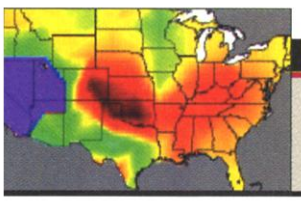
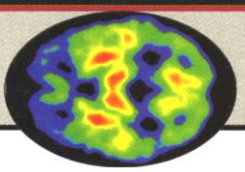
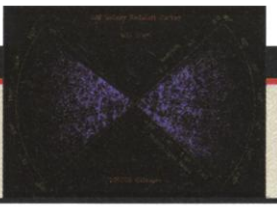


2113 The coarseness of climate models

LEAD STORY 2116 When the brain is primed to learn





2121 100,000 galaxies, and counting

figures. They scanned every single autoradiogram and compared them with each other using image-processing software to alter orientation, intensity, and contrast. All told, Rapp says, his team found 357 apparent manipulations and fabrications of autoradiograms in the articles Herrmann co-authored. For instance, in one paper on an oncogene's activity, the same assemblage of bands was used to illustrate cellular responses to different chemicals. In other figures, bands were copied, flipped, or otherwise reused elsewhere. The 94 papers with clear or suspected manipulation could be "a lower estimate," says Gerok, as the task force members were unable to check the veracity of the raw data in most papers. Herrmann, now in private medical practice, did not respond to several requests from the task force, nor did he return calls from *Science*. Brach could not be located.

The task force investigators also found evidence of fudged figures in the habilitations of Brach, Lindemann, and Oster. The latter two contained allegedly manipulated figures appearing exclusively in the habilitations. "Since a habilitation is a single-author publication, the author is ultimately responsible for its entire content, and this makes an active participation [in the manipulations] very likely," says Rapp. During the initial investigations 3 years ago, Lindemann, who has denied involvement in data manipulation, retracted his habilitation and replaced it with a new version. Rapp's task force intended to examine it, but Lindemann failed to respond to a request for raw data, Rapp says. Instead, Mertelsmann informed the task force that Lindemann had decided to leave academic research. A University of Freiburg spokesperson, however, told *Science* that Lindemann is still with the university and has asked for a 1-year leave of absence starting 1 August. According to Rapp, Oster, who has since left the University of Freiburg, declined to respond to the task force other than with a written statement claiming he had nothing to do with the alleged misconduct. Neither Lindemann nor Oster could be reached for comment.

The task force report criticized Mertelsmann for failing to monitor the department's research closely enough to pick up on the fraud, "especially for publications in which he is the senior author," says Gerok. During its investigation, Rapp says, Mertelsmann told the task force that as a clinician he lacked a deep understanding of the molecular biology research, and thus left it to Herrmann to oversee. That did not impress the panel—or Gerok, who says that "such a notion of authorship is lethal for science." The task force also randomly selected five of Mertelsmann's 245 papers that do not include Herrmann as an author. After analyzing one in detail, the task force in its report states that it found "no conclusive proof of conscious falsifications," although "data may have been manipulated." Rapp's group plans to analyze the other four papers in the coming months. When contacted by *Science*, Mertelsmann declined to comment.

All the researchers implicated in data manipulation could face demands from the DFG and the cancer charity, the Deutsche Krebshilfe, to repay grant money used to fund tainted work. The DFG, Grunwald says, is considering legal action to recover part of the $440,000 it spent on Herrmann's work. In the meantime, Gerok says, the authors should retract all 52 clearly tainted papers.

On 19 June, University of Freiburg president Wolfgang Jäger resurrected the university's own fraud panel in order to probe for irregularities in Mertelsmann's department. "You can expect this process to drag on for a long time," says Rapp. Indeed, it may take years more for the German scientific community to put this affair behind it.

–MICHAEL HAGMANN

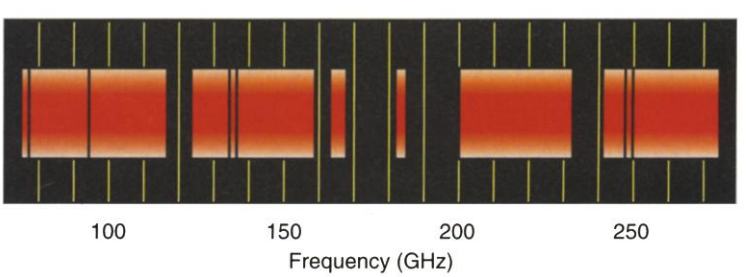
ASTRONOMY

Researchers Get Spectrum Bands

Technology has a way of opening windows of opportunity and promptly closing them again. In radio astronomy, a surge of technological advances has opened such a window over the past decade by allowing astronomers to see the electromagnetic spectrum at millimeter wavelengths. But scientists have been in danger of losing this precious band to another burgeoning technology—telecommunications—as millimeter wavelengths look promising for transmitting high-bandwidth wireless information over relatively short distances. Earlier this month, however, astronomers won an international agreement to keep their window open.

For astronomers, this band in the spectrum, which falls between long-wavelength radio waves and short-wavelength infrared light, is a gold mine. The bulk of the energy in the universe is emitted at these wavelengths; it comes from molecules in the interstellar medium, from the cosmic microwave background, and from cool material forming stars, planets, and galaxies. Studying these emissions promises insight into subjects as diverse as the origins of life and the birth of stars. But commercial technologies are already being developed to broadcast and receive at frequencies above 50 gigahertz, which corresponds to wavelengths below 6 millimeters. That's uncomfortably close to the frequencies of interest to radio astronomers, which fall between 71 and 275 GHz. "If you wanted, for instance, to broadcast the Internet from satellites in orbit—and God forbid this will ever happen—you have to go to much lower wavelengths than any employed now," says astronomer Al Wooten of the University of Virginia and the National Radio Astronomy Observatory in Charlottesville.

Now critical wavelengths have been guaranteed safe for radio astronomers. Although radiation in much of the millimeter band is blocked by Earth's atmosphere, three frequency bands can pass through relatively unscathed. The 2500 delegates to the World Radio Communication Conference, known as WRC-00, which met from 8 May to 2 June in Istanbul, Turkey, agreed to allocate all three to radio astronomers, reserving frequency bands with no scientific importance for military uses, such as satellites that require downlinks at millimeter frequency. "This is a preventive measure to assure that the future of millimeter-wave astronomy will be as free of interference as possible," says Tomas Gergely, electromagnetic spectrum manager for the



Astronomy reserve. Regions of the electromagnetic spectrum within three frequency bands not blocked by the atmosphere have been allocated to radio astronomers.

CREDIT: J. WHITEOAK/CSIRO AUSTRALIA TELESCOPE NATIONAL FACILITY

National Science Foundation's Division of Astronomical Sciences.

When the WRC last dealt with spectrum allocations back in 1979, millimeter-wavelength astronomy was in its infancy. "At the time there was no way of emitting or detecting waves in that band," says Wooten, "so there was no commercial interest, and the WRC decided to ignore it. Now, as the technology is developing, people are also discovering military and commercial applications in that band."

For radio astronomers, advances in receiver technology and high-speed digital processing have turned millimeter wavelengths into a new frontier. A $550 million joint European–U.S. observatory, to be built in the high desert of northern Chile, is at the end of its design phase. The project, which will consist of an array of 64 12-meter radio telescopes, is scheduled for completion in 2010. Some plan to use it to search the interstellar medium for complex molecules, such as glycoaldehyde, the simplest possible sugar, recently observed among the stars. Wooten describes such chemicals as "on the road to life." Others will use the observatory to study galaxies billions of years older than the Milky Way that formed stars at a rate 10 to 100 times faster. "A lot of those galaxies are completely invisible at the visible wavelengths, because their photons have been redshifted all the way into millimeter wavelengths," says Wooten. "Now we know we'll be able to see them clearly and without interference." –GARY TAUBES

NUCLEAR SECURITY

Los Alamos Under Siege After Secrets Recovered

Smaller than a paperback spy novel, the secrets-packed computer hard drives that temporarily disappeared at the Los Alamos National Laboratory in New Mexico could spark big changes in science and security at the country's nuclear weapons laboratories.

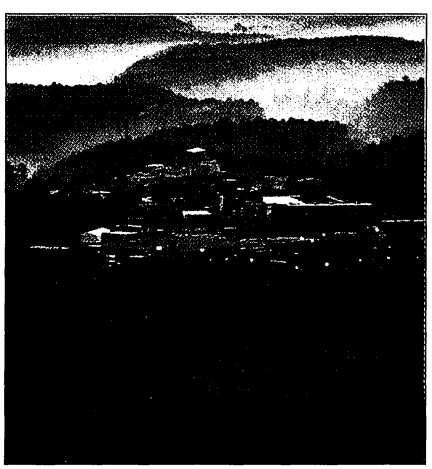
As *Science* went to press, investigators were trying to determine if the disks—missing from a vault since at least 7 May and discovered behind a nearby copying machine on 16 June—were pocketed by spies or just mislaid by employees. Their disappearance touched off a debate about how useful they might be to a rogue nation or terrorist group. Energy Secretary Bill Richardson says he believes the disks never left the premises and "espionage was not a factor." But he isn't waiting for a final report to slap new controls on the flow of sensitive lab information. He has already blamed the lab's contractor, the University of California (UC), for the lax security, raising the possibility that the Department of Energy (DOE) may try to sever the university's 57-year oversight of the lab. At the same time, some lawmakers are calling for Richardson's head.

The incident has refocused attention on lab security and revived debate about the fate of Los Alamos scientist Wen Ho Lee, arrested last December and awaiting trial for allegedly mishandling classified information. It has also broken the logjam blocking the confirmation of former CIA official General John Gordon as head of a new National Nuclear Security Administration to improve security and oversee all weapons work. These and other issues were expected to get a high-profile airing at congressional hearings this week, even as several task forces and the FBI investigate how a team that is supposed to help prevent nuclear terrorism lost track of its classified cookbook for finding and disarming weapons.

To date, DOE officials have been intentionally vague about the contents of the laptop computer hard drives, confirming only that they stored information that might help its Nuclear Emergency Security Team (NEST) find, identify, and disarm a homemade atom bomb or stolen warhead. Formed in 1975, NEST has responded to dozens of calls with a team of scientists and emergency personnel equipped with sensitive bomb-finding and -disarming equipment.

Those familiar with NEST have speculated that the hard drives contain information, ranging from bomb radiation signatures to wiring diagrams, that could be valuable to terrorists and aspiring nuclear powers. Even poorly detailed guides to the shape and construction of weapons components, says Greg Mello of the nonprofit Los Alamos Project in Santa Fe, "would be very valuable to a technically advanced but data-starved country like Pakistan. It would shave years off new weapons' development by helping them avoid dead-end research alleys."

A few commentators have proposed

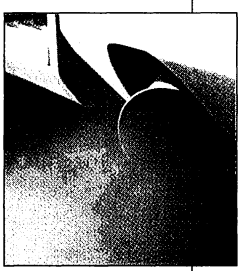


Hot spot. The disappearance of sensitive computer disks during forest fires last month has sparked new criticisms of Los Alamos lab.

CREDITS: (LEFT TO RIGHT) J. SCHOELLKOPF/AP; INDEX STOCK PHOTOGRAPHY

ScienceScope

Trial Balloon Federal officials are about to test reaction to a hot-button question in the global warming debate: whether the Environmental Protection Agency (EPA) has the authority to regulate carbon dioxide (CO_2) emissions from new vehicles.



Within a few weeks, the agency expects to publish a *Federal Register* notice asking for comments on a petition filed last October by the International Center for Technology Assessment, a green-leaning think tank in Washington. The petition argues that EPA can and should regulate CO_2 under the Clean Air Act because it's a pollutant that's harmful to public health and welfare. Comments already submitted by industry groups, however, argue that the act doesn't apply to CO_2. Moreover, extra CO_2 "is not having harmful effects, and it can be and has been shown to be beneficial," argues Paul Kamenar of the conservative Washington Legal Foundation.

EPA insists that it has no immediate plans to actually regulate CO_2. And officials note that the agency has been asked to air the idea at the request of two warming skeptics in Congress: Representatives David McIntosh (R–IN) and Ken Calvert (R–CA). "The agency isn't taking any position on the merits of the petition," says David Doniger of EPA. "It's simply to get everybody's two cents."

Signing Up After years of dithering, the Indian government has joined global efforts to develop a vaccine against AIDS. Last week Indian and U.S. officials pledged to accelerate cooperative research aimed at developing a vaccine against the HIV subtype most common in the Indian region. India has traditionally been wary of foreign scientists seeking to conduct vaccine trials on its territory for fear that the trials would not benefit its population (*Science*, 20 November 1998, p. 1394), although about 3.5 million people are thought to be HIV positive.

The new accords were signed last week in Washington, D.C., by C. P. Thakur, the Indian Minister of Health and Family Welfare, and U.S. Health and Human Services Secretary Donna Shalala and cover maternal and child health as well as AIDS. A working group of Indo–U.S. scientists will propose specific projects to be carried out under the auspices of the Indian Council of Medical Research in New Delhi and the U.S. National Institutes of Health.