biomedical lobbyists hope to keep on a pace to double its budget within 5 years. Last month, Republican leaders put off any votes on the NIH bill until September, partly in hopes that they could broker a deal with the White House to restore the shortfall in NIH's budget. Advocates of breaking the budget caps include Representative John Porter (R–IL), chair of the House appropriations subcommittee that oversees NIH, and Senator Ted Stevens (R–AK), chair of the Senate appropriations committee.

Indeed, Stevens has suggested one possible route out of the impasse: a deal in which the White House agrees to a smaller tax cut bill in return for some surplus funds to raise 2000 budgets. Without a deal, however, "any hope that NIH will keep doubling its budget this year are gone with the wind—we'd be lucky to get a 3% increase," says a Democratic House aide, in contrast to last year's 15% hike. Absence of a budget deal could also imperil efforts to restore funds to NASA and raise NSF's budget by the requested 6%, she says. Ironically, it also undermines the hard-fought House increases in the Pentagon's basic research accounts, which the White House had slated for cuts.

The defense bill is already ensnarled in a debate that could prompt a veto. It centers on a congressional plan to reorganize the Department of Energy's (DOE's) nuclear weapons research program—which is largely funded by the defense bill—into an independent agency within DOE. Energy Secretary Bill Richardson, however, opposes the plan, complaining that it undermines his authority, and has recommended that Clinton veto the entire bill. Richardson supports a different plan passed by the Senate.

Even a smaller tax cut has a downside for science: A proposed 5-year extension of the R&D tax credit, long sought by high-tech and pharmaceutical companies, is currently included in the tax bill. But its cost, estimated at $20 billion, could make it a casualty of this fall's expected political horse trading.

–DAVID MALAKOFF

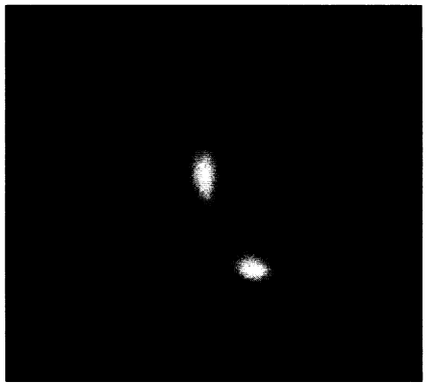
PLANETARY SCIENCE

Deep Space 1 Traces Braille Back to Vesta

Asteroids tend to wander far from home, but researchers can now reunite a wayward offspring with its "parent" in the main asteroid belt between Mars and Jupiter. At a press conference last week at the Jet Propulsion Laboratory (JPL) in Pasadena, California, researchers announced that observations of an asteroid called Braille, returned by the Deep Space 1 spacecraft last week, show that the 2-kilometer-long rock is probably a chip blasted off the 500-kilometer asteroid Vesta, the third largest in the solar system.

Deep Space 1, launched in October 1998, is the first mission in NASA's New Millennium program, set up to test new space technologies. It boasts a xenon-fueled ion propulsion system, high-efficiency solar cells, and an automated navigation system, AutoNav, that enables it to find its way in interplanetary space by tracking stars and asteroids without help from ground controllers. The navigation system brought the spacecraft within 10 to 15 kilometers of the asteroid—the closest flyby ever achieved. The asteroid, discovered in 1992, was only recently named after the Frenchman Louis Braille (1809–1852), who invented the alphabet for the blind. It orbits the sun in an elongated path outside Earth's orbit.

First reports suggested that Deep Space 1's encounter with Braille was a bust, because the spacecraft's camera was pointing into



A lumpy offspring. Two-kilometer asteroid Braille may be a chip off 500-kilometer Vesta.

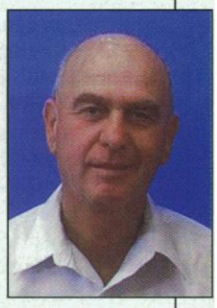
empty space and missed its target. However, some of the last data beamed back did provide images of a distant, lumpy, elongated body and "colors" of the asteroid in the infrared range. Apparently, Deep Space 1 lost sight of Braille as it approached the asteroid from its dark side, but reacquired its target soon after passing to the asteroid's daylit side, according to mission engineer Marc Rayman of JPL.

Although scientific observations are seen as a mere bonus in the New Millennium Program, team members regretted losing what would have been the closest look at an asteroid so far. But the infrared spectra proved some consolation. Braille's distinctive absorption pattern is "a remarkably close match" both to the asteroid Vesta in the main belt and to a type of meteorite known as a eucrite, said team member Laurence Soderblom of the U.S. Geological Survey in Flagstaff, Arizona. The close resemblance of eucrite spectra to that of Vesta had persuaded most astronomers and meteoriticists that eucrite meteorites come from Vesta, the only strong meteorite-asteroid link

CREDIT: (TOP TO BOTTOM) ISRAELI KNESSET; JPL/NASA

ScienceScope

New Face in Israel A career army officer–turned-politician is Israel's new science minister. Recently elected Prime Minister Ehud Barak last week appointed Matan Vilna'i (right) to oversee the nation's new Ministry of Science, Culture, and Sport.



Scientists are waiting to see whether Vilna'i can protect a drooping $50 million science budget from further cuts. He told *Science* he would "do everything needed to invest in and develop science" after being sworn in on 6 August—words welcomed by Israel Hanukoglu, a molecular biologist at the College of Judea and Samaria, who served as science adviser to former Prime Minister Benjamin Netanyahu. Vilna'i appears "committed to strongly supporting science," Hanukoglu says.

Vilna'i, 55, has vowed not to let science play second fiddle to soccer within his newly amalgamated ministry. But if nothing else, quips one researcher, "maybe science will become the national sport."

No Class Rings? Biomedical teaching powerhouses of the world relax: The National Institutes of Health (NIH) won't be muscling onto your turf after all. NIH officials last month quietly abandoned controversial plans to create a doctoral program on the NIH campus in Bethesda, Maryland.

NIH had planned to seek Congress's permission to admit about 15 students a year to a 5-year program in "disease-oriented integrative biology." But in June, three members of an influential NIH advisory panel came out against the plan, noting that U.S. universities are already under fire for producing too many biologists (*Science*, 11 June, p. 1743). The row prompted NIH director Harold Varmus and deputy director for intramural research Michael Gottesman to give up the idea. "This was obviously beginning to be a source of irritation," says Gottesman.

Instead, the pair will focus on expanding programs that allow grad students to earn credit for work done at NIH. The agency already has such partnerships with the University of Maryland and Duke, George Washington, and Johns Hopkins universities.

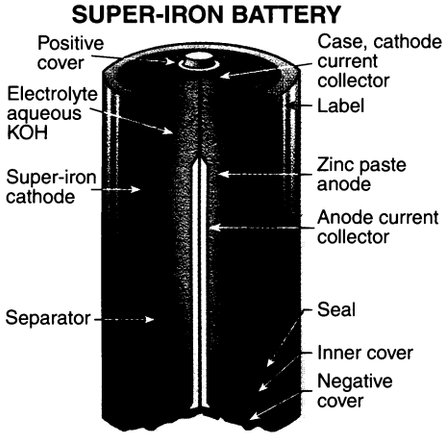
mental risks small, the two researchers say, the new rice strain may draw less opposition from the critics of genetically engineered foods than other modified crop plants now being marketed (*Science*, 28 May, p. 1442). DellaPenna hopes they are right. These results, he says, "are wonderful and what needs to be done." **–TRISHA GURA**

Trisha Gura is a free-lance writer in Cleveland, Ohio.

ELECTROCHEMISTRY

"Super-Iron" Comes to The Rescue of Batteries

Georges Leclanché, the French chemist who developed the dry battery nearly 140 years ago, would probably recognize the basic elements of a flashlight battery today. Most such batteries still contain a zinc anode and a cathode made of a mixture of carbon and manganese dioxide. But now a team led by Stuart Licht at the Israel Institute of Technology, or Technion, in Haifa reports on page 1039 the development of a



Charge it. It looks like a regular battery, but the difference is in the cathode.

CREDIT: (LEFT) LICHT *ET AL.*

new class of batteries that have greater capacity, a faster discharge rate, and are rechargeable. The difference is in the cathode, which is made from unusual iron-based molecules known as iron(VI), or "super-iron," compounds that absorb more electrons than manganese dioxide. "Their performance in a battery system is very astounding," says Jeff Dahn of Dalhousie University in Halifax, Canada.

When a battery discharges, electrons absorbed from the electrolyte by the zinc anode pass through an electric circuit and end up in the cathode, where two manganese dioxide (MnO_2) molecules join to form a manganese sesquioxide (Mn_2O_3) molecule, absorbing two electrons in the process. In the new super-iron compounds—which contain oxygen, as well as potassium, barium, and other elements—each iron atom is missing six electrons. During discharge, the iron is converted into a form of ferric oxide (Fe_2O_3)—common rust—that is three electrons short of its normal complement. Each iron atom thus absorbs three electrons, one more than two manganese dioxide molecules absorb.

This larger appetite for electrons translates directly into increased storage capacity. The Technion team has produced batteries with super-iron cathodes that have capacities up to 47% greater than standard manganese dioxide batteries of the same size. They also found that the batteries' performance at high discharge rates was better because super-iron compounds are also better conductors of electricity. Another advantage is rechargeability: The team reports some 400 charge-discharge cycles.

The team searched a long time before settling on super-iron compounds. "Previously we looked at sulfur, hydrogen peroxide, and a variety of materials, each of which have very unusual electrochemical properties, but were not compatible with the existing systems," says Licht. Some other possible compounds were also ruled out because "we specifically wanted to start with an [environmentally] 'clean' material," says Licht. The rust generated by discharging this battery is preferable to the somewhat poisonous manganese compounds that remain in the batteries presently used, notes Licht.

Even so, super-iron compounds were not an obvious choice, because they are considered too unstable. "When these [compounds] were made in the past and you put them in a solution, they disappeared within minutes, decomposing into rust," says Licht. The team solved this problem by carefully eliminating two catalysts, nickel and cobalt, that usually contaminate these compounds. The researchers found that, even in very small quantities, they cause the super-irons to break down. "We have demonstrated lifetimes of the super-irons without any change on the order of a month and extrapolated lifetimes of years," says Licht. Denis Dees of Argonne National Laboratory in Illinois says, however, that he would like to see evidence that such batteries can survive for 6 to 12 months on the shelf and still be discharged. Because of the questionable stability of iron(VI) compounds, he says, "it is interesting that they have made it work at all."

If the cathodes do prove durable, Licht says the batteries should not be difficult to make. "We have been able to take it from a concept very quickly to conventional-sized batteries, and that is very promising," he says. Another plus is that the starting materials are inexpensive and more easily available than manganese compounds. **–ALEXANDER HELLEMANS**

Alexander Hellemans is a writer in Naples, Italy.

ScienceScope

India's Science Summit Indian scientists want their government to create a pair of autonomous commissions that would help improve the country's performance in biotechnology and sustainable technologies. The recommendation, made last week by more than 150 researchers attending the first National Science Summit in Bangalore, aims to build on the success of panels that have channeled new resources into space and nuclear power.

The summiteers, gathered by the nonprofit education group Bhartiya Vidya Bhawan, also took stock of India's science record. Although many cheered advances in space research, agriculture, and other areas, others worried that success remains uneven. "There are icebergs of good science floating in a sea of bad," said biophysicist Padmanabhan Balaram of the Indian Institute of Science in Bangalore and editor of *Current Science*, a leading journal.

It's too soon to know whether the proposed panels will ever set sail. The politicians who would have to approve them are in the thick of an election campaign that ends in October.

Science Succession Democrats have a new leader on the House Science Committee. As expected, Rep. Ralph Hall (below) of Texas last week officially inherited the leadership slot left open by last month's death of Rep. George Brown (*Science*, 23 July, p. 509).

Hill watchers don't expect any immediate changes in the committee's slant under Hall, who will lead the 22 Democrats serving on the 47-member panel. But the Texan—who has served on the committee for almost 2 decades and is a former head of its space subcommittee—is far more conservative than his predecessor, often voting with Republicans on fiscal and social matters. Although that history may smooth relations with feisty panel head James Sensenbrenner (R–WI), House aides say it is unclear what it means for science policy. Says one: "He is further right, but those partisan labels often don't mean much in science politics."

Contributors: Rachelle H. B. Fishman, Bruce Agnew, Pallava Bagla, and David Malakoff