RANDOM SAMPLES

edited by CONSTANCE HOLDEN

Medical Use of Marijuana to Be Studied—Again

Instead of stomping out the smoldering controversy over the medical use of marijuana, Administration opposition seems to have helped reinvigorate it.

Under pressure to do something about reports of rising marijuana use, the president's drug-policy office on 30 December warned doctors that if they encourage patients to smoke pot, they might lose their licenses to write prescriptions. (Both Arizona and California passed voter initiatives last fall legalizing marijuana smoking for patients with life-threatening illnesses such as AIDS or cancer.) Drug office chief Barry McCaffrey said at the time that the health risks of smoking marijuana outweigh the benefits. And Alan Leshner, head of the National Institute on Drug Abuse, publicly asserted that research has conclusively laid the issue to rest.

But instead of cooling the furor, McCaffrey's move stirred advocates of the medical use of marijuana into renewing claims that the government is ignoring evidence that it works in treating nausea and appetite loss. And a group of physicians, including AIDS clinician Marcus Conant of the University of California, San Francisco (UCSF), filed suit last week, claiming that the White House is interfering with their free speech.

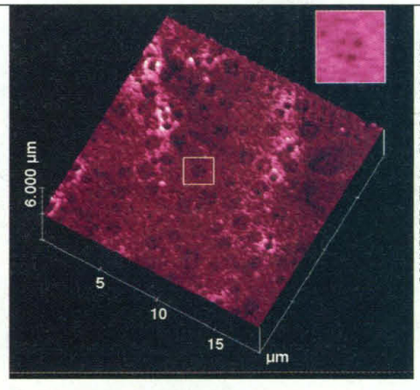
Conant also claims that for 4 years federal officials have used petty tactics to prevent another UCSF physician, Donald Abrams, from conducting a trial to compare the appetite-inducing qualities of smoked marijuana with a widely prescribed medicine (Marinol) based on marijuana's active ingredient, THC.

The upshot of it all? The Administration will undertake new studies to settle the churning controversy. McCaffrey's office is sinking $1 million into a review of marijuana's medical uses by the Institute of Medicine. (Members of the study panel have not yet been named.) And Leshner will convene a meeting of experts next month to review the scientific literature in an attempt to come up with a consensus on whether marijuana smoking has a place in medicine.

Early Peek at a Cellular Porthole

Researchers have caught the first glimpse in living cells of what appear to be the pores on surface membranes that control the release of chemicals. The findings, published in the 7 January issue of the *Proceedings of the National Academy of Sciences*, cast light on a process behind everything from nerve-cell signaling to the secretion of digestive enzymes.

To spy on cellular secretion in action, a team led by cell biologist Bhanu Jena of Yale University School of Medicine used an atomic force microscope, which runs an ultrasharp tip over surfaces to produce atomic-scale images. Looking at cultured rat pancreas cells, which secrete the starch-digesting enzyme amylase, they saw a multitude of tiny pits in the amylase-secreting region. These pits appear to be "fusion pores"—valves in the cell membrane. Researchers suspect that vesicles inside the cell that contain compounds destined for secretion dock to these pits. When stimulated to dilate, the pores release the contents.



SCHNEIDER *ET AL.*, *PNAS* **1**, 316 (1997)

Cell landscape. Pits are secretion valves?

The Yale group believes it has spotted amylase control valves because when amylase release was chemically stimulated, the pits expanded. And when they inhibited production of a protein thought to be needed to create fusion pores, pit size shrank and amylase secretion declined.

Some experts are not yet convinced that the pits are in fact the long-sought fusion pores. Harvard neurobiologist David Clapham says that no one has yet directly observed amylase coming out of the pits. Jena says his team plans to add fluorescent markers to the amylase vesicles to see if they dock to the underside of the pits. If that confirms their conclusions, Clapham says, "it's terrific. Seeing fusion pores [in living cells] is something people have been after for a long time."

U.S., Japan Split Japan Prize

Groundbreaking work on cancer-causing chemicals and new manufacturing paradigms has earned four U.S. and Japanese researchers the 1997 Japan Prize, a lucrative award that sometimes foreshadows a Nobel Prize.

This year, in the category of "biotechnology in medicine," cancer researcher Takashi Sugimura, president emeritus of Japan's National Cancer Center and currently president of Tokyo's Toho University, and biologist Bruce Ames of the University of California, Berkeley, are each getting 50 million yen ($452,000) for work done independently on how certain environmental chemicals can damage DNA and cause cancer. The work "demonstrated the close relationship between mutagenicity and carcinogenicity," according to the Science and Technology Foundation of Japan, which administers the prizes.

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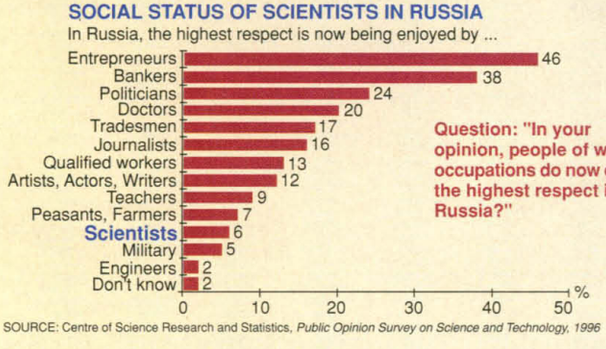
Russian Scientists Plummet in the Polls

Russian science has more than its crumbling institutes to repair: It now has a major image problem. Once hailed as "Socialist heroes," Russian scientists are now held in less esteem than peasants or politicians, according to a survey by the Center for Science Research and Statistics, a Moscow-based think tank. "I would suspect that salaries have a lot to do with it," says Alexandra Stepanian, director of the U.S. National Science Foundation's Eastern Europe program. Russian scientists are now getting less than $100 a month on average and scramble for subsistence by doing odd jobs outside their labs. No wonder talented Russian grad students and postdocs are leaving science in droves for jobs in banking and sales.



SOURCE: Centre of Science Research and Statistics, *Public Opinion Survey on Science and Technology, 1996*

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In the category of "systems engineering for an artifactual environment," the prizes go to Joseph Engelberger, a pioneer in the development of industrial robots and founder of HelpMate Robotics Inc. in Danbury, Connecticut, and University of Tokyo President Hiroyuki Yoshikawa. Yoshikawa is hailed for promoting a "techno-global paradigm," especially by spurring the creation of the Intelligent Manufacturing Systems program, a multinational research project on next-generation manufacturing technologies. The scientists will be honored at a ceremony in Tokyo on 25 April.

The prize is given in two categories each year. Coming up in 1998: "biotechnology in agricultural sciences" and "generation and design of new materials creating novel functions."

Eco-Solution to Airport Bird Pests

Many airports, especially those near water, have big problems with birds. During takeoffs and landings, birds have a way of getting sucked up into jets' engines, which does considerable damage to both parties.

New York's John F. Kennedy International Airport is particularly plagued by seabirds, located as it is on two migration flyways and next to a wildlife refuge. At most airports, officials evict avian intruders by shooting them, and JFK is no exception: Over the last 6 years, shooters from the Department of Agriculture have killed about 60,000 birds. Last year, however, they only shot 2000.

A wildlife biologist with the New York Port Authority, Steven Garber, cleared most birds—including laughing gulls, the biggest troublemakers—off the premises with the help of three gyrfalcon-peregrine falcon hybrids and three Harris's hawks. The birds of prey (most of them females, which are larger than males) frighten away the gulls on several daily flights around the area.

Garber also employs psychological warfare, creating the illusion of a catch by giving the raptors dead gulls to feed on and playing tapes of gull distress calls. The raptors terrorize, but are trained not to catch gulls. "The falcons killed nothing all summer long," says Garber. "But the birds don't know that. They [only] know that the falcons mean business."

RALPH GINZBURG

Gullbuster. Falconer Mike Givline with Harris's hawk at JFK.

Between June and October in 1995, 57 dead gulls were found near runways and presumed to have been sucked into engines or killed by engine wash. During the same period in 1996, with the falconry program in force, that number fell to 26, Garber reported in the September 1996 *Journal of the International Civil Aviation Organization*. The total number of birds hitting planes fell from 189 to 73.

Garber wants to try a larger predator, perhaps a golden eagle, to see if it can scare off larger birds like Canada geese, which flock to JFK within days of the opening of the fall hunting season, apparently to escape hunters. "Up until now, the culture has been to solve the problem by killing the animals," he says. Now "we're using behavioral ecology." Says William Seegar, wildlife management expert at the U.S. Army Edgewood Research and Development Center in Aberdeen, MD, Garber "brings a very astute scientific approach to the bird-strike problem."

Universal Vector?

Time was when only virologists and a few bug experts paid any attention to a virus, from the insect *Autographa californica*, which kills moth larvae. But now the virus may turn out to be a versatile tool for molecular biologists.

A few years ago, they found they could add the genes for certain proteins to the virus, put it in cultured insect cells, and get the cells to produce the proteins. Now, University of Chicago developmental biologist Nipam Patel believes the virus can be used to add genes to a variety of new hosts. He found the virus, carrying added bits of DNA, would enter insect, crustacean, and frog cells. The virus has a coat that fuses with the cell membranes of all the organisms tested so far, Patel reported last month at the meeting of the Society for Integrative and Comparative Biology in Albuquerque, New Mexico.

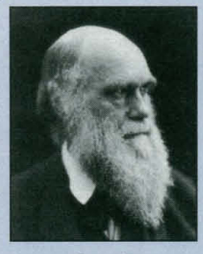
The virus itself won't replicate in alien cells, but Patel, with Daniel Oppenheimer and Angus McNichol, has confirmed the vector works by inserting marker genes. Next, he wants to try a gene believed to influence leg development. Usually researchers have to make a different vector for every organism to which they hope to add a gene. But this baculovirus, Patel predicts, "can infect almost any cell."

Other researchers are also exploring the virus's new role. Pathologist Nancy Bucher from Boston University School of Medicine reported last month in San Francisco at the meeting of the American Society for Cell Biology that she has used it to put marker genes into lab-grown liver cells. The drawback of the technique, says biologist Mark Martindale of the University of Chicago, is that it's hard to control which cells are receiving the genes. Nevertheless, "I think everyone will want to use it."

Darwin's Angst

Much has been written about the chronic ill health of Charles Darwin, who, shortly after his epochal *Beagle* voyage, retreated to the country, where he lived out his life as a virtual recluse.

What was wrong with him? Panic disorder, according to psychiatrist Russell Noyes and radiologist Thomas J. Barloon of the University of Iowa College of Medicine in Iowa City, writing in the 8 January *Journal of the American Medical Association*. Darwin, born in 1809, had an active youth. But at 28, a year after returning from the 5-year voyage on the *Beagle*, he started having "sensations of fear" and soon moved with his wife to a house in Kent. Until his death in 1882, Darwin suffered symptoms of severe anxiety, from heart palpitations, lightheadedness, and shortness of breath to trembling, hysterical crying, and nausea and vomiting. He spent a lot of time "treading on air and vision," which the authors say suggests feelings of depersonalization.



SOTHEBY'S

Darwin

He feared going out, the agoraphobia often seen with panic disorder, writing in 1837 "anything which flurries me completely knocks me up afterwards and brings on violent palpitation of the heart."

Doctors puzzled over Darwin during his life and have been doing so ever since his death, positing such diagnoses as parasitic diseases, arsenic poisoning, depression, epilepsy, and inner-ear disorder. But the symptoms clearly add up to panic disorder, say Noyes and Barloon. That diagnosis "really is very convincing," concurs Columbia University psychiatrist Jack Gorman.

As for poor Darwin, there may have been compensations for his travails. "[I]ll-health ... has annihilated several years of my life [but] has saved me from the distraction of society," he wrote. Conclude the authors: "Had it not been for this illness, his theory of evolution might not have become the all-consuming passion that produced *On the Origin of Species*."