ical Survey—to finance a Bush campaign promise to spruce up national parks.

Other research funders—from the Environmental Protection Agency to the National Oceanic and Atmospheric Administration—are also expected to fare poorly. The belt-tightening is a result of a presidential promise to deliver a $1.6 trillion tax cut, plus increased spending on education and the military, while keeping a lid on spending. Administration officials say they want to boost discretionary spending (which does not include required spending on social welfare programs) by 4% to about $663 billion. But nearly two-thirds of the planned $26 billion increase would go to education and defense, leaving little money for other programs.

One winner in the initial budget battle, however, appears to be the National Institutes of Health (NIH). Bush is expected to follow through on a campaign promise to keep biomedical research spending on a path to double by 2004; doing that would technically require a 15% increase this year ($3.4 billion) for NIH. Defense science also may jump, with Bush promising to increase the Pentagon's R&D budget by 6%. How much of that increase would go to basic research, however, remains unclear.

If the details seem unpredictable right now, so does Congress's reaction. Key lawmakers—including Senator Pete Domenici (R–NM), leader of the Senate Budget Committee that will formulate Congress's initial spending blueprint—have already complained about its penury. Boehlert and Representative Vern Ehlers (R–MI), another science committee leader, also raised concerns about the slim pickings for science during a 14 February meeting with White House Budget Director Mitch Daniels. "He was fully aware of the issue," says one congressional aide.

Still, some science leaders worry that the grim budget outlook is another sign that the new Administration is not taking science seriously. Exhibit A, they say, is the absence of a science adviser. "Concrete gets poured fast on budgets," so it is critical that researchers have a voice inside the White House, noted Jack Gibbons, who served as Bill Clinton's first science adviser, at a meeting last week of the National Academy of Sciences' public policy committee. D. Allan Bromley, who held the job in the first Bush Administration, agreed. "All of us hoped and believed there would be [an adviser] by now," he said. But for the moment "there is no evidence that we will see anything for a few more months." A source familiar with the search agreed that a selection "was not imminent" but said that "making quality appointments takes time."

–DAVID MALAKOFF AND JEFFREY MERVIS

EUROPEAN SCIENCE

Max Planck Takes an E-Publishing Plunge

In the evolution from the Gutenberg era to the so-called Ginsparg era of electronic publishing, European researchers have mostly watched from the sidelines. But big changes are afoot. Germany's Max Planck Society, which runs the country's flagship network of 80 research institutes, is about to launch a publicly accessible electronic publishing center that will enable its scientists to post published papers—and findings before they are peer-reviewed. The center will also develop new tools for information dissemination and electronic management, and negotiate on behalf of all the institutes to cut deals for cheaper access to electronic journals.

For years, the United States had a virtual lock on e-publishing. In 1991, Los Alamos National Laboratory's Paul Ginsparg shook up scientific communication with the world's first preprint server, where physicists post articles before they are peer reviewed. More recently, Harold Varmus, former director of the U.S. National Institutes of Health, created a stir among biologists by backing the launch of "PubMed Central," originally conceived as both a free Internet archive of published papers and a preprint journal, although the latter idea is now on indefinite hold (*Science*, 14 July 2000, p. 223). Now European researchers are beginning to carve out territory in cyberspace (see table). The Max Planck's new Center for Information Management (CIM), which is just now getting under way, is one of the most comprehensive of these efforts.

Previously, individual Max Planck institutes have dipped their toes in the e-publishing waters. In 1997, for example, the Institute for Gravitational Research in Potsdam began publishing a peer-reviewed Web journal of review articles in its field. Contributors pledge to keep their articles updated, hence the journal's name: *Living Reviews* (www.livingreviews.org). "But the society [as an entity] has not been present" in the e-publishing arena, says Jürgen Renn, co-director of the Institute for the History of Science in Berlin.

CIM's roots can be traced to a pilot project in which the Max Planck Society in 1999 negotiated access to 1200 electronic journals and tallied usage and approval among its 3000 scientists. With a positive response to this initial foray into the e-world, Renn and his colleagues asked Rick Luce—director of Los Alamos's digital library initiative, Library Without Walls (lib-www.lanl.gov/lww/welcome.html)—to help organize a more ambitious effort: the CIM. A six-person team, primarily computer scientists, will staff the $1.5-million-a-year operation, which will be based at the Institute of Plasma Physics in Garching.

CIM plans to create an archive of publications by Max Planck authors. But perhaps the most exciting of CIM's projects will be to post preprints of articles from all Max Planck scientists on a server freely accessible to the public before they are submitted to traditional journals for peer review. The society does not know when the preprint operation will be up and running.

Some Max Planck researchers are skeptical that the society will be nimble enough to keep pace with the rapidly evolving world of Web publishing. Others caution that the CIM must take care—particularly with its preprint server—to label the sources of the material it distributes electronically. "It will be important to differentiate between peer-reviewed papers and what amounts to private communication that a scientist may post," says Peter Fromherz of the Institute

EUROPE, ELECTRONICALLY

Institution	Project	Web site
League of European Research Libraries (LIBER)	Pan-European digital journals	www.SUB.Uni-goettingen.de/liber-wg
European Mathematical Society and FIZ Karlsruhe	Free access to 40 e-journals; Electronic Library of Mathematics	www.emis.de
Max Planck Society Center for Information Management	Preprint server for Max Planck researchers, discount subscriptions	www.mpg.de/it/cim/cime.html
Danish National Library Authority	Access to 6000 journals via library network	www.deflink.dk/english/def.ihtml
CNRS Center for Direct Scientific Communication	Preprint server for natural sciences and humanities	under construction
U.K. Electronic Libraries Programme	Hybrid libraries with digital archives	www.ukoln.ac.uk/services/elib

for Biochemistry in Martinsried.

As the society gets its act together, the U.S.-based Open Archives Initiative (www.openarchives.org) will hold a meeting in Berlin next week on creating the architecture necessary to link emerging European preprint archives, including the one at Max Planck, with those in the United States. CERN, the European laboratory for particle physics near Geneva, will get in on the action too next month with a meeting, co-sponsored by Open Archives, on archive melding. A decade late, perhaps, but the e-publishing revolution is finally crossing the Atlantic.

–VIVIEN MARX

Vivien Marx is a science writer who lives in Boston and Cologne, Germany.

NEUROBIOLOGY

A Discriminating Taste for Bitter

Life has many bitter moments—sometimes of the culinary kind. Now, a new study suggests that our taste cells are much better at distinguishing between bitter flavors than some researchers have thought. On page 1557, University of Miami biologists Alejandro Caicedo and Stephen Roper report that—contrary to one popular theory—taste buds recognize the many unique bitter flavors that land on your tongue. Your mouth, they say, knows the bitter of beer from a bitter pill any day.

"In terms of evolution, this work makes good sense," says Sue Kinnamon, a neurobiologist at Colorado State University in Fort Collins. "It suggests that bitter taste perception involves multiple cells and mechanisms." This could be important, she adds, in a world with many different toxic compounds, which tend to taste bitter. Indeed, a well-developed system for recognizing bitters could enhance survival.

Flavor detectors. Taste cells, shown here labeled in green, may be able to tell one bitter flavor from another.

CREDIT: (BOTTOM) ALEJANDRO CAICEDO AND STEPHEN ROPER/UNIVERSITY OF MIAMI

Although there are five basic tastes—sweet, sour, salty, bitter, and umami (MSG)—researchers so far have identified the receptors for only umami and bitter. Taste has been tricky to study, because scientists don't know how to grow taste cells in the lab. Indeed, the bitter receptors were discovered just last year by two groups, one led by Nicholas Ryba at the National Institute of Dental and Craniofacial Research in Bethesda, Maryland, and Charles Zuker at the University of California, San Diego, and the other by Linda Buck of Harvard Medical School in Boston.

That work showed that the bitter receptor family consists of 50 to 100 related proteins, each of which seems to respond to a different bitter flavor. Because Ryba and Zuker's group found that individual taste bud cells express the genes for most of the receptors, they concluded that the cells couldn't discriminate between the many different bitter compounds they encounter. In this scenario, cells would send the same "bitter" signal up to the brain no matter what.

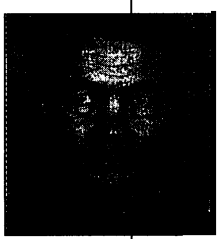
But Caicedo and Roper weren't so sure that all bitters taste the same. To pursue their hunch, they decided to catch the taste cells in action. When a receptor is activated by a bitter compound or other stimulus, it triggers a spike in calcium concentrations inside the cell, which in turn causes the cell to release its neurotransmitter. So first the researchers injected a fluorescent marker of calcium activity into taste cells taken from a rat's tongue. They reasoned that if the cells could distinguish between bitter flavors, some bitters would cause the telltale calcium boost—and an accompanying rise in fluorescence—while others would not.

Then, one at a time, Caicedo and Roper added five common bitter compounds—cycloheximide, denatonium benzoate, quinine hydrochloride, sucrose octaacetate, and phenylthiocarbamide—to the solution bathing the marked taste cells. Sure enough, 65% of the cells fluoresced strongly in response to just one of the bitter compounds. About 25% of the cells responded to two compounds, whereas just 7% reacted to three or more of the bitters. Cell responses to the different bitters also varied in amplitude, length, and sensitivity. "It appears that different taste cells are tuned to different bitter compounds," says Roper. "These cells are not generalists, as some suggest." At this point, however, the researchers can't explain the specificity of the taste cells' responses, given that each one makes so many different bitter receptors.

Even so, says David Smith, a neurobiologist at the University of Maryland, Baltimore, the study moves the field of bitter taste perception past molecular guesswork

ScienceScope

Young Blood The French government has tapped a leading hepatitis C expert, Christian Bréchot, to head its biomedical research agency, INSERM. The decision to appoint a clinician to the post is in line with the government's urge to spur life scientists into producing more new therapies and products.



Bréchot—who heads the liver unit at the Necker Hospital and a hepatitis research center at the Pasteur Institute, both in Paris—takes the reins of the $450 million INSERM at a time when the agency's star is on the rise. It is believed that Bréchot's predecessor, clinician Claude Griscelli, who at 65 had reached the mandatory retirement age, last year won INSERM a 16% budget increase by beefing up research in government priority areas such as gene therapy. Bréchot, however, is eager to quell fears that he will favor clinical over basic research. "My major concern ... is to arrive at a better balance," he told *Science*.

The government is hoping that the relatively young director—Bréchot is 48—can infuse fresh blood into INSERM, in which the average age of researchers has risen from 43 to 47 in the past decade. That won't be easy, says Gérard Orth, director of a papillomavirus unit at the Pasteur Institute. "He will have to be convincing" to persuade the government to create new jobs.

Reaching Out Sandwiched between Russia and the rest of Scandinavia, Finland and its scientists often feel isolated from the scientific mainstream. That could soon change. On 1 April, the Academy of Finland will get a new research director whose top priority is to forge stronger ties with the world's scientific community.

Finland is no science lightweight: It spends a higher percentage of its gross domestic product on R&D—3.1%—than any other country, amounting to $3.5 billion in 1999. But many fields "could clearly benefit" from more international collaboration, says physicist Mikko Paalanen of Helsinki Technical University, who praises the appointment of agricultural scientist Anneli Pauli to a 5-year term as research director. "Internationally coordinated research will add a new dimension" to Finnish science, says Pauli, who also plans to add up to 12 institutes to a "Centers of Excellence" program that now provides extra funds for 26 centers deemed globally competitive.

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