with parkinsonism might be because the disease does not manifest itself until 70% to 80% of brain dopamine has been depleted.

Andy Parrott, head of the Recreational Drugs Research Group at the University of East London, calls the findings "very worrying." He points out that some ecstasy takers—even "novice" users—have motor symptoms such as tremors and twitches, "which may be best explained in these dopaminergic terms," because dopamine-dependent neurons are one of the major lines of communication in the motor system.

Other researchers are continuing to withhold judgment about the perils of MDMA, pointing to methodological difficulties in this kind of research and evidence that the damage might be only temporary. Cognitive neuroscientist Jon Cole of the University of Liverpool, for example, is skeptical about the Parkinson's risk. So far, he says, "there is only a single case report of parkinsonism related to the use of ecstasy. The sheer number of ecstasy users indicates that there would be millions of these patients presenting for treatment." Nonetheless, he says the study might call for a major revision of the existing view of MDMA: "The entire human literature ... relies on the notion that MDMA is a selective serotonergic neurotoxin."

The Johns Hopkins finding is thus unlikely to put an end to the ongoing debate over MDMA. Criminalized in the United States in 1985, MDMA is still a subject of intense controversy, because some psychologists believe it can be a useful adjunct to psychotherapy—helping people open up emotionally, especially those suffering from posttraumatic stress disorder. Indeed, trials are ongoing in Israel and Spain, and the U.S. Food and Drug Administration approved a new one last November to be conducted in North Carolina. –CONSTANCE HOLDEN

U.S. SCIENCE POLICY

NSF Fights Changes in Oversight Bill

Two Senate committees have approved a bill supporting a 5-year doubling of the National Science Foundation's (NSF's) budget, one of the highest priorities of NSF Director Rita Colwell and lobbyists for the scientific community. But the legislation also contains some bitter pills—involving science and math education, major research equipment, and NSF's relation with its oversight board—that Colwell hopes to avoid swallowing.

Lobbyists see this month's votes, which set NSF policies but don't provide any money, as a sign of the growing strength of their doubling campaign. "It's symbolic, but at least it puts both panels on record in favor of doubling," says Samuel Rankin, head of the Coalition for National Science Funding. The reauthorization bill, S. 2817, is a variation on one (H.R. 4664) passed in June by the full House, and the two versions must now be reconciled. The NSF spending bill goes through a different set of committees, which will miss a 1 October deadline to complete their work.

HOW TO DOUBLE THE NSF BUDGET

Current budget is $4.8 billion

Year	House plan	Senate plan
2003	$5.5b	$5.5b
2004	$6.3b	$6.4b
2005	$7.3b	$7.4b
2006	–	$8.5b
2007	–	$9.8b

SOURCE: (TOP) H.R. 4664, S. 2817

Double or nothing? Congress has endorsed bills that would double NSF's budget in 5 years, but its spending panels have yet to weigh in.

At the same time, those lobbyists are quite unhappy with provisions that would merge a Department of Education program that gives states money to improve science and math education with a new NSF program that awards grants through a national competition to achieve the same end (*Science*, 11 January, p. 265). The hybrid, proposed by senators who felt that NSF was more likely to run a high-quality program involving university scientists, would allow NSF to continue its national competition for 3 years before converting to a block grant program in 2006.

The compromise leaves both sides unhappy. The lobbyists fear that local jurisdictions could be left out in the cold if NSF makes grants on a competitive basis. "Moving the program to NSF effectively reduces vital resources and programs at a time when local education agencies need them the most," a coalition of professional societies wrote to Senator Ron Wyden (D–OR), chair of the science subcommittee of the Senate Commerce, Science, and Transportation Committee, shortly before a vote last week by the full committee. And NSF doesn't like being tied to a predetermined formula. The use of block grants, Colwell wrote Wyden the day before the vote, "is inconsistent with the Foundation's exemplary merit review process and conflicts with competitive processes that promote excellence." House members are also unhappy with the Senate language, which had been drafted and approved a week earlier by another Senate panel with jurisdiction over NSF's education programs, and they hope to remove it before the bill moves forward in the Senate.

On another contentious issue, the Senate panels and the House have adopted identical language requiring NSF to rank the impor-

ScienceScope

Blue Laser Blues A Japanese engineer out to gain more respect—and cash—for Japanese inventors suffered a setback last week when the Tokyo District Court ruled against his attempt to reclaim patent rights to a groundbreaking discovery.

Shuji Nakamura was working for Nichia Corp. in 1997 when he developed a blue light–emitting diode and later a blue semiconductor laser (*Science*, 21 March 1997, p. 1734). The devices have extremely promising commercial applications, with current annual sales topping $400 million. Now a professor of materials science at the University of California, Santa Barbara, Nakamura sought to reclaim the rights to a key manufacturing process, for which the company paid him $170. He also asked for $16 million in compensation.

On 19 September the court sided with Nichia, noting that Nakamura had used the company's facilities and staff for the research. It delayed a decision on the compensation issue. Nakamura, who hoped his suit would boost the status of Japan's corporate researchers, plans to appeal once the ruling becomes final.

Britain Shifts Space Cash Imagine this: The U.S. government suddenly decides that scientists need a more direct hand in running space missions and moves NASA's space science budget to the National Science Foundation. Although an unlikely scenario in the United States, the British government has decided to do something similar.

Following a review of the British National Space Centre (BNSC), the government announced this week that the agency's science budget will now be managed by the Particle Physics and Astronomy Research Council (PPARC). And its Earth-observing research funding will go to the Natural Environment Research Council. Most of the money—about $78 million annually—will still go straight into the coffers of the European Space Agency, but the researchers will now have a bigger say in how it is allocated.

Researchers are divided over the shifts. "It's a good idea," says Paul Murdin of Cambridge University's Institute of Astronomy, a former director of science at BNSC. "There's nothing like owning a budget to make you really care about it." But Birmingham University's Mike Cruise, chair of PPARC's space science advisory committee, thinks it is "regrettable." Although BNSC still coordinates the government's overall space activities, he says, it will be further removed from the scientists who can help craft long-range strategy.

tance of projects approved for its major research equipment account. The growing number of big projects approved by the National Science Board but not yet funded has become an irritant for Congress, which has warned NSF that it will be hard to fend off efforts to fund specific projects that are stuck in the queue unless NSF signals which are most important (*Science*, 12 July, p. 183). Colwell has told legislators that such rankings would limit her ability to adjust priorities according to the timeliness of the science, the size of her budget, and the current lineup of projects being supported.

The most objectionable portion of the Senate bill, according to Colwell's letter to Wyden, is a provision giving the science board authority to hire its own professional staff. Senate appropriators have proposed similar steps to strengthen the board's independence, and legislators in both bodies see it as an innocuous way to improve government oversight at a time when corporate boards are also being encouraged to be more accountable. But Colwell says the language "would fundamentally change" the relation between the board and the foundation, as well as create a needless bureaucracy to deal with personnel issues now handled by NSF.

Board chair Warren Washington says he can see both sides of the issue. "I don't think it's a huge impediment to our doing our business," he says. "But some members don't see a need to fix something that isn't broken."

–JEFFREY MERVIS

ASTROPHYSICS

Rings of Light Could Reveal Black Holes

The fertile mind of astrophysicist John Archibald Wheeler has conjured another nifty notion: a direct way to detect a black hole that might wander near our solar system. Sunlight would dance rings around the hole and return to Earth, briefly creating a flare in otherwise empty space. Searching for such an exceedingly rare vision might not be practical for decades, but the elegant analysis has delighted other physicists. "It's an ingenious and charming idea," says Wheeler's Princeton University colleague, astrophysicist Bohdan Paczyński.

Albert Einstein's general theory of relativity predicts that a black hole's intense gravity bends passing rays of light. Near the event horizon—the threshold beyond which nothing can escape the hole's gravitational well—this deflection becomes extreme. Some photons orbit at least once before darting back into space on new paths. Black holes thus spray incoming light in all directions, like water drops from a whirling sprinkler.

Wheeler and his former undergraduate student, astrophysicist Daniel Holz, realized that light from our sun redirected in this way could expose a black hole. If Earth sat between the sun and the hole, some sunlight would reflect back as concentric rings. Photons returning after one-half orbit (π radians, or 180 angular degrees) would create a sharp outer ring. Fewer photons would stream back after a tighter encounter of 1.5 orbits (3π radians) around the hole, forming a fainter and smaller ring, and so on. Wheeler dubbed the shadowy mirror a "retro-MACHO," after the "massive compact halo objects" in our galaxy that deflect light from more-distant stars. (Nor could he resist adding "Pi in the sky?" to the paper's title.)

Holz worked on the details for the last few years with Wheeler, who pioneered the study of black holes in the 1960s and is still active in retirement at age 91. Their results, to appear in the 20 October issue of *Astrophysical Journal*, suggest that a black hole 50 times farther away than Pluto's orbit with 10 times the mass of our sun would flare for about a day as Earth orbited between the hole and the sun. The rings would be too tiny to resolve, but giant telescopes just might catch the faint solar reflection. "It's a clean calculation," says Holz, now a postdoctoral researcher at the University of California, Santa Barbara. "If there are black holes out there, this effect would happen."

Scanning the sky for the flare is another matter. Paczyński notes that it's not feasible—at least not yet. Current telescopes could barely perceive light reflected from a hole at the outskirts of our solar system, even if they knew where to look. Further, astronomers suspect that isolated black holes typically are dozens of light-years apart, making it unlikely that one would drift nearby. "There's maybe a 50–50 chance it has happened in the history of our galaxy," says astronomer David Bennett of the University of Notre Dame in Indiana.

Holz and Wheeler acknowledge the caveats. "It's incredibly speculative, but we don't know what our telescope sensitivities will be in 50 years," Holz says. In the far future, arrays of telescopes could detect a more distant flare. Our descendants might even probe for rogue black holes with lasers that search for their own reflections—a Wheeler-esque vision indeed.

–ROBERT IRION

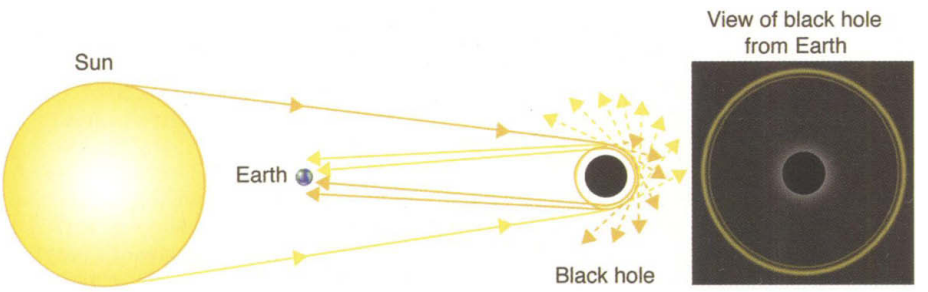

ILLUSTRATION: C. SLAYDEN

Wheels of light. Sunlight reflected from a nearby black hole would return to Earth as sharp, concentric rings, caused by light rays that orbit the hole either 0.5 or 1.5 times.

AIDS RESEARCH

Mystery Anti-HIV Factor Unmasked?

Sixteen years ago, in the relatively early days of the AIDS epidemic, virologist Jay Levy of the University of California (UC), San Francisco, proposed an answer to one puzzle about the AIDS virus and created another. He had tantalizing evidence that immune system cells secrete a chemical that can stop HIV, and he suggested that HIV-infected people who have high levels of this factor could live for decades without damage to their immune systems. This would explain in part why HIV kills at such disparate rates. But just what is the mystery factor? Legions of AIDS researchers have searched for this treasure, unearthing half a dozen different candidates, none of which has been completely convincing. Now a team led by Linqi Zhang and David Ho of the Aaron Diamond AIDS Research Center in New York City claims to have the elusive factor in hand. But other researchers who have been digging for answers and have seen the new data say they're not throwing away their shovels.

In a report published online by *Science* this week,* Zhang, Ho, and co-workers finger three tiny molecules known as α-defensins. The researchers discovered that white blood cells with CD8 receptors secrete these molecules, but infection by HIV appears to shut down production. However, the CD8 cells of people who remained unharmed by the virus a decade or more after being infected continued to produce them. "It largely solves a mystery that's been out there for 16 years," says Ho. Robert Siliciano, an AIDS virologist at Johns Hopkins University in Baltimore, Maryland, says the work is "cer-

* www.sciencemag.org/cgi/content/abstract/1076185