

Briefings

edited by FAYE FLAM

Signs of Intelligent Life?

There is life on Earth. In case you weren't sure, NASA's Galileo spacecraft has confirmed the fact. Two years ago, knowing that the craft would have to swing by Earth twice on its circuitous voyage to Jupiter, Cornell University astronomer Carl Sagan suggested that Galileo test its instruments by looking for signs of life on the home planet.

NASA got its chance last December, when Galileo swept by Earth on the first of two passes. The results are in, according to a newsletter published by the Planetary Society, and they offer reassurance about the state of both the spacecraft and the planet.

During the hours-long flyby, spectrometers aboard Galileo analyzed the composition of Earth's atmosphere. According to Charles Hord, who heads the project's UV spectroscopy team, the instruments faithfully detected the abundant oxygen and methane in the atmosphere, as well as its nonequilibrium composition—telltale signs of Earth's living inhabitants.

Hord says he and other NASA scientists don't expect Galileo to find any signs of life when it reaches the frigid cloutops of Jupiter in 1995. Still, the flyby was a valuable dry run for Jupiter, where Galileo will seek out heavy hydrocarbons, amino acids, and other simple organic chemicals. "We will do a better job of looking for these kinds of things on Jupiter because we tested out our equipment on the earth," says Hord.

Of course, the instruments will be useless if they can't send their data back from Jupiter—a possibility mission controllers faced last week. The craft's main communications antenna—a 16-foot-wide, high-tech umbrella—failed to unfurl properly on the first try. At this writing, flight

controllers were scrambling to un snag it.

The flyby also provided a reminder that there's only so much that can be discovered from space. As Hord pointed out in the Planetary Society newsletter, "We have unequivocally discovered life on Earth but we're not sure yet that it's intelligent."

Opening the Mail

A proposal that would make it easier for the government to read private, encrypted computer mail and phone conversations has set off a flap among manufacturers and users of electronic communications systems. The proposal appeared in an antiterrorism bill (S 266) introduced in January by Senator Joseph Biden (D-DE), which has since been referred to the Senate Judiciary Committee.

Section 2201 of the bill, dealing with federal investigative powers, states that it is the "sense of Congress" that "providers of electronic communications services and manufacturers of electronic communications service equipment shall ensure that communications systems permit the government to obtain the plain text contents of voice, data, and other com-

munications when appropriately authorized by law." In short, the government wants to be guaranteed the ability to read coded electronic mail, even if the senders and recipients don't want their mail read.

Manufacturers of computerized encryption systems like RSA Data Security of Redwood City, California, *The New York Times* has reported, are worried that the new law could put them out of business. If commercial data encryption systems, which are now quite effective, were made inherently "crackable," they would lose credibility and customers wouldn't buy them, company officials fear. Chief security officials for financial firms in Los Angeles and Boston told *Science* they are skeptical of the value of this legislation.

"This is not a real bright idea," said one Boston bank official who asked not to be named. The enforcement of such a law would hobble U.S. encryption services, while leaving foreign companies unaffected.

Officials involved in managing federal computer network systems mentioned other grounds for skepticism. "We would be deeply concerned" if this law meant that the government could have access to private mail traveling on the global

system known as Internet, said Vint Cerf, leader of a group trying to develop "secure" electronic mail systems for the Federal Networking Advisory Committee. Like many others, he thinks the bill raises fundamental questions about the rights of personal privacy.

No hearings have yet been scheduled on the proposal, according to Senator Biden's staff.

The Molecule That's Supercool

Every once in a while, science comes across a molecule that reminds one of a straight-A, all-American quarterback with knockout looks: it seems to have, well, too much going for it.

The latest contender for the category is the molecule du jour called buckyballs—those 60 carbon, soccer ball-shaped molecular cages that have been driving chemists and physicists wild. The tiny orbs were intriguing enough (and arrestingly beautiful to the chemically minded) upon first discovery, but now it's come out that under certain processing conditions they can also affect one of the most fashionable behaviors in solid state physics—superconductivity.

Voyage to Inner Earth

NASA scientists have often sought out equivalents of outer-space conditions here on Earth—in deserts, on mountaintops, in Antarctica. Now they are looking inside the earth for a foretaste of the darkness and general sensory deprivation future space explorers may suffer. Their model system: what may be the world's deepest cave.

Next February, four to six members of the United States Deep Caving Team will descend into the Huautla cave system near Oaxaca, Mexico—a steep, dark, damp, and largely unexplored complex of tunnels snaking 46 miles under the highlands of southern Mexico. The team plans to stay underground for about 42 days exploring the tunnels and diving through flooded passages. The explorers' goals are threefold: to map the cave, explore its geological intricacies, and probe their own limits.

Surveys have already shown that the cave could descend past the current record cave depth of 1600 meters. "It could be the world's deepest cave, but we don't know yet," says expeditionist

James Smith, adding in the spirit of an explorer, "that's why we're going down there." Once in the cave, the explorers will do some mapping of local geology. But the main scientific value of the foray may lie in the test it provides of psychological tolerance to physical hardship, says caving team spokeswoman Heather Sloan.

NASA scientists, she says, have enlisted the explorers to gather data on the way small groups of human beings cope with isolated and taxing conditions. Bill Stone, the leader of the group, says the team will go right to the depths carrying NASA's extensive psychological questionnaires—on waterproof paper, of course.



Caveman.

E. Shettle

Arthur F. Hebard and his colleagues at AT&T Bell Laboratories in Murray Hill, New Jersey, have found that when they deposit buckyballs as powders and thin films, riddle them with potassium ions, and then chill them to 18 K and 16 K, respectively, the electrical resistance of the resulting "fullerene" materials starts plunging. Cooled to 5 K, the researchers found, the films and powders shed all resistance to carrying electrical current.

Though these temperatures are frigid compared to those required by the high temperature superconductors that have created a stir recently, the buckyballs newly discovered talent puts a wouldn't-you-know-it smile on many scientists' faces. The AT&T team reported this latest item on the fullerene résumé last week at a meeting of the American Chemical Society in Atlanta and in a paper in *Nature*.

Testy Fellows

Several studies have shown that violent criminals tend to produce excess testosterone—but so do their sometime defenders. Maybe the stars of "L.A. Law" won't be surprised, but a new study from Georgia State University has found that male trial lawyers, too, produce more than their fair share of the hormone. The study's author, psychologist James Dabbs, concludes that the aggressive tendencies of both groups may be linked to the male hormone.

Dabbs measured testosterone in the saliva of 60 lawyers and found the trial lawyers harbored more of the hormone than the presumably less combative non-trial variety. Dabbs also compared males in different professions and found that actors, as well as trial lawyers, came out on top. (Which is why you might want to be cautious around those guys on the "L.A. Law" set.)

"The connection may be in the bluffing and showing off," says Dabbs, recalling earlier work suggesting that the hormone influences various kinds of forward, aggressive, and even anti-

social behavior. Ministers, he says, came out at the bottom.

Of course, women produce less testosterone than male ministers, but even so, violent female criminals have more of it than your average woman. So Dabbs plans to check testosterone in women lawyers next.

Asked if there are any grander issues underlying these findings, Dabbs says that genetics plays the biggest part in determining who has higher testosterone levels, though environmental factors can alter hormone levels. In a fight, for instance, the winner often will emerge brimming with extra male hormone, while the loser comes out somewhat drained. But lawyers, he says, tend to come into their courtroom battles already charged up with testosterone. Dabbs doesn't mind using the link between high testosterone and antisocial behavior to take a jab at the much-maligned profession. "Trial lawyers are essentially taking behavior that is antisocial and making a good living at it."

How about scientists? Dabbs hasn't rated them. Like "Saturday Night Live's" Church lady, some lawyers might say: "Isn't that conveeeenient?"

No Free Lunch

All those "subliminal" self-help tapes found in bookstores—

Lonely Ph.D. Seeks Like

Want to meet a special someone who can intelligently discuss ultraviolet spectroscopy, polymer chemistry, or perhaps the latest on the T-cells of transgenic mice? Pick up a copy of *Technology Review*, the MIT magazine, at your local college bookstore and head for the advertisements in the back. In the April issue is one from Science Connection Inc., in Youngstown, New York. What SCI promotes is not the latest National Science Foundation software package for digital collaborations but rather a singles network "for people interested in science or nature."

The idea was so hot that the editors of *Chemical and Engineering News* invited Science Connection president Anne Lambert to explain her firm's service in their 8 April issue. For an annual fee of \$80 (\$95 for Canadians), your average (or above average) researcher will get "miniprofiles" of other science and natural history buffs. "Surprising as it may seem," she says, "there are many unattached adults who are interested in science and natural history."

We're not surprised. We're thinking of answering the ad ourselves. We have science degrees too, and we're getting tired of trying to identify an NIH'er somewhere in the horde of lawyers gamboling on the Mall these sunny spring weekends.

the ones promising boosts in memory and self-esteem—couldn't possibly work, could they? A group of scientists has finally done a double-blind study on the tapes, which play music combined with an inaudible "suggestive" message, and their answer, not surprisingly, is no.

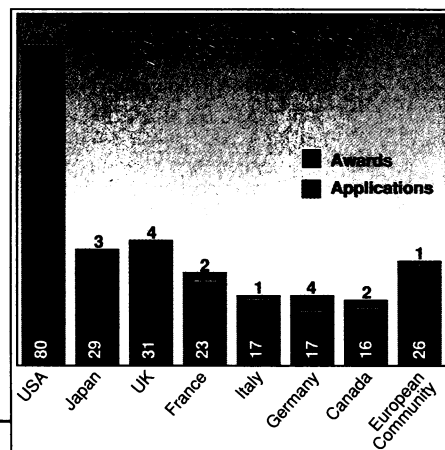
The investigators, psychologists all, were headed by Anthony Greenwald of the University of Washington. They gave out a pile of memory improvement tapes to 237 self-improvement-hungry subjects. However, they had switched labels on

some tapes so about half the subjects who thought they had a memory tape really had a self-esteem tape and vice versa. The researchers gave the subjects standardized memory and self-esteem tests before and after the experiment.

The result: Those who listened to memory tapes improved memory about the same amount as those who got self-esteem tapes. Oddly, though, the memory tapes seemed to do a significantly better job of bolstering self-esteem than the tapes that were billed to do so.

Grants Without Frontiers

A Japanese science program struggling to develop an international identity last week awarded a second annual round of research grants in molecular biology and brain science. The program—called the Human Frontiers Science Program (HFSP)—will spend approximately \$12 million to support 32 research projects involving international collaboration, along with 90 post-doctoral fellows. In spite of the program's international thrust, much of the money will end up in the United States.



The HFSP was initiated by Japan in 1987 largely as a way to deflect U.S. criticism that Japan was not spending enough on basic research. Although Japan has tried to encourage other countries to join in supporting HFSP, it still carries the lion's share of the load: \$24.5 million for the fiscal year that began 1 April, with France (the host country for the HFSP secretariat) next at only \$1.5 million.

U.S. scientists won 15 of the 32 new grants (worth approximately \$250,000 per year for 3 years) and eight of the fellowships. But the United States gets even more of the program's money than those statistics suggest: 57 of 90 fellows worldwide will be coming to this country for their research projects.