

Briefings

edited by CONSTANCE HOLDEN

World Bank Environment Fund

The World Bank, which has been hounded for years by environmentalists for failing to heed the consequences of its loan policies, is setting up a fund called the Global Environment Facility (GEF) to help finance the environmental aspects of development projects. Proposed 2 years ago by France, the idea was formally agreed upon at a meeting in Paris last November. Commitments totalling \$1.5 billion have been made for a 3-year pilot program offering low-interest loans and grants in four areas: global warming, marine pollution, biodiversity, and ozone depletion.

According to Nicholas Van Praag of the bank's environment department, the fund will help poor countries obtain money to make a needed project environmentally defensible—for example, adding scrubbers to a proposed power plant using high-sulphur coal. The fund will also encourage more participation by nongovernmental

organizations—for example, in planning small biodiversity projects, says Van Praag.

U.S. environmental groups are all in favor of such a fund but don't think the World Bank is the place for it given its lamentable record, according to Bruce Rich of the Environmental Defense Fund. He says the money is merely "a drop in the bucket" toward ameliorating the effects of projects, particularly in forestry and energy, that are ill-advised to begin with.

Proving Einstein Right (or Wrong)

According to legend, late 16th-century Italian scientist Galileo Galilei performed a simple experiment in which he dropped a lead and a wooden cannonball from the leaning tower of Pisa and showed that the different masses struck the ground at the same time. Now, two Stanford physicists, C.W. Francis Everitt and Paul Worden Jr., have proposed a test of this principle—now known as the equivalence of inertial and gravitational mass—that they say will improve the accuracy of Galileo's results by 14 orders of magnitude.

The principle is the founda-



Fine Arts Gallery of San Diego

Galileo. *An era of cheap science.*

tion for Einstein's geometrization of gravity in his general theory of relativity. It stems from the fact that unlike other fundamental forces—electromagnetism and the strong and weak nuclear forces—gravitational acceleration can be expressed as a function of mass and is therefore comparable to inertial accelerations. "The more you think about it, the stranger this is," says Everitt. Any breakdown in the equivalence of gravitational and inertial mass would show limits to the theory of relativity.

To test the limits of equivalence, the two physicists have proposed a satellite-based experiment consisting of three differential accelerometers, each a solid rod floating within a hollow cylinder. If the equivalence principle holds, as expected, the

rod will remain centered in the cylinder as the satellite orbits the earth. Any "drifting" of the rod will indicate that gravity is tugging more strongly at one of the two objects, leading them to travel in slightly different orbits.

If approved by the European Space Agency—which is co-sponsoring the project with NASA—the experiment might be lofted into orbit by the end of the decade. Price tag: \$18 million for the launch alone.

Looking for Planets

In the past decade, there have been tantalizing hints—from both ground- and space-based telescopes—that there are planets orbiting stars other than our sun. While there have been no confirmed discoveries, the National Research Council thinks the time is ripe for an aggressive search for new planetary systems. Such a program would be "technologically feasible, scientifically exciting, and richly rewarding," says a report by the NRC Committee on Planetary and Lunar Exploration.*

The report is the product of 6 years of study by a 29-member committee headed by University of Colorado astronomer Larry Esposito. It calls for a decade-long hunt for extrasolar planets, accompanied by laboratory studies to understand how planetary systems form, and theoretical and computer models to guide the search. "We want to go beyond what we know about our solar system," says Esposito. "We want to know how common a phenomenon it is to have planets, and to compare our solar system with other planetary systems."

The report includes no cost estimates, and funding prospects may seem dubious at a time when approved projects such as the space station are being cut back. But Esposito says that NASA is already aiming in the right direction: The planetary division is spending about \$5 million this year on research and planning for a search that would

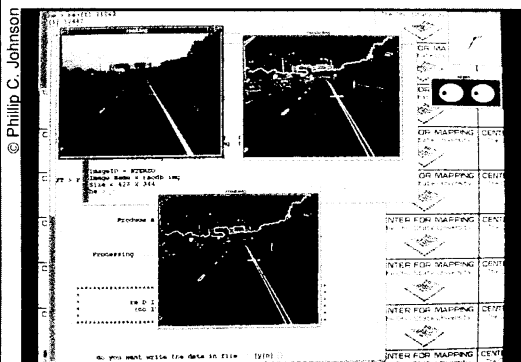
Cruising the Digital Highway

It's late, and you've taken the wrong exit off the interstate. You don't know where you're headed, and your road atlas is out of date. So you flip a switch on the dashboard and let your car's navigation system plot a course to your destination.

Science fiction? Not to Ohio State University's

Center for Mapping, where a team led by geodesist Phillip Johnson has a new way to make computer-readable digital maps—a basic element of the infrastructure necessary to support "smart" cars. These days, such maps are produced (for monitoring road conditions) by individually digitizing existing maps, a costly, time-consuming, and ultimately not very accurate procedure. Johnson's team has taken a more direct approach by digitally mapping the highway itself.

Outwardly, their mapping vehicle—a standard Ford van with two externally mounted digital videocameras—is not overly impressive. But inside, sophisticated equipment records the van's exact location by obtaining readings from the Pentagon's Global Positioning Satellite system. The combination of video input and precise positional information makes it possible to create a high-quality digital road map in about the time it takes to drive down the highway, plus additional time for post-processing.



The thin white line. A mapping computer locates the edge of the road in a video image.

start with ground-based telescopes, move on to space observatories and, eventually, to an array of telescopes constructed on the back side of the moon. And instruments on the Hubble Space Telescope are slated to look for other planets within the next few years.

*Copies of the report, "Strategy for the Detection and Study of Other Planetary Systems and Extrasolar Planetary Materials: 1990-2000," are available from the NRC Space Studies Board, 2101 Constitution Ave., NW, Washington D.C. 20418.

Campus Drinking

Illegal drug use has dropped sharply among college youth. But drunkenness is as common as ever on the nation's campuses, according to a survey by a Harvard psychologist.

Henry Wechsler of the Harvard School of Public Health reports that a poll of freshmen at 14 Massachusetts colleges indicates that, compared with a similar study in 1977, the proportion of nondrinkers has quadrupled to 12%. But the prevalence of heavy imbibing remains constant: among men, close to one-third have five or more drinks at a time more than once a week; among women, the proportion is 14%. And—in line with statistics showing that people are getting in trouble with alcohol at ever earlier ages, Wechsler says that most heavy drinking stu-

One-quarter of scientists engaged in recombinant DNA research feel they have been negatively affected by public and political responses to their line of work, according to a survey conducted by biologist Isaac Rabino of the State University of New York's Empire State College.*

Rabino wanted to know how litigation and political advocacy—in particular, activities spearheaded by genetic engineering's number one irritant, Jeremy Rifkin—have affected their work. He sent eight-page questionnaires to 160 biologists at the University of California at Davis, and to 2648 members of the American Society for Microbiology.

Of the 430 respondents currently involved in RDNA research, reports Rabino, 44% think activism has been beneficial and 24% think it harmful. Others see mixed results—only 6% perceived no impact. Scientists in industry and government were more likely than those in academia to have had bad experiences, such as having to delay or

dents are continuing habits begun in high school.

Wechsler says a companion survey of 73 deans indicates that problems such as violence, date rape, and vandalism are alcohol linked. At least one other observer, Thomas Short of Kenyon College, has suggested that drinking is also implicated in the rise in racial incidents on campus.

Wechsler's findings are in accord with a report last year on "Campus Life" by the Carnegie Foundation for the Advancement of Teaching, in which

Public Attitudes Toward Gene Splicing

PERCEIVED IMPACT OF ACTIVISM ON RDNA RESEARCH, BY SECTOR

	% Academia	% Government	% Industry
RESEARCHERS WHO THINK PUBLIC ATTENTION HAS BEEN HARMFUL TO PROGRESS	20	28	29
THOSE WHO THINK ATTENTION HAS BEEN BENEFICIAL	47	43	39
THOSE WHO FEAR FEDERAL AGENCIES WILL BECOME MORE RELUCTANT TO FUND RESEARCH	46	56	63
THOSE WHO THINK INDUSTRY FUNDING IS LIKELY TO BE REDUCED	54	62	54

cancel an experiment. Even among scientists who have not been adversely affected, however, Rabino reports "considerable concern" about the future impact of activism, particularly with regard to human gene work. Eighty-two percent of the respondents said they felt the United States might lose its competitive edge in genetic engineering because of controversy and litigation.

*"The Impact of Activist Pressures on Recombinant DNA Research," published in the Winter 1991 issue of *Science, Technology, and Human Values*.

50% of college administrators surveyed said drunkenness was one of the biggest problems at their institutions.

Physicists Hurting

The erosion in research dollars for individual investigators has once again reared its ugly head in the responses of 667 physicists to a recent survey by the American Physical Society.

The APS queried the physics faculties of all 175 physics Ph.D.-granting universities in the United States, soliciting information from those who had received their doctorates since 1980—"the majority of our best young physicists," the report states. And the results weren't all bad.

Comparing responses to those garnered in a similar poll conducted in 1977, APS found that job satisfaction remains high: 91% (compared with 88% in 1977) said they find their positions "professionally challenging." And only 10% said they would not go into physics if they had it all to do over—compared with 19% in 1977.

But when it comes to funds for research, the change is striking.

In 1977, 63% said research funding was adequate and only 22% said it wasn't. This year, the situation was reversed: only 11% were satisfied; 69% said research funding is inadequate.

How to Win a Westinghouse

A superficial demographic analysis of the finalists in the 1991 Westinghouse Talent Search suggests that those concerned with increasing the production of top science achievers among all ethnic and social groups throughout the nation face some difficult challenges:

Of the 40 teenage finalists including 17 females—almost one third live in New York State; 45% have Asian or Asian Indian names; and 50% have one or both parents identified as "Doctor."

A Westinghouse spokesperson says that over the 50 years of the Talent Search, "99%" of the winners have gone on to become scientists.

PMA launches ad campaign.

According to a Gallup poll of biomedical researchers in academia and industry conducted early this year for the Pharmaceutical Manufacturers Association, academic funding shortages are expected to worsen. Respondents also say fewer people are going into biomedical research, and more researchers are leaving the field. The picture is symptomatic of "a manpower problem that permeates the ranks of the entire scientific enterprise," said Sheldon G. Gilgore, chairman of the PMA Foundation, at a 12 February press conference in Washington, D.C. Pharmaceutical manufacturers, who put 16% of their income into R&D, are running scared as the growth of industry needs is outpacing the national rate of Ph.D. production.

CAN AMERICA AFFORD TO LOSE ITS LEAD IN SCIENCE & TECHNOLOGY?

The question is whether we will be able to keep our lead in science and technology. The answer is not simple. It depends on many factors. One is the quality of our education system. Another is the amount of research and development funding. A third is the ability of our industry to innovate. A fourth is the quality of our infrastructure. A fifth is the quality of our workforce. A sixth is the quality of our government. A seventh is the quality of our environment. A eighth is the quality of our culture. A ninth is the quality of our values. A tenth is the quality of our future.

John J. Edgar

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