, business-class air tickets, and swank hotels to the group for its final meeting in Johannesburg on 3 to 4 July, before a major international AIDS conference in Durban.

But panelist Stefano Vella, president-elect of the International AIDS Society, believes that the money will be well spent if the panel convinces Mbeki that HIV causes AIDS. "We can't skip dealing with him," says Vella. "South Africa is seen as a leading country in Africa." A government official who sent the invitation did not respond to *Science*'s inquiries.

Genetic Variety Forty Japanese drug firms will fund a $10 million program to explore single-nucleotide polymorphisms (SNPs), the single-base variations in a person's genetic code that influence disease risk and treatment reactions. University scientists involved in the program, set to begin next year, will analyze blood samples from 1000 Japanese individuals and make the data freely available to other researchers.

The project will run in parallel with two existing efforts funded by the government and an international consortium. Backers of the $45 million SNPs Consortium, supported by European and U.S. firms, hoped that Japanese companies would join their effort (*Science*, 16 April 1999, p. 406). But a spokesperson for the Japan Pharmaceutical Manufacturers Association said that the group felt it needed its own program, although future cooperation is possible. And how the private effort, which has an applied focus, will coordinate with Japan's more basic research–oriented public program isn't clear, says Yusuke Nakamura of the University of Tokyo, who heads the government-funded effort. But he agrees that Japan "definitely needs its own [SNPs] database."

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