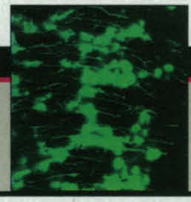


semble either Chara or Coleochaete algae, which still thrive in lakes and streams today.

For plant taxonomists, the new data strike a blow to the foundation of their discipline: the 250-year-old system, designed by botanist Carolus Linnaeus, which groups species by the number and arrangement of their reproductive organs, the stamens and pistils. At the meeting, a vocal band argued that the Linnaean system should be thrown out, or at least overhauled, because many plants presumed by their appearance to be closely related—such as the water lily and the lotus—are in fact quite different genetically.

In crafting a phylogenetic tree, Deep Green scientists confirmed that classic categories like monocot (one seed leaf) and dicot (two seed leaves) often fail to group plants accurately; that fungi are more closely related to animals than plants; and that some green algae are more like land plants than algae. Moreover, Mishler says, the brown, red, and green plants each arose independently from a common single-celled ancestor and thus deserve their own kingdoms. Overall, he claims, at least half the Linnaean classifications are wrong.

Mishler and others would prefer to name plants according to clade, or genetically related group—a system called the PhyloCode. For example, the herb *Prunella vulgaris* and hundreds of other plants might simply go by the name *vulgaris*, with a tag in some master directory that scientists could refer to for phylogenetic data. "When I first heard this, I thought it was crazy," says Kathleen Kron, a botanist at Wake Forest University in Winston-Salem, North Carolina. "But it's not. A plant's rank is arbitrary, and naming it by clade is a far more relevant, practical way to go."

Not everyone agrees. "The new phylogenetic information is absolutely wonderful, but renaming all these plants is going too far," says Richard Brummitt of the Royal Botanic Gardens in Kew, England. "A red oak is not a white oak, and without rank, we lose the ability to make that distinction easily." Like it or not, Brummitt concedes that the push to revamp nomenclature is gaining ground. Not too long from now, he predicts, botanists will have to cope with two systems—one Linnaean, the other cladistic.

As the green plant tree grows, scientists should be able to start to decode the genetic ciphers explaining how competitive advantages evolved in plants—for example, how mosses gained an ability to resist drought. And some Deep Green insights may offer a biomedical payoff. For example, Patrick Keeling of the University of British Columbia in Vancouver reported that Microsporidia, a parasite that can sicken people with weakened immune systems, evolved from a fungus—not an ancient, premitochondrial eukaryote, as many scientists believe. Thus, drugs that disable fungal proteins may also work against Microsporidia, Keeling says.

Although Deep Green is finished, researchers say it has sown the seeds for future collaborations. "It's taken people by surprise that botanists have been so willing to share unpublished data so we could all work together," says Pamela Soltis. Along the way, the green plant tree is sure to branch off in new directions. Says mycologist John Taylor of the University of California, Berkeley: "As more genes are added to these phylogenies, we're not going to be so smug that we've got it all figured out." **–KATHRYN S. BROWN**

Kathryn S. Brown is a science writer in Columbia, Missouri.

U.S. BUDGET

Tax Cut Politics Could Swallow Research Gains

An already uncertain year for science funding got even more complicated last week. In a last-minute flurry of votes before their summer recess, House and Senate lawmakers passed spending and tax cut bills that drew White House veto threats. That action/reaction is prelude to a legislative showdown when Congress returns to Washington next month that could extend beyond the start of the fiscal year on 1 October. For the major science agencies, appropriations bills now being considered by Congress fall several billion dollars short of the Administration's proposals. The critical issue will be whether that shortfall can be funded by breaking politically sensitive limits on domestic spending or diverting money from projected budget surpluses.

Unlike in past years, the current debate is fueled by the prospect of a $1 trillion surplus over the next 15 years. The Republican tax cut, passed on 6 August, would return much of the money to taxpayers. But President Clinton has vowed to veto the tax cut, which won't arrive on his desk until next month, saying the funds should be used instead to pay down the national debt and shore up retirement and medical insurance funds. Some science lobbyists worry that the partisan bickering may drown out their campaign to boost the government's $78 billion research and development budget.

White House science adviser Neal Lane has already begun beating the drums. This week Lane called a meeting of Washington science community leaders to rally opposition to the reductions by the House in a number of high-profile science programs within NASA, the National Science Foundation (NSF), and other agencies (see table). "This situation can be turned around if America's research community makes its strong voice heard," he said in a 6 August statement. Republicans say the cuts, on bills passed generally on party-line votes, are required under a 1997 budget-balancing law that imposes strict caps on spending in 2000. "The White House is blaming us for obeying the law," said one Republican House aide. In fact, neither side so far has been willing to take the political heat for suggesting that the caps be raised.

Other lawmakers, however, have called for using part of the surplus to restore the $18 billion or more that will be needed to prevent cuts in several major spending bills, including the one that funds the $16 billion National Institutes of Health (NIH), which

HOUSE BOUND

Program	Request (in millions)	House level
Advanced Technology Program (NIST)	$239	0
Earth Observing System (NASA)	663	513
Information Technology (NSF)	181	35
Spallation Neutron Source (DOE)	196	60

SOURCE: CONGRESS/OMB

Swipe at science? House members, either as a whole or in committee, pruned the president's 2000 budget request for several high-profile science projects.

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

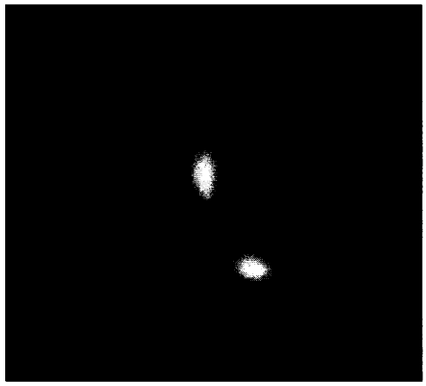
PLANETARY SCIENCE

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.