Opposite views. Germany's president, Johannes Rau (*left*), and its chancellor, Gerhard Schröder, both Social Democrats, disagree on the ethics of embryo research.

about life and death affect us all. We therefore must not leave them to the experts," he said. "We must debate these issues and then decide on them together." He also conjured Nazi ghosts, warning that "no one should forget what happened in the academic and research fields" in Germany during World War II. "An uncontrolled scientific community did research for the sake of its scientific aims, without any moral scruples," Rau said.

In response, German Chancellor Gerhard Schröder—like Rau, a Social Democrat—led a freewheeling debate in the Bundestag (the lower house of Parliament) on 31 May by defending researchers seeking new treatments against diseases such as Alzheimer's and Parkinson's. "The ethics of healing and of helping deserve just as much respect as the ethics of creation," said Schröder, who does not want to ban limited stem cell research. He warned that German leaders must keep in mind the potential consequences of "the neglect of research and development" if rules are so strict as to deprive people with intractable diseases of possible treatments. Schröder said it was wrong for politicians to accuse ES cell researchers "of having dark and unethical motives."

But Schröder found limited support for his view in the Bundestag. Several fellow Social Democrats lined up against his position, and the leader of the opposition Christian Democrats, Angela Merkel, argued that even importing ES cells for research "violates the spirit," if not the letter, of Germany's Embryo Protection Law. Merkel plans to introduce legislation that would place a moratorium on such research until Parliament comes to a decision. Delegates of the Green Party—part of Schröder's coalition—also opposed both ES cell and preimplantation diagnosis research. "I've never seen any scientific topic in Germany as vividly debated," says Detlev Ganten, director of the Max Delbrück Center for Molecular Medicine in Berlin and a member of the bioethics panel, comprised of 24 scientists, theologians, legal experts, business executives, and philosophers. "I find it healthy."

Others question whether the panel has any chance of mending the political schism. The ethics council is bound to struggle with the issue of ES cell research, says panel member Christiane Nüsslein-Volhard, a director of the Max Planck Institute for Developmental Biology in Tübingen. "It's likely that such research will be done mainly in England and Israel, and not in Germany and the United States," predicts the Nobelist, who says she finds Rau's approach "too extreme" and generally agrees with Schröder's pragmatic attitude. Brüstle, who was in Israel last week discussing the possibility of importing ES cell lines for his research project, says he does not expect Germany to agree on a new policy on ES cell and preimplantation diagnosis research anytime soon, in part because of next year's federal elections.

–ROBERT KOENIG AND GRETCHEN VOGEL

SPACE SCIENCE

Canada Eyes Front-Row Seat in Mars Program

BOSTON—Canada's space efforts over the past 2 decades have focused largely on radar satellites and a robotic arm for the international space station. Now Canadian space officials are asking scientists to help them plan a Mars mission so outstanding that it can overcome tight budgets and leapfrog other research priorities to win government funding.

As a first step in that campaign, some 120 researchers met late last month in Montreal to kick around ideas ranging from drilling beneath the martian surface to returning samples from one of its moons. "We look at this as the next major space program for Canada," says Marc Garneau, recently named executive vice president of the Canadian Space Agency. "We want to be involved with Mars in more than peripheral ways."

Garneau thinks the timing is right to pump new funds into space science, which receives about 15% of the agency's $234 million annual budget. Spending is winding down on the $600 million robotic arm, which was installed on the space station this spring but is suffering from technical troubles. But even so, the estimated cost of a Mars mission—likely to top $300 million even with the help of international partners—would require a bigger overall budget, says Garneau, who is hoping for an increase in the fiscal year that begins 1 April 2002.

The agency intends in the months ahead to develop a set of possible missions for

ScienceScope

Begging for Bioinformatics Two bioinformatics companies are hoping the Canadian government will join their bid to create a massive new public database on protein interactions. Computer giant IBM and MDS Proteomics, a Canadian company, last week announced that they will provide $3 million each for the Biomolecular Interaction Network Database (BIND).

Blueprint Worldwide Inc., a nonprofit corporation organized to oversee BIND, hopes to persuade governments and other companies to put up $50 million for what it sees as a global repository on protein, RNA, and DNA interactions. If successful, BIND will help promote bioinformatics in Canada and encourage researchers to standardize their data, says Tony Pawson, a researcher at the Samuel Lunenfeld Institute in Toronto, who co-founded Blueprint.

Mega-Ecosurvey What's billed as the largest study ever of the health of the world's ecosystems is now officially under way. The United Nations this week launched the Millennium Ecosystem Assessment, a 4-year, $21 million effort sponsored mainly by the UN, World Bank, and foundations. The funds will allow an estimated 1500 scientists around the world to assess how well lands and waters are standing up to human impacts (*Science*, 8 September 2000, p. 1677).

R.I.P. *The Sciences*, the highbrow, art-laden magazine for laypeople produced by the New York Academy of Sciences (NYAS), has been given the ax after 40 years of publication. The NYAS board of governors voted to close down the award-winning magazine at a 31 May meeting, and the next day its six staffers were laid off.

The bimonthly magazine, with a circulation of 46,000, carries almost no advertising and has always been a drain on the academy's budget. But with membership stagnant and the NYAS changing course, executive officer Rodney Nichols said in a statement that the academy's mission "cannot include being publisher of a general science magazine." Spokesperson Fred Moreno says that the academy has been reshuffling its priorities and wants to devote more resources to issues such as science education and the role of technology.

"I'm sure it's a good thing that the NYAS is worrying about technology and society, but it seems a real shame to end something as unique and superb as *The Sciences*," says Stanford University biologist Robert Sapolsky, a contributing editor.

strains, which will provide more genetic and behavioral diversity to compare. The team, funded by the National Institutes of Health, has made its SNP database and gene-hunting algorithm freely available on the Web (mouseSNP.roche.com). "It's a great resource," says geneticist Carollee Barlow of the Salk Institute for Biological Studies in La Jolla, California.

The traits used in the trial run haven't been mapped down to the gene level by any method, so no "gold standards" exist to test the method, cautions Dean Shepherd of the University of California, San Francisco: "To prove what the method is really worth, we'll have to actually find some specific mutations that explain the differences in phenotype." As other researchers search for their own favorite genes, the effectiveness of this new method for mapping QTLs should quickly become apparent. Shepherd, for one, is optimistic, saying "It's extremely likely that in the near future this will really have a significant payoff."

Unemployed? If a new mapping technique pans out, thousands of lab mice may be out of work.

–R. JOHN DAVENPORT

PCR

Roche Dealt a Setback On European Taq Patent

A key biotechnology patent belonging to Swiss pharmaceutical giant Hoffmann-La Roche ran aground on the legal shoals of a third continent last week. On 30 May the European Patent Office (EPO) revoked Roche's patent on native Taq polymerase, a crucial element of the polymerase chain reaction (PCR), the ubiquitous technique used to amplify snippets of DNA. Roche officials say they will appeal the ruling. But this is a costly setback, because the company is already fighting to overturn related decisions in both the United States and Australia.

The ruling marked another in a string of victories for a group of small biotech companies that have challenged Roche's Taq patents in recent years. The companies, led by biological reagent supplier Promega of Madison, Wisconsin, have argued among other things that labs in the United States and Russia isolated the native Taq (n-Taq) enzyme before scientists at Cetus Corp., which transferred the patent to Roche in 1992. The Munich-based EPO agreed, ruling that the patent EP-0-258-017 B1 was invalid. "This decision reaffirms once again what Promega and many others in the research community have long believed: that the Taq patents should never have been issued," says Promega CEO William Liton.

The decision means that Promega can continue to sell n-Taq without paying royalties to Roche. Roche officials argue that this has little effect on the bottom line, because n-Taq makes up only 10% of the Taq they sell; the other 90% is recombinant forms of Taq (r-Taq), which are widely used in automated gene-sequencing machines and are covered by separate patents. But Promega's general counsel Brenda Furlow contends that the legal damage to Roche is broader, because some of the provisions of the patent struck down by the EPO applied to r-Taq, and Roche's separate r-Taq patent is currently being challenged in Europe. "We think the recombinant [Taq] claims will fall," says Furlow.

Genetics researchers are hoping that Roche's patent troubles will bring down prices. Although gene sequencers predominantly use r-Taq, n-Taq remains widely used in a host of other genetic studies, such as genotyping, a procedure used to sort out how genes are inherited in families. These studies typically require Taq or another polymerase enzyme to amplify specific DNA strands. "This is done very well with native Taq," says Maynard Olson, who heads a genome sequencing center at the University of Washington, Seattle. But cost remains a big issue.

Taq currently costs about 50 cents for the amplification step used in a single round of genotyping, says Olson: "There would be a lot more genotyping done if it only cost a penny for the Taq." Olson adds that he is hopeful that if Roche does wind up losing its hold on the Taq patents, this will encourage other companies to enter the market and bring down the cost. "That would be very welcome for us," agrees James Weber, a geneticist whose lab conducts approximately 6 million genotypes a year at the Marshfield Medical Research Foundation in Wisconsin. Weber says that about 8% of his research budget currently goes to paying for Taq. "If we could reduce the cost of Taq, we could produce more genotypes per year. No doubt."

–ROBERT F. SERVICE

ScienceScope

Cuts Coming? Japan's attempts to rein in a budget deficit could crimp spending on science. Last week an advisory council to new Prime Minister Junichiro Koizumi recommended a "large-scale reduction" in funding for public corporations, which include several major science agencies.

The main targets of the cuts are the bodies that run Japan's toll roads and airports. But the budget ax may also fall on RIKEN, the country's largest collection of research labs; the Japan Atomic Energy Research Institute, which leads the nation's efforts on the International Thermonuclear Experimental Reactor project; and the National Space Development Agency (NASDA), which leads Japan's contribution to the international space station and other space activities (such as satellite launch, above). The overall goal is a 20% cut in the $44 billion allotted to public corporations, according to media reports. A NASDA official says that the space agency will "probably be affected, but we just don't know how."

German Reforms Advance Germany's federal cabinet has approved research minister Edelgard Bulmahn's controversial plan to create "junior professorships" and pay professors based on merit rather than seniority. But more than 3700 professors are fighting the reform plan, which also faces opposition in the German parliament.

The 30 May cabinet approval paves the way for likely approval by Germany's lower house of parliament, the Bundestag, this fall. But opponents in the Bundesrat, the upper house composed of the governors of Germany's 16 states, say the plan could impose hefty costs on the states, which bear primary responsibility for universities. Although Bulmahn's plan would provide $170 million between 2002 and 2005 to subsidize new "junior professor" slots, critics contend that it will force cash-strapped states to reduce student enrollments to free up funds for salaries.

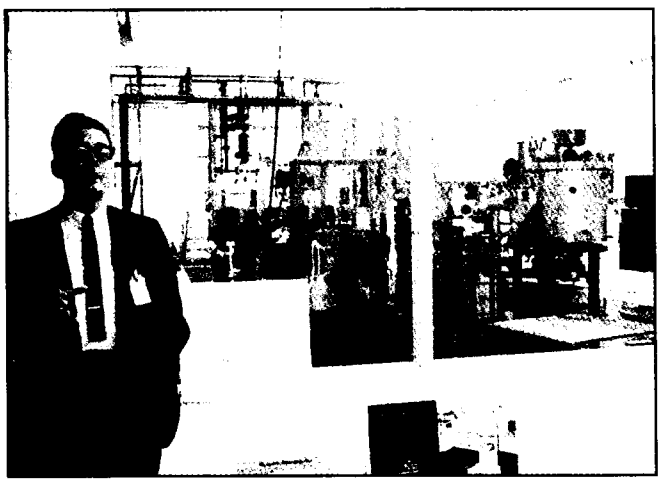
Bulmahn isn't backing down. She says the reforms—which also would phase out the nation's archaic Habilitation post-Ph.D. requirement for professorships—are an important step toward "significantly modernizing the higher education landscape."

CREDITS: (LEFT TO RIGHT) HULTON-DEUTSCH COLLECTION/CORBIS; NASA

ASTROBIOLOGY

Returning Alien Rocks Right the Second Time

The first time astronauts brought rocks and soil back from the moon, efforts to protect Earth from possible contamination were "a travesty," says meteoriticist John Wood. Exposures to Apollo lunar material meant that if anything pathogenic had come with them, "we'd have been in bad trouble," says Wood, of the Harvard-Smithsonian Center for Astrophysics in Cambridge, Massachusetts. To do it right the next time—when Mars rocks are returned as early as 2014—researchers need to start deciding now how to handle extraterrestrial samples both safely and cleanly, according to a report* released last week by the U.S. National Research Council (NRC).



A flawed first try. The complex vacuum chamber used to contain the first Apollo moon rocks proved unreliable and unnecessary.

The challenge of avoiding infecting Earth with any ET life or dirtying Mars samples with terrestrial materials will require a quarantine facility "unlike any in existence," says Wood, who chaired the NRC committee. "It's not an insurmountable task, [but] we need to get started."

Memories of Apollo's troubles heightened the urgency. At the Lunar Receiving Laboratory (LRL) in Houston, "there was not really enough time to do what needed to be done," says Wood. When samples arrived in 1969, tight schedules and NASA's stress on astronauts' convenience combined to make contamination happen. The hatch was popped open while the Apollo capsule was still bobbing in the Pacific, and a leak in the receiving lab sent 11 exposed people into quarantine with the astronauts. Others fled the area to avoid guards charged with enforcing quarantine rules, according to the report.

Although the first Mars sample return won't have astronauts to contend with, it will require a receiving facility more stringent than any now used to contain exotic killers like the Ebola virus. In biological containment facilities, the chamber containing the biological agent is kept below atmospheric pressure so that the inevitable leaks will let outside air in but prevent anything inside from getting out. In a clean room designed to keep samples pristine, the reverse is true. The room is held at a higher pressure to keep chemical contaminants out. But any Mars sample receiving lab must "simultaneously achieve biological containment and clean room conditions in one facility," says Wood.

The challenge of keeping anything from getting in or out while examining Mars samples mandates 7 years of planning and construction before the samples arrive, the NRC committee concludes, plus whatever time is first required to sort out the technical problems. That means starting now, the committee says, even if the first samples don't get here until 2014. With the LRL's lapses in mind, the committee also recommends that NASA keep it simple this time around—no chilling the samples to Mars temperatures or keeping them at martian atmospheric pressure. NASA welcomes most of the committee's recommendations, says NASA's planetary protection officer, John Rummel. "I would hate to think we'd make the same mistakes" as Apollo workers, he says, "and this report gives us some good guidelines to avoid them." –RICHARD A. KERR

* www.nap.edu/books/0309075718/html/index.html

SMITHSONIAN INSTITUTION

Director of Natural History Museum Quits

The director of the world's most visited museum has resigned to protest a planned reorganization that would separate the museum's scientific and educational roles. Robert Fri, who heads the Smithsonian Institution's National Museum of Natural History in Washington, D.C., said in a memo to his staff on 28 May that he cannot commit to the proposed changes. He plans to step down by October.

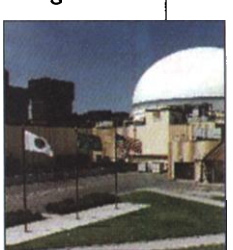
About three-quarters of the Smithsonian's 425-member scientific staff are based at the

ScienceScope

Stretching Out India may become the latest outpost for the Massachusetts Institute of Technology's (MIT's) high-tech Media Lab. The Indian Cabinet last week approved $16 million for the Media Lab Asia project, which hopes to join MIT and India's information technology ministry in what could eventually become a 10-year, $1.25 billion technology development push. A new multidisciplinary research center, to be opened later this year in a new facility outside Mumbai, will be a pilot project modeled after the original Media Lab in Cambridge, Massachusetts, and one established last year in Dublin, Ireland.

The Media Lab, founded in 1985, has worked on everything from virtual reality gear to nimble robots. Indian officials hope such creativity will help public-private research teams invent technologies that will be relevant to everyday life in rural areas.

ReFlux Can the Fast Flux Test Facility (FFTF) survive another near-death experience? In 1996 and again this year, Department of Energy (DOE) officials decreed that the research reactor, which has sat idle on Washington state's Hanford nuclear reservation since 1992, be dismantled (*Science*, 1 December 2000, p. 1666). But last month Energy Secretary Spencer Abraham gave the reactor a reprieve, pending a review of its potential uses by physicist Mike Holland of Brookhaven National Laboratory in Upton, New York.



A lengthy review completed just last year concluded that producing medical isotopes for cancer treatment and plutonium for space batteries wasn't worth the $314 million needed to restart the reactor and $58 million annually to operate it. But FFTF supporters convinced Abraham that the study overlooked income-generating possibilities.

Holland's report is due in July, but critics already are furious. "This is essentially a huge illegal waste of money," says Gerald Pollet, director of the Seattle-based environmental group Heart of America. He charges that the turnabout violates DOE contracts and diverts funds from Hanford cleanup projects. If Holland recommends restart, Pollet predicts that DOE will face a gauntlet of lawsuits from environmentalists and Oregon and Washington state officials, who oppose reopening the facility.

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