sult that light bends in the opposite direction. Veselago's speculation appeared to have been confirmed last year, when a group at the University of California, San Diego (UCSD), made a "metamaterial"—a microscopic lattice of circuit boards imprinted with copper "split ring resonators" and wire strips (*Science*, 6 April 2001, p. 77)—said to display a negative index of refraction for microwaves.

Their work was spurred by Pendry's calculation that these negative index media have an added bonus: They amplify so-called "evanescent waves." In most materials, parts of a light wave decay—the evanescent wave—and this ultimately limits the clarity of a lens. Pendry's insight was that these waves do not decay as usual when light is refracted negatively.

But some researchers think such a phenomenon is too good to be true. A team led by Prashant Valanju at the University of Texas, Austin, says in the 6 May issue of *Physical Review Letters* (*PRL*) that Veselago himself made a mistake in the direction of a light ray in a fundamental diagram. That purported error casts doubt over all subsequent research with these materials. Negative refraction "would violate two basic laws of physics: that no signal can travel faster than light, and that causality must be obeyed," says Valanju.

In the 20 May issue of *PRL*, Nicolas Garcia and Manuel Nieto-Vesperinas of Spain's Higher Council for Scientific Research in Madrid claim that it's Pendry, not Veselago, who's in error. For the evanescent waves to be sufficiently amplified, they say, the energy density in the material would have to be infinite—a physical impossibility. Valanju thinks the UCSD group did not see negative refraction in its metamaterial but rather "diffraction effects."

"Whatever our experiment was," says David Smith of the UCSD team, "the [critics] wouldn't be happy," because it conflicts with Valanju's theoretical predictions. Pendry stands by the UCSD data. He believes that Valanju errs in calculating the velocity of light in these negative index media and that the objections to the "perfect lens" are largely emotional. Pendry and Smith are submitting another paper to *PRL* that they believe answers Valanju's theoretical criticisms. But new experiments—at UCSD and elsewhere—may be the only way to bring this debate into sharper focus.

–KONSTANTIN KAKAES

Konstantin Kakaes is a writer in Paris.

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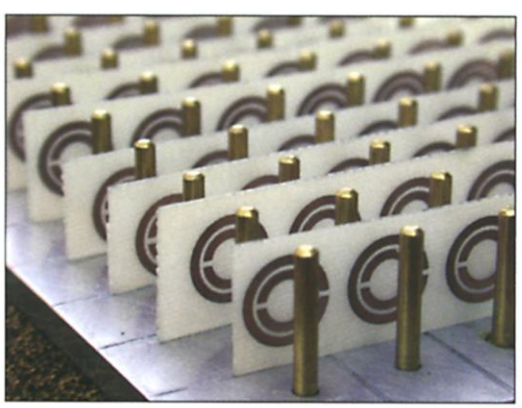


Weird stuff. Researchers say this "metamaterial" can refract microwaves the wrong way.

RUSSIA

Scientists Wary of New Academy Reforms

MOSCOW—A revolution appears to be under way at the Russian Academy of Sciences (RAS)—but it's unclear whether this is a genuine transformation of Soviet-style management at the country's research behemoth or a cynical attempt to thwart real reform.

At the RAS general meeting last week, academy members approved a sweeping overhaul that would merge several of the disciplinary fiefdoms, stripping power from top officials on RAS's governing board, the presidium. The academy's leadership portrays the reorganization—creating nine divisions out of the existing 18—as a way to steer more funding to the cream of its roughly 400 institutes. However, others view it as shuffling chairs on the deck of the *Titanic*.

In either case, observers agree that the academy has indeed hit an iceberg in the form of President Vladimir Putin. At a meeting of his top advisers last March, Putin declared that the state would no longer distribute research funding as a kind of welfare but instead focus it on several unnamed priority directions. That would be a radical change for RAS, which since the Soviet collapse has fiercely defended its system of doling out crumbs to each scientist, rather than conducting merit-based competitions. In the meantime, the unknown fraction of scientists who actually perform research has had to subsist on tiny Russian grants or team up with foreign labs.

The new system, which incorporates Putin's thinking, could strengthen areas such as mathematics that once commanded respect worldwide but have since lost scores of top minds to emigration. Merging RAS's two mathematics divisions, says Guriy Marchuk, who until 1991 served as president of RAS's Soviet predecessor, could resurrect the discipline. A single division will now be responsible for funding much of Russia's mathematics, with explicit instructions to funnel more money to the elite and eliminate redundant projects, says Gennady Mesyats, deputy to RAS presi-

ScienceScope

Favored Fauna Animals in Germany, which already enjoy some of the strictest legal safeguards in Europe, are about to be labeled a protected resource. On 17 May, the lower house of parliament, the Bundestag, voted overwhelmingly to amend the constitution to include animals in a phrase pledging the state to protect "natural resources" for "future generations." The vote—543 in favor, 19 opposed, and 15 abstaining—brushed aside objections from the country's leading research organizations. Next week Germany's upper house, the Bundesrat, is expected to go along.

Although the change is expected to have little immediate impact, many scientists worry that it will give activists new grounds on which to attack the use of animals in research. Another section of the German constitution that protects scientific freedom means researchers should win such suits, says Ivar Aune of the Gesellschaft Gesundheit und Forschung e.V. in Berlin, a research advocacy organization. But the resulting delays, he says, might mean "we could win the battle and lose the war."

Now Batting for NSF The House and Senate spending panels that oversee the National Science Foundation's $4.8 billion budget made it clear during recent hearings that they view the 5% boost proposed by President George W. Bush to be inadequate. Although it's impossible to predict NSF's budgetary fate before either panel gets its spending allocation for all the agencies under its jurisdiction, here are some educated guesses based on comments from influential members and their staffs:

- An overall increase of between 8% and 10%;
- More money for disciplinary research, especially in the physical sciences;
- More money for large new facilities already partially funded, such as a high-altitude airplane and a millimeter-wavelength astronomical array in Chile;
- More money for undergraduate research; and
- Full support for initiatives in nanotechnology and information technology.

Sadly, from NSF's perspective, legislators will also almost certainly include money for their pet research projects.

Contributors: Gretchen Vogel, Andrew Lawler, Adam Bostanci, Jeffrey Mervis

dent Yuri Osipov.

If the presidium had confined itself to these mergers, its reforms might have won broad acclaim. But Mesyats also used the meeting to announce that the new divisions will be divided into sectors, each of which would elect members to the academy. These new barriers between RAS scientists could lead to new research-stifling fiefdoms, says Alexander Krasovsky, an academician at the Military Aviation Technical University in Moscow. "Instead of freeing the academy of the swollen administrative machinery, the reform has forged new links in the managerial chain," he says. And that, some fear, is akin to adding subdivisions in a scientific Potemkin village.

–VLADIMIR POKROVSKY AND ANDREI ALLAKHVERDOV

Vladimir Pokrovsky and Andrei Allakhverdov are writers in Moscow.

SMALLPOX RESEARCH

World Health Body Fires Starting Gun

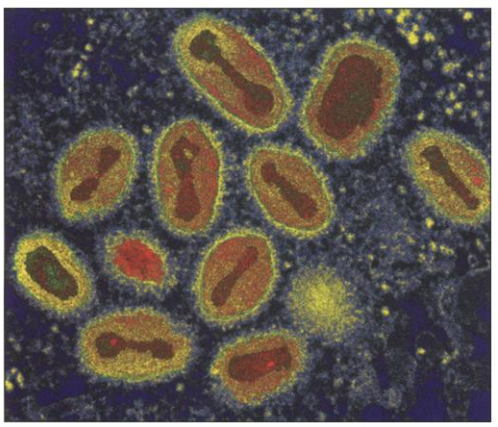
CAMBRIDGE, U.K.—The privileged few who study one of the world's most notorious viruses now have an unfamiliar luxury: boundless time. On 18 May, the World Health Organization's (WHO's) top decision-making body approved a recommendation to delay destruction of the world's two known stocks of smallpox, held under tight guard in Russia and the United States. And, to the surprise of many at last week's meeting of the World Health Assembly (WHA) in Geneva, anticipated calls for a new destruction date failed to materialize.

A year ago, WHO was poised to approve incineration of the stocks—the last known samples of live virus after the disease was eradicated from the wild—by the end of 2002. But the 11 September attacks, followed by the anthrax-tainted letter campaign, heightened fears that smallpox could be resurrected from clandestine stocks or, less plausibly, diverted from sanctioned stocks. Those disturbing scenarios prompted WHO's governing board last January to recommend extending the virus's stay on death row. The reprieve could permit Russia, the United States, and collaborating countries to develop modern diagnostics, safer vaccines, and drugs against the disease (*Science*, 15 March, p. 2001).

WHA's imprimatur allows this loosely coordinated program to shift into high gear. "For scientists, it's really good news," says Antonio Alcami of the University of Cambridge, U.K., a mousepox expert and WHO adviser. He notes that potential smallpox studies—part of a batch of biodefense projects that a U.S. National Institute of Allergy and Infectious Diseases panel will review for funding next month—could now proceed with confidence that any promising vaccines or drugs they turn up could be pitted against live virus.

Indeed, smallpox researchers may have more breathing room than expected. Last January, China's Permanent Representative to the United Nations in Geneva, Sha Zukang, implored the agency to set a new date for destruction (*Science*, 25 January, p. 598). China backed off this demand at the WHA meeting. According to Lev Sandakhchiev, director of the Russian smallpox repository in Koltsovo, this "may mean that we have another 5 to 7 years [of research] ahead of us."

–RICHARD STONE



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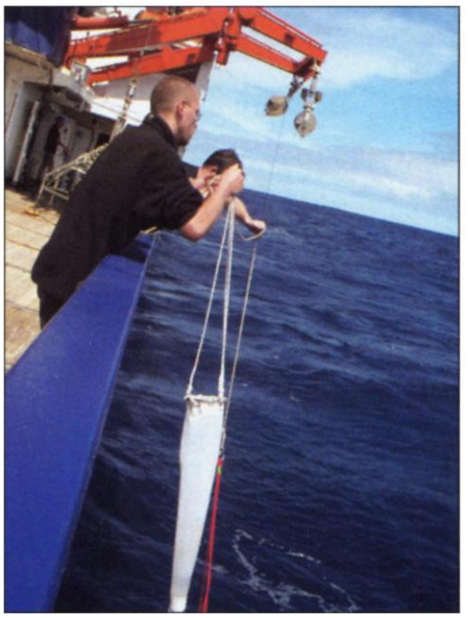
Not dead yet. Last week's WHA decision paves the way for research on live smallpox virus for the next several years.

U.K. RESEARCH

Accounting Error Leads To Funding Drought

CAMBRIDGE, U.K.—A major British research funding agency has canceled an entire round of grants, worth $19 million, in an attempt to fend off a cash crisis. Last week's decision by the Natural Environmental Research Council (NERC) has infuriated scientists in fields ranging from atmospheric and polar sciences to freshwater biology. "The long-term damage will be to the career structure of young scientists" who find themselves without a project this year, says Ekhard Salje, head of earth sciences at Cambridge University.

NERC is one of seven agencies that channel government money into academic research. Its current woes stem from a failure in its new accounting system and overspending on staff salaries last year. In a statement last week, NERC announced that the cruel double whammy, its own doing, has forced it to save $28 million this year, although NERC has asked the government to contribute $8.5 million to lessen the blow.



Loss of talent? Cancellation of NERC funding may force Britain's young scientists abroad.

The agency will find most of the savings by canceling its first of two rounds of 3-year research grants planned for 2002, forcing researchers on as many as 50 projects to seek funding elsewhere. Aspiring grantees must now wait until December for the next round. "It was a regrettable decision that was not taken lightly," says David Brown, NERC's director of science programs. "If there was any other course of action we would have taken it." He says that other programs, such as NERC's small grants, studentships, and prestigious fellowships, are unaffected.

Researchers are dismayed by the lost opportunity and the major blow that it will deal to departments that rely heavily on NERC money, says Salje. Many of the students in his own department at Cambridge, he notes, are funded through the standard grants program. "We won't be able to educate the next generation of young scientists," he says. In some cases, labs in other countries will benefit from NERC's accounting error. Ph.D. student Markus Geisen of the Natural History Museum in London was to lead a research project on a micropaleontology grant this summer but says he now plans to skip over to Germany for a short-term contract researching coccolith biology.

Brown says that NERC will seek more money for the December round of grants if it receives a flood of strong proposals. However, paleontologist Jeremy Young of the Natural History Museum, who was hoping to employ Geisen, doesn't know what to expect come December. "The competition … will be very high," he predicts. "It is going to cause absolute chaos." **–JULIA DAY**

Julia Day is an intern in the Cambridge, U.K., office of *Science*.