RANDOM SAMPLES

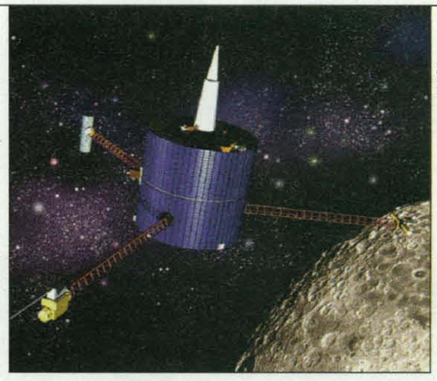
edited by CONSTANCE HOLDEN

The Moon Is Back in Style

Next month a low-budget spacecraft will begin cruising above the lunar surface for signs of water and other important features of Earth's closest neighbor. The $63-million mission, called Lunar Prospector, will be only the third to the moon in the past 20 years.

Speaking at a National Aeronautics and Space Administration (NASA) press conference in Washington, D.C., last week, principal investigator Alan Binder of the private Lunar Research Institute in Gilroy, California, explained the unconventional path he had to follow to get a purely scientific U.S. mission to the moon for the first time in 25 years. The most recent moon shot, the Clementine orbiter launched in 1994, was a military exercise primarily to test Star Wars technology.

Originally conceived 8 years ago as a private effort using donated hardware, the current version is still simplicity itself. It has no computer, which means it will make no decisions on its own but will only follow direct orders from Earth. And all its scientific instruments are veterans of past flights. Even the low-cost launch vehicle, the Lockheed Martin Athena II, was put together from solid-propellant rocket motors designed for submarine-launched missiles.



NASA

Prospector's-eye view. First U.S. scientific lunar mission in 25 years to fly next month.

Following its 5 January launch, Lunar Prospector will spend 105 hours getting to the moon. Once in orbit, it will survey a planetary surface three-quarters of which remains unmapped in crucial ways. "We've only scratched the surface of the moon," says lunar researcher Michael Drake of the University of Arizona in Tucson.

By scanning the entire surface from an altitude of only 100 kilometers, Lunar Prospector will look for ice that may be frozen in permanent shadow near the poles. Its five instruments will also map out the elemental composition of surface rock, illuminating how a huge impact on early Earth formed the moon. It will also map the moon's gravity field, providing insight into internal structure. And the public will be able to learn about it all almost as fast as scientists do, at a Web site (lunar.arc.nasa.gov) where data will appear in near real time.

'Science Wars' in California?

A California commission charged with developing new standards for science education is going back to the drawing board after withdrawing a contract to a university team. Last week, the panel, on the advice of its lawyer, capitulated to an appeal by group of scientists who asserted that it didn't follow its own rules when it made a $178,000 award last month to the Institute for Science Education, based at California State University, San Bernardino.

The state panel explained that the losing group, Associated Scientists, has far less experience writing standards. But the scientists, including Nobel laureates Dudley Herschbach, Glenn Seaborg, and Henry Taube, complained that the commission had bypassed the cheaper bid—they had offered to do the job for free.

Cheryl Mason, of the Center for Research in Mathematics and Science Education at San Diego State University, worries that a fight is shaping up like the state's ongoing "math wars," which have pitted "back to basics" proponents against reformers who stress conceptual understanding. (*Science*, 29 August, p. 1194). The Associated Scientists are among those concerned that hands-on activities are being emphasized at the expense of facts. The group's chair, biologist Stan Metzenberg of California State University, Northridge, says that was a problem with earlier science standards devised by members of the San Bernardino group, which were "lacking clarity and content."

Metzenberg says, however, that he hopes the two sides can "broker an agreement," whoever ultimately wins the contract. That may take some doing. One of the leaders of the Institute for Science Education, Bonnie Brunkhorst, an earth scientist and former president of the National Science Teachers Association, says she feels her group has been unjustly maligned by the Associated Scientists. But she says "we hope that people interested in writing good content standards will work with us."

Applications are due by 20 December, and state officials plan to award a new contract in January. The new standards are supposed to be ready next August.

German Life Scientists on the Ascendance

After decades of playing second fiddle to other branches of science, life scientists are riding high in Germany's research hierarchy as leaders of three of the country's leading scientific organizations.

The latest sign is the election of biochemist and geneticist Ernst-Ludwig Winnacker, now head of the University of Munich's Gene Centers, as president of the basic research granting agency, the Deutsche Forschungsgemeinschaft (DFG).

Winnacker assumes his post on 1 January. He joins zoologist Hubert Markl, who last year became president of the prestigious Max Planck Society, and Detlev Ganten, scientific director of Berlin's Max Delbrück Center for Molecular Medicine, who last month became chair of the Helmholtz Association of National Research Centers.

The sudden prominence of three strong advocates of genetic research suggests that Germany is getting over its post-Hitler aversion to genetics. It's "a sign of growing acceptance of the biomedical sciences," says Winnacker, as well as "an indication of the increasing importance of biological thinking in the natural sciences." It also marks a swing of the pendulum toward natural scientists as leaders of the DFG and Max Planck: Markl's predecessor was a law professor, Winnacker's a literature professor.

Monkeypox not Mutating

A monkeypox outbreak last summer in central Africa appears more likely to be due to changes in human behavior than to a new strain of the virus.

Writing this week in the World Health Organization's *Weekly Epidemiological Record* and the *Morbidity and Mortality Weekly Report* from the U.S. Centers for Disease Control and Prevention (CDC) in Atlanta, researchers suggest reasons for the outbreak in the Democratic Republic of Congo (*Science*, 18 July, p. 312). In particular, they cite a decrease over the last 2 decades in vaccinations against smallpox, a close relative, and the country's civil war, which has forced more people deeper into

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the rain forest to find food. That foraging has brought them in closer contact with wild animals that carry the virus.

Genetic analysis of the virus suggest there is "no reason to think it's a different virus from the one we saw in the 1980's" during a previous outbreak, says the CDC's Brian Mahy. And scientists who visited the area in October report no new cases in or around the outbreak's epicenter in the Katako-Kombe region.

Although the virus readily jumps from animals to humans, the latest reports estimate that only 8% of people who came in contact with an infected person later came down with the disease. That's within the range reported during the earlier outbreaks, says Mahy.

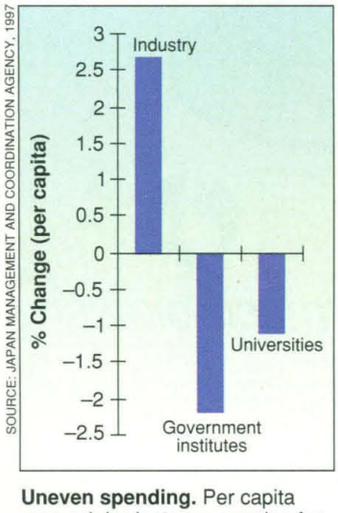
Which animals harbor the virus is not yet clear, Mahy adds, but monkeys may not be the primary culprit. The virus has been isolated from a squirrel, he says, and "there are also large rats which may be seropositive."

Japan Hits R&D Spending Milestone

Japan has increased R&D spending for the second straight year, reaching an important symbolic benchmark: R&D now accounts for 3% of the nation's $4 trillion Gross Domestic Product (GDP), a rate that leads the world.

Government figures for the 1996 fiscal year, which ended 31 March 1997, show an increase of 4.7% to $120 billion. A quarter of that rise is the result of a bookkeeping change—adding software industries to the R&D pool. But the main reason is that industry is continuing to flex its R&D muscles, raising its investment by 7.2%, signaling a continuing recovery from a 3-year slump earlier this decade. That increase more than offset a 4% drop in government spending. "We're facing a very severe financial situation" in government, notes Hideo Funabashi, director of research at the Science and Technology Agency, a result of Japan's continuing economic woes. Japan still trails the rest of the industrialized world in government R&D spending.

In comparison to Japan, the United States spends roughly 2.5% of its GDP on R&D, although research advocates have been pressing for 3%. The U.S. figure drops to 2% if defense spending is excluded, while nearly all of Japan's R&D goes for civilian programs. A breakdown of Japan's R&D pie shows that 14% goes for basic research, down 1% from 1995, while the slice going for development rose by 1%, to 61%. Applied research held at almost 25%.



Uneven spending. Per capita research budgets are growing for corporate scientists and shrinking for those in the public sector.

"Dipstick" Test for *E. Coli*

Escherichia coli O157 is a particularly deadly variation of the common intestinal bacterium. In 1993, tainted hamburgers killed three children at a fast-food restaurant in Washington state. And this year, the presence of *E. coli* O157 closed the Hudson beef plant in Columbus, Nebraska.

Detecting such culprits relies on growing bacteria, a slow and not always reliable process. Now, a team of Montana researchers say they can do the job in 4 hours. The technique involves using tiny beads coated with antibodies to *E. coli* O157 and mixing them in with a substance—say, a slurry of ground meat—containing the bacteria. The antibodies bind key molecules on the *E. coli* surface. The sample is then passed through a magnet, which concentrates the bacteria by attracting the beads. They can then be detected under a microscope with the aid of fluorescent dyes.

The test is so sensitive that it can spot a few bacteria in a gram of raw hamburger, says immunologist John Jutila, president of Montana ImmunoTech in Bozeman. In contrast, isolating the bug in a cell-culture test is very chancy, since viable bacteria often fail to grow in cultures.

BARRY PYLE/SUE BROADAWAY

On target. Beads coated with fluorescent-labeled antibodies glom on to *E. coli* bacteria.

The company has applied for a patent on the technology and, with a $750,000 small-business grant from the National Institutes of Health, is exploring ways to convert the antibody-coated beads into a simple "dipstick" test that can be used on site. The method will be field-tested on the feces of cattle before slaughter. The test could also be used at the local supermarket. Because little is known about how *E. coli* contaminates cattle, the technology "should let us go back up the environmental ladder to see where cattle get it" by checking their feed and water, says microbiologist Gordon McFeters, who, with Barry Pyle at Montana State University in Bozeman, invented the magnetic bead-antibody technology.

"A test like this would be a tremendous breakthrough," says Scott Coates at the Association of Official Analytical Chemists in Gaithersburg, Maryland, which validates meat inspection test kits. NASA, which funded the original work, hopes to use the test to check astronauts' food and drinking water on space missions.

Journal of NIH Research, RIP

The hand of capitalism has struck down the struggling *Journal of NIH Research*, a monthly news and features magazine for biomedical researchers. Begun in 1989, it ends publication with the December issue.

Officials at Medical Economics Company of Montvale, New Jersey, the publication's owner, say they closed the unprofitable venture after attempts to find a buyer proved unsuccessful. "We just didn't have enough advertising revenue to support continued publication. It's as simple as that," says company vice president Thomas Rice. The magazine's former editor, Deborah Barnes, however, blames the company for not understanding the product it was putting out.

Despite its bureaucratic title, the journal was never a government publication. Two former employees of the AAAS (publisher of *Science*), William Miller and Tod Herbers, started it with backing from a group of venture capitalists including the *New Republic*'s Martin Peretz. They hired Barnes away from the *Science* news staff to be editor. The magazine was sent at no cost to about 35,000 researchers with National Institutes of Health (NIH) grants, and the idea was to rely entirely on advertising for income.

But profits never materialized, and the magazine was sold to Medical Economics in 1994. The new owner tried to cut costs by ordering Barnes to pare her staff, which only comprised a half-dozen people. She resigned instead, in February 1996. "I don't think [Medical Economics] ever understood what we did, our readers, or how to sell ads in our market," she says.

But if the advertising never made the grade, the editorial product received several journalism awards and good reviews from scientists. "The journal was a pioneer in dealing with issues of science policy as they affect the scientific community," says National Academy of Sciences president Bruce Alberts. Says NIH director Harold Varmus: "It's a shame to see it go."