together proposals. The prize will be $25 million a year over 4 years for each institute, and the winners must raise twice that amount from outside sources. Only the 10 University of California (UC) campuses, including the new Merced site, are eligible to host the new institutes, but collaborators can come from any university in the state.

"The bill promotes technological and scientific research and training to maintain California's leadership," says Antonio Villaraigosa, former speaker of the California assembly, who introduced the bill at the request of Governor Gray Davis. "These institutes will concentrate resources and mobilize the state's best scientists and engineers in medicine, biotechnology, telecommunications, energy, space, and agriculture."

The idea for the California Institutes for Science and Innovation grows out of the state's economic boom and a rare political alignment in which Democrats control the governor's mansion and both legislative houses. It's a departure from most other state science and technology investments, which tend to focus on short-term economic development rather than basic research. It also differs from the typical state investment in university buildings, made without regard to the potential commercial value of the research going on inside. "States spend billions of dollars on university infrastructure, but most of it is not targeted for an economic payoff," says Dan Berglund, executive director of the State Science and Technology Institute in Columbus, Ohio. Adds Robert Conn, dean of the Jacobs School of Engineering at UC San Diego (UCSD), "The commitment of the state to provide this infrastructure is extraordinary. It's bold thinking."

Conn is part of a team at UCSD and UC Irvine drafting a proposal for an institute in telecommunications and information technologies that would build on existing research efforts and local expertise. Officials have already made progress in lining up outside donations, Conn says, including a $15 million pledge from QualComm, the wireless communications giant headquartered in San Diego. In a similar vein, UC Davis, the state's agricultural campus, is proposing an institute on environmental informatics and technology to develop new production methods in agriculture and other sectors. "We want to improve the economy without damaging the environment," says Kevin Smith, Davis's vice chancellor for research.

The Los Angeles and Santa Barbara campuses are jointly proposing a nanosystems institute that would also have a heavy emphasis on developing a cadre of researchers for this emerging area. "The institute would provide core facilities that otherwise would be difficult to build or to use because we wouldn't have a critical mass of investigators," says Roberto Peccei, dean of physical sciences and interim vice chancellor for research at UCLA. "One of the products of this institute will be grad students and undergrads who will have some real understanding of cross-disciplinary fields. You can get a lot of people to work together who otherwise wouldn't."

Although the bill has yet to be approved, the UC system has asked campuses to submit their ideas by the end of this month. Experts in the relevant fields will review them for scientific and educational merit, along with the importance of the work to the state's economy, says UC official Susanne Huttner, and from that pile will come a final round of submissions in September. Any California campus, public or private, can collaborate on a proposal, and a single campus can submit more than one idea. But no university can land more than one institute.

Although the state money is intended for bricks and mortar, state officials say that the outside funding—from federal agencies, foundations, and industry—may be used for research activities and operating costs. And while three new institutes pale in comparison to the number of existing centers on California campuses, they would represent a significant part of the state's investment in basic research (see pie chart). In addition, the absolute amount is nothing to sneeze it, says Berglund: "$300 million over 4 years is a big number."

–EVELYN STRAUSS

TOXICOLOGY

Dioxin Draft Sparks Controversy

Even before it is released, the U.S. Environmental Protection Agency's (EPA's) new report on dioxin is creating a furor. A draft, leaked to *The Washington Post* last week, concludes that dioxin is 10 times more likely to cause cancer than previously believed, posing a risk as high as 1 in 100 among the most exposed individuals. Some scientists immediately blasted the findings as "unbelievable," while acknowledging that they had not seen the report. Even before the leak, concern from other federal agencies about public anxiety prompted the White House to organize an interagency review of the draft, which has yet to undergo review by EPA's Science Advisory Board.

Five years ago, that same board kicked an earlier version of the dioxin reassessment back to EPA for revision, calling it scientifically flawed (*Science*, 26 May 1995, p. 1124). The 1994 assessment concluded that low levels of dioxin could be causing significant reproductive, immune, and developmental effects and retained dioxin's label as a "probable" carcinogen. After analyzing the

ScienceScope

Late Hit Representative James Sensenbrenner (R–WI), chair of the House Science Committee, reduced a senior National Science Foundation (NSF) official to tears last week when he banned her from testifying about science education. "Your conduct is insulting to this committee," he bellowed at a mortified Judith Sunley, NSF's chief education officer. "I'm giving you an F and excusing you for the day."

Sensenbrenner's gag order was triggered by NSF's failure to heed a committee policy requiring witnesses to submit testimony at least 24 hours in advance. The purpose, says committee spokesperson Jeff Lungren, is to give staff and members time to prepare questions. Instead, a copy of Sunley's two-page statement arrived a few minutes before the start of the 17 May hearing on H.R. 4271, a bill that would expand NSF's role in precollege science and math education (*Science*, 21 April, p. 419).

That statement, the product of negotiations between NSF and the White House, expressed support for the bill's intent but offered caveats. "Ironically, [the White House] thought our original draft was too supportive," says one NSF official. Even without NSF's verbal endorsement, the committee is expected to approve the legislation. But its chances of going any further this year are slim.

Elusive Goal A heavily touted promise to eradicate polio by the end of this year won't be met, world health officials admitted last week. Speaking at the World Health Assembly in Geneva, World Health Organization (WHO) Director-General Gro Harlem Brundtland (right) said that obstacles ranging from armed conflict to a temporary vaccine shortage will foil the organization's best efforts in sub-Saharan Africa and the Indian subcontinent, regions where the disease is still active.

CREDIT: AP PHOTO/J. MCCONNICO

Noting a current $300 million shortfall in the campaign's budget, Brundtland also urged leaders in high-risk countries to remain committed to an effort that has made considerable progress. Some 190 countries are now free of the disease, and even the Indian subcontinent reports that the number of cases plummeted from 25,711 in 1988 to 1866 last year. But Uton Muchtar Rafei, WHO regional director for Southeast Asia, warns that up to 10% of the target population remains out of reach because of a growing birthrate, a transient population, and insufficient supplies of the oral vaccine.

without killing any of the mice. These results, Jacobs says, show that the mutated enzyme is not only critical to the ability of *M. tuberculosis* to cause disease but also to its ability to persist. "This is the first persistence mutant ever isolated," claims Jacobs.

Others question whether the gene is involved in persistence, partly because the mutant strains did not rapidly disappear in the mice after the initial stage of infection; thus, knocking out this gene did not dramatically cripple the bacterium's ability to persist. "It's an interesting gene, but I wouldn't consider it the crux of persistence," says Bishai.

But nobody is questioning the impact of the new technology for creating TB mutants, which Harvard's Rubin hails as "a huge advance." Indeed, Jacobs says that in the past 6 months his team has created about four times as many TB mutants (32) than have been published to date.

Both groups have more work to do in figuring out what role the genes they have identified might play in TB virulence and persistence. But in any new knowledge, there is hope. Says microbiologist Michael Mahan of the University of California, Santa Barbara: "The payoff is huge when you really understand a disease." –INGRID WICKELGREN

BIOMEDICAL ETHICS

HHS Plans to Overhaul Clinical Research Rules

Health and Human Services (HHS) Secretary Donna Shalala announced last week that the government intends to issue new guidelines and regulations designed to protect human subjects who participate in clinical trials. Curiously missing from the announcement, however, was the final word on a long-anticipated reorganization of HHS's framework for monitoring patient safety in clinical research.

The department is planning to appoint a "czar" who will run a new office in HHS that will coordinate efforts by 17 agencies to protect human research subjects. According to several sources, the job is being offered to Greg Koski, an anesthesiologist and director of human research affairs at Massachusetts General Hospital in Boston. But a deal had apparently not been consummated in time for last week's announcement, which came on the eve of congressional hearings on the topic, and the department was left proclaiming a new policy but not the person who will implement it.

> **HHS needs "a world-class leader"... from "outside the bureaucracy."**
>
> —Donna Shalala

The announcement said HHS plans to ask Congress for civil penalties for lapses in obtaining informed consent from research subjects—up to $250,000 per clinical investigator and $1 million per institution. Both the National Institutes of Health (NIH) and the Food and Drug Administration are drawing up new guidelines on obtaining consent. HHS also plans an "aggressive effort" to train clinical investigators and members of Institutional Review Boards (IRBs) on the use of human subjects. And NIH intends to clarify its guidelines on conflict of interest to ensure that "any researcher's financial interest in a clinical trial [is] disclosed to potential participants."

As for the new czar, Shalala said earlier this month that the job will go to "someone who is experienced and is a world-class leader" but is from "outside the bureaucracy." That formula clearly ruled out one top candidate: Gary Ellis, the current director of the Office for Protection from Research Risks (OPRR), a small office at NIH that watches over institutions receiving federal money for clinical research. Ellis confirms that he will not go to HHS when the office moves but instead will be offered other employment at NIH. Under Ellis, OPRR experienced a sudden change of style. After being criticized in Congress in 1998 for not taking the initiative, OPRR came out with guns blazing over the past year and a half, shutting down half a dozen prestigious clinical research programs for noncompliance. Ellis's high-impact style may have cost him some support among university chiefs, observers say. But it also won praise. One leader in the field says Ellis "raised the public consciousness." He also got an endorsement from Representative Dennis Kucinch (D–OH), who said this month that Ellis's record was "the only bright spot" in a "dismal area" of federal oversight of human research subjects.

Koski—if he is the appointee—will clearly be wading into a contentious political job. An assistant professor who has spent the past 30 years at Harvard and Harvard Medical School conducting basic research, clinical medicine, and teaching, Koski declined comment.

One of the czar's first tasks will be to answer questions about federal monitoring of experiments such as the gene therapy trial in which an 18-year-old died last September (*Science*, 12 May, p. 951). The Senate public health subcommittee has scheduled a hearing on this case for 25 May. Meanwhile, a House Government Reform subcommittee, chaired by Representative

ScienceScope

Hot Air? When Congress ordered the federal government 4 years ago to sell off its massive helium gas stockpile by 2005, some scientists got a sinking feeling. They worried that the result could be shortages which would hamper a host of research-related technology efforts, from the development of fiber-optic cable to magnetic-resonance imaging systems. But a National Research Council report released this week says the end of the federal monopoly on the element is unlikely to affect users—in science or industry. Even so, the report calls for the government to explore new ways to locate supplies of the gas, improve storage systems, and search for substitutes.

Cash to Burn The wildfire that scorched the Los Alamos National Laboratory in New Mexico disrupted research and reduced some offices to rubble—but it may yield a hefty consolation prize from Congress. The Senate last week added $85 million to a defense spending bill to help the lab rise from the ashes that followed a controlled parkland burn that ran amok (above). The House is expected to follow suit.

CREDIT: AP PHOTO/THE NEW MEXICAN, S. POYNTER

The lab's 7000-person workforce is "almost completely" back on the job after 2 weeks off, says associate lab director Tom Meyer. And despite the destruction of dozens of employee's homes and about 30 chemistry offices in temporary trailers, officials say fears of harmful releases from stored waste have so far proven unfounded. Spectrometers and other equipment are still being checked for smoke damage.

Meanwhile, lab officials are making recovery plans, including how to spend $26 million for environmental restoration that is part of the defense bill. First on the agenda are measures to handle excess runoff from denuded watersheds, which could be hard hit by approaching "monsoons." Still, fire damage may pale in comparison to the wounds—in morale and hiring—inflicted by recent allegations of Chinese spying at the lab. Says physicist David Campbell of the University of Illinois, Urbana-Champaign, former head of the lab's Center for Nonlinear Studies: "The spy stuff was much more devastating."

AIR POLLUTION

Three Asian Nations Launch Joint Study

SEOUL—Pollution from China's booming industrial northeast has long rained down on its richer neighbors, South Korea and Japan, damaging ecosystems and degrading public health. But scientists in all three countries hope that a 5-year project to measure the extent of the problem will provide critical information to help China clean up its act.

The research, which began last month, is the first of nine projects among the three countries dealing with transboundary pollution from a variety of sources. Others will focus on the effects of water pollution, acid rain, and desertification—which generates the airborne "yellow sand" that clogs Korean lungs—along with ways to meet the CO_2 emissions goals of the Kyoto protocol. They are the outgrowth of agreements struck by the environmental ministers of the three countries, most recently at a February meeting in Beijing (www.temm.org).

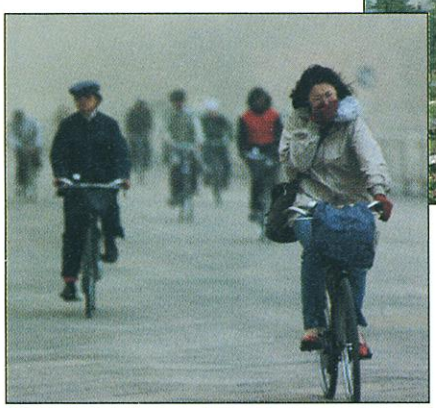
The new initiative will feature computer modeling of the flow of pollutants as well as the compilation of a list of major sources. Prompted by public pressure to deal with the problem, Korea is taking the lead with a promised $6 million next year. Japan's contribution is a modest $200,000 annually for the next 2 years, while China has not yet settled on an amount.

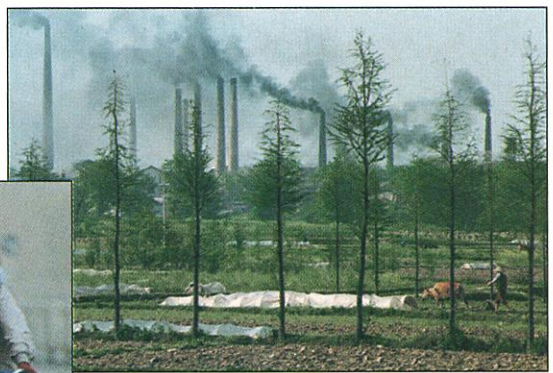
The project is seen as an important extension of Japan's Acid Deposition Monitoring Network in East Asia (EANET), which will soon begin to collect data after a decade spent setting up 38 monitoring sites in 10 countries, from Indonesia to Mongolia. "We expect this [new project] will develop into a regional framework for acid rain," says Eisaku Toda, assistant director of the air pollution control division in Japan's Environmental Ministry.

EANET, which lags 15 to 20 years behind similar tracking in Europe and North America, has been slow to get off the ground due to a limited budget and the difficulty of winning political support. Toda says the current monitoring network—which includes 10 stations in Japan, two in Korea, and nine in China—falls short of what is needed, and that Japan alone should have 40 to 50 stations. "But it's a good start," he says.

For years any type of international cooperation on environmental matters was plagued by political obstacles. Until the mid-1990s China "vehemently denied the existence of such a problem," says Kenneth Wilkening of the Nautilus Institute, a nonprofit organization in Berkeley, California, that works on security and environmental issues throughout Asia. Wilkening, who is organizing a meeting this summer in Seattle to discuss the transport of air pollutants across the Pacific, says that although most of China's pollution remains within its borders, the 5% to 10% that travels abroad can represent a significant part of a neighboring country's load. Depending on which computer model is used, Wilkening says, as much as half of Japan's acid rain could be blown in from China and Korea.

Chinese officials deny erecting any roadblocks to monitoring transboundary pollution. Instead, says a spokesperson for the environmental agency, China was reluctant to join international efforts until it had a better handle on the domestic sources, transmission routes, and impacts of the dirty air. Clean air is now a government priority, he noted, and Chinese cities regularly announce public air quality bulletins and forecasts. The country's emissions of sulfur dioxide and particulates dropped by 7.8% in 1998, he says, thanks to a campaign to reduce emissions in 47 cities hard-hit by acid rain and by the closing of many small, inefficient factories that use high-sulfur coal. "There has been equal and mutually beneficial cooperation between China and Japan and Korea on pollution control and environment management, and we hope to continue such cooperation," the official says.





Clearing the air. New project will model pollution from smokestacks like these in northeast China that darken skies over Korea and Japan.

CREDITS (LEFT TO RIGHT): WORLD RESOURCES INSTITUTE; J. STEVENS/LAWRENCE LIVERMORE NATIONAL LABORATORY

ScienceScope

Counting on NIF The true cost of building the world's largest laser is proving elusive. Earlier this month, Department of Energy (DOE) officials admitted that the cost of building the troubled National Ignition Facility (NIF) at California's Lawrence Livermore National Laboratory would nearly double, to $2.1 billion (*Science*, 5 May, p. 782). This week, however, a leaked government accounting study pegged the cost at $3.6 billion for an instrument (above, with project manager Ed Moses) that will shoot 192 laser beams at a BB-sized target. The experiments are aimed at developing fusion energy and modeling nuclear weapons without actually testing them. Livermore officials, however, say the bigger number includes R&D projects that aren't directly tied to NIF's construction.

The true size of the overrun has implications for other programs. Senator Pete Domenici (R–NM) is vociferously resisting any attempt to rechannel cash from his state's Sandia and Los Alamos labs to NIF. And he will use his power as head of the Senate Energy Committee, which oversees DOE's budget, to block any shift, Domenici vowed to the *Albuquerque Journal*: "It's not going to happen while I'm chairman."

Rat Race The rat will be the next target of publicly funded gene sequencing efforts in the United States, Francis Collins, director of the National Human Genome Research Institute (NHGRI), told his advisory council this week.

Until recently, no researcher would have considered taking on the burden of another mammal's genome while jammed sequencing centers worked through the human and mouse. But high-throughput labs in Massachusetts, Texas, Missouri, and California have added machines and increased their capacity some 10-fold, says Robert Waterston, director of the center at Washington University in St. Louis. Now their output, plus that of Britain's Sanger Centre, is "enough to do a working draft of a mammalian genome in 4 to 5 months," Waterston told the council. As a result, the NHGRI-funded centers want to sequence the rat, mouse, and human genomes in parallel—if NHGRI and the National Heart, Lung, and Blood Institute can carve out funds from the still undecided 2001 budget.

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