nia. "Basically, we've resolved the solar neutrino problem with a 99% confidence level. It's oscillations."

"This is an absolutely direct measurement," Bahcall says. "Previous results were not so direct." SNO scientists have already added salt to the heavy-water sphere, which will increase the instrument's sensitivity to muon and tau neutrinos and add another level of precision. "That will be a thrill," says Bahcall. –CHARLES SEIFE

U.S. RESEARCH BUDGET

Picture Brightens a Bit As First Bills Advance

U.S. scientists anxious about next year's federal research budget got some good news last week. Several congressional panels approved preliminary 2002 spending bills that restore research programs targeted for cuts by the Bush Administration, while others are considering channeling part of larger budget allocations to science. Pentagon officials also signaled that they may request a significant boost for defense R&D. Congress, however, still has a long way to go before any numbers become final for the fiscal year that begins 1 October.

The first bit of good news came from a panel that oversees the U.S. Geological Survey (USGS). Its members recommended that the agency get an $18 million boost to $901 million, some $87 million above the president's request. The biggest winner was USGS's $203 million Water Resources Division, which would get a 1% increase rather than a 22% cut (*Science*, 13 April, p. 182). "It's essentially a restoration budget, [and] that's a good thing," says lobbyist David Applegate of the American Geological Institute in Alexandria, Virginia, which had lobbied hard against the cuts. He is optimistic that the full House will approve the numbers later this month, and that the Senate will eventually follow suit.

The USGS funding was part of an $18.9 billion bill approved 13 June that funds the Department of Interior and a flock of smaller agencies. One, the Smithsonian Institution, was singled out in the wake of a controversial effort to reshape the museum complex's science programs. The panel ordered Secretary Lawrence Small to tread water until a new external advisory panel makes its report later this year, in effect backing complaints by Smithsonian scientists that Small has ignored their advice (*Science*, 11 May, p. 1034).

Many biomedical scientists were also pleased with language in a $74 billion agriculture spending bill approved by a House panel on 13 June. It would postpone for another year the development of new federal rules for the care of millions of laboratory mice, rats, and birds. Biomedical groups claim the rules would be duplicative and expensive.

Prospects for the Department of Defense's (DOD's) science budget—a mainstay for university math, engineering, and computer science departments—are also looking up. New DOD R&D chief Edward Aldridge told a Senate subcommittee on 5 June that he hoped to spend between 2.5% and 3% of the Pentagon's total budget on basic and applied science, endorsing a goal set by an advisory panel several years ago. That target, if incorporated in a long-delayed DOD budget request later this summer, could generate more than $10 billion for research, a 10% increase over current levels.

National Science Foundation (NSF) officials, meanwhile, are hoping to get a portion of an extra $1 billion allocated to the House and Senate panels that handle its budget, along with those of the Veterans Administration, the Department of Housing and Urban Development, NASA, the Environmental Protection Agency, and several other agencies. Lawmakers from both parties have deplored the Administration's 1.3% increase for NSF, a paltry $56 million, including a cut in its $3.3 billion research account. The House subcommittee will vote on a bill next week. –DAVID MALAKOFF

With reporting by Erik Stokstad and Jeffrey Mervis.

U.S. SCIENCE POLICY

Memo to Congress: Get Better Advice

Add science policy wonks to the list of those hoping to bring extinct species back from the dead. Academics, science lobbyists, and government officials gathered in Washington last week to hash out ideas for reviving Congress's Office of Technology Assessment (OTA), a science advice agency that lawmakers killed in 1995. By the end of the daylong workshop, however, there was no consensus on what might convince Congress to change its mind.

Created in 1972, OTA was known for organizing diverse panels that churned out well-regarded reports on hot policy topics such as genetic engineering. It's also been the inspiration for similar science advisory agencies established in other countries. But

ScienceScope

Banking on Chemicals Gene hunters have GenBank. X-ray crystallographers have their Protein Data Bank. Now Harvard University chemist Stuart Schreiber wants chemists to have a bank of their own to store the wealth of information on new bioactive small molecules.

The notion behind the aptly named Chembank, says Schreiber, is to collect a standard set of information on the way small biologically active molecules affect organisms. Chembank entries would cover both general effects, such as how a molecule might change a developing organism's appearance, and specific effects, such as how it might inhibit a specific protein kinase receptor. Chembank could also allow researchers to pinpoint common structural motifs in bioactive compounds—a feature that Schreiber believes could help synthetic chemists design more potent drugs with fewer side effects.

"It is a terrific plan; it would be a very valuable database," says Kevan Shokat, a chemical biologist at the University of California, San Francisco. But he and other supporters won't know until August if the National Cancer Institute, which is currently reviewing Schreiber's idea, will back the project.

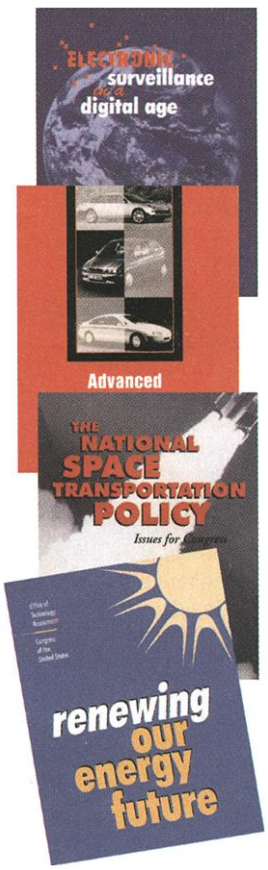
Universities Fall in Line The government's controversial plan to privatize Japan's 99 national universities—and perhaps close or merge as many as two-thirds of them—got a big lift last week when the target population withdrew its opposition.

The Japan Association of National Universities changed its stance after deciding that greater independence is the key to coping with changing demographics, says that group's chair, Makoto Nagao. The association's traditional view that every national university should emulate the others and be treated uniformly, he says, clashes with attempts to meet growing demands on universities to conduct advanced research and provide adult education and other types of real-world training.

At the same time, Nagao remains concerned about local communities that might lose their national university. "Japan's future rides on the shoulders of education and research, and there should be more careful discussion over how to not jeopardize those functions," says Nagao, who is also president of Kyoto University. The association hopes to be consulted as the government makes plans to implement privatization over the next few years.

some lawmakers felt that OTA had become a bastion of Democratic bias that took too long to complete expensive studies. When Republicans won control of Congress in 1994, one of their first moves was to eliminate the $22 million office. Ever since, science community leaders have complained that lawmakers lack a trustworthy, neutral source of expertise on emerging issues such as stem cell research and nanotechnology.

To fill the gap, workshop organizer M. Granger Morgan of Carnegie Mellon University in Pittsburgh, Pennsylvania, asked 10 academics and science advice veterans to explore five potential models. The ideas ranged from a small body that would contract out studies to a neo-OTA housed at an existing nonprofit or university. However, none of the plans escaped criticism from workshop participants, who included a number of former OTA staffers.



Packaged advice. OTA reports covered the world of science.

One plan, which would require Congress to decide ahead of time on a list of "well-established" nonprofits approved to conduct studies, is "the most hopelessly impractical thing I've ever seen," said Bruce Smith of Columbia University in New York City. Others pronounced a bill to resurrect OTA in its original form, H.R. 2148, recently introduced by Representative Rush Holt (D–NJ), as dead on arrival. "Congress at this point does not seem ready to invest in a new staff-heavy organization," said Bill Bonvillian, a senior aide to Senator Joe Lieberman (D–CT). Any such proposal also faces a steep learning curve: Holt confessed that some of his colleagues "didn't even know that OTA had been abolished."

Despite the darts, Morgan said that the workshop achieved its intended goal of "getting a national conversation started." For skeptics, however, the meeting demonstrated that convincing Congress it needs a new OTA will be about as easy as cloning a dinosaur.

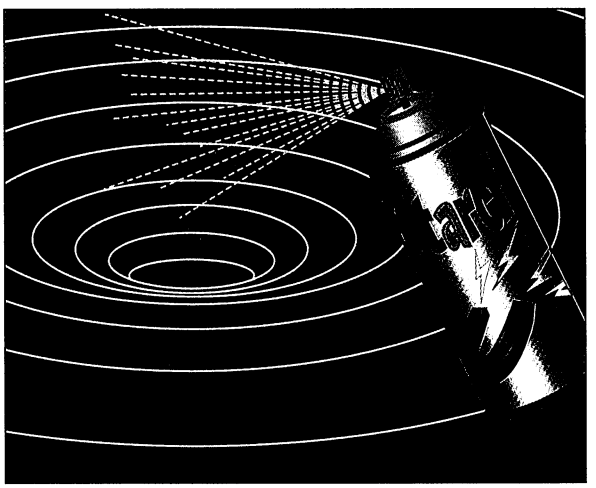
–DAVID MALAKOFF

COSMOLOGY

Math Trick May Cause Tension Headache

Albert Einstein's rubber sheets may be due for a dose of starch. The reason, says Christos Tsagas, a physicist at Portsmouth University in the United Kingdom, is magnetism. By reanalyzing the basic equation of general relativity—which treats space and time as a stretchy membrane—Tsagas discovered that magnetic fields tend to flatten and stiffen the fabric of space-time. The discovery might force cosmologists and astronomers to reexamine how magnetic fields have shaped the evolution of the cosmos.

"The normal assumption is to neglect magnetic fields in the early universe, mostly for simplicity," says Bernard Carr, a physicist at Queen Mary's College in London. "But magnetic fields could have an interesting cosmological effect. It might not be satisfactory to neglect it."



Starched sheets. A new look at Einstein's theory shows that the fabric of space-time may be stiffer than physicists thought.

Einstein's general theory of relativity is essentially a description of the geometry of space and time. According to Einstein, a hunk of matter such as a star bends space-time like a bowling ball perched upon a rubber sheet. The result, described in relativistic terms, is gravity. That much has been known for the better part of a century. But Tsagas looked at the equation in an unusual way, switching the roles of space and time—a swap that makes no mathematical difference but changes the form of the equation. "You see effects that are a bit difficult to see in a more traditional form," Tsagas says. As a result, Tsagas spotted something no one had seen before: A term in the equation showed that magnetic fields transfer their properties to the very fabric of space-time itself.

Like very elastic rubber bands under tension, magnetic field lines try to remain as straight as possible. Magnetic fields transmit that tension to space-time, Tsagas realized, making nearby space like a rubber sheet that has been stretched a little bit tighter. According to Tsagas, such a region becomes stiffer and flattens out somewhat. "This effect can be crucial," he says.

If the big bang created a primordial magnetic field, then the extra stiffness of space-time would have resisted the rapid inflation that many physicists think occurred in the first split second of the universe. It also would have ironed out the entire universe. "It tends to make the background cosmology more like a flat cosmological model," Carr says. That might help explain why the cosmos doesn't appear to have any curvature, a role physicists have traditionally assigned to inflation. Stiffer space-time might also damp gravitational waves, Carr says, making them harder to detect than physicists at observatories such as LIGO and TAMA have been counting on.

Magnetic stiffening of the early universe probably won't win instant acceptance; inflation is so useful to physicists that any challenger is going to be tested very sternly. But if it pans out, cosmologists will have to rethink the role of magnetic fields in shaping the cosmos. And black hole theorists—who deal with sharply curved space near strong magnetic fields—might need to revise some pet notions as well. Astrophysicists in general, it's safe to say, could lose a little sleep over stiff sheets.

–CHARLES SEIFE

ASTRONOMY

Cluster Watchers View A Hot, Violent Birth

In a dwarf galaxy 12 million light-years from Earth, astronomers may be witnessing the birth of a globular cluster. The cluster, the youngest so far detected, could shed light on how similar balls of stars formed in our own galaxy billions of years earlier.

According to Jean Turner of the University of California, Los Angeles, the new cluster may contain up to a million stars in a region only 10 light-years across. "It's the best, closest, and probably youngest example of a super–star cluster," says Turner, who presented her team's findings at the 198th meeting of the American Astronomical Society in Pasadena.*

* 3–7 June, Pasadena, California.

CREDITS: (TOP TO BOTTOM) ILLUSTRATION: A. STONEBRAKER; COURTESY OF OTA