RANDOM SAMPLES

edited by CONSTANCE HOLDEN

A Brighter Day for Edward Taub

Psychologist Edward Taub, best known as the target of animal-rights activists in a celebrated 1981 case involving his treatment of research monkeys at his Silver Spring (Maryland) lab, has received a public stamp of approval from his peers. Last week, at its annual meeting in Washington, the American Psychological Society (APS) bestowed its highest honor on him, naming him a William James Fellow.

The ceremony attracted a solitary protester from People for the Ethical Treatment of Animals (PETA), Taub's nemesis, but the intruder was quickly hustled out, according to APS director Alan Kraut.

Taub was honored for "fundamental discoveries" about brain reorganization, upon which he has based new treatments for human rehabilitation. "I was astonished," Taub says. "I thought that the Silver Spring monkey situation would preclude any public recognition of anything I had done."

Taub's award is based on research that he says is no longer permitted anywhere: He severed nerves in monkeys' arms to see what happens in the corresponding regions of their brains. Infiltration of his lab by a PETA member led to police seizure of the 16 animals and a trial in which Taub was convicted of providing inadequate veterinary care to six monkeys. He spent years litigating the case, and in 1984 a Maryland appeals court overturned the conviction. Since 1986, he has been at the University of Alabama, Birmingham.

Taub and others, including Tim Pons of Bowman Gray Medical Center in Winston-Salem, North Carolina, have published research on the monkeys showing that their brains, surprisingly, underwent "massive reorganization" after their injuries. Based on this research, Taub has designed a routine to help people with disabilities from brain injuries that entails extensive exercise of an afflicted limb.

One of Taub's monkeys still survives, at Tulane University's primate center in New Orleans. "Locked in his brain is the answer to an extremely important question about brain reorganization, not just in the cortex but in the thalamus," says Taub. But Congress has decreed that, while "terminal" (pre-euthanasia) experiments can be done on the animal, none may last more than 4 hours. Probing the thalamus, says Taub, would take too long.

The Perils of Late-Age Procreation

A team of Russian researchers has found, from a study of European noble families, that daughters of older fathers may have shorter life-spans. The team claims its finding reflects the accrual of gene mutations as fathers age—specifically, damage to "housekeeping" genes on the paternally transmitted X chromosome.

Leonid A. Gavrilov, of the A. N. Belozersky Institute at Moscow State University, and his colleagues looked at data from 700 families, including 2159 daughters and 4942 sons born in the 1800s. To minimize the effect on mortality of infectious diseases, they tallied only children who survived past 30. They found that daughters born to fathers in their 30s lived, on average, to age 74.5. If fathers were in their 50s, daughters' life-spans were about 2 years shorter—72.4. Gavrilov and his colleague and wife, Natalia Gavrilova, say that when the data are controlled for maternal age, parental longevity, and historical fluctuations in life expectancies, the difference is closer to 3 years.

ARCHIVE PHOTOS

Old dad. King Lear and youngest daughter Cordelia.

There was no significant difference for sons, who died, on average, in their mid-60s.

The Gavrilovs say their research supports the notion that people accrue genetic mutations from cell division as they age, and those can be transmitted to offspring. Mothers don't accumulate mutations in their ova because they are born with all their eggs. But sperm cells, manufactured throughout adulthood, are vulnerable to mutations. Recipients of the paternal Y chromosome (boys) may not be affected by such mutations because the Y doesn't have much on it, says Gavrilov. But only girls get the paternal X.

Richard Suzman of the U.S. National Institute on Aging, where the Gavrilovs have presented their work, calls the study "a really fascinating piece of medical biodemography." Geneticist James Crow of the University of Wisconsin, Madison, says it's consistent with other studies suggesting that children of older fathers are more likely to have inherited disorders. But he thinks the effect found by the Gavrilovs is "surprisingly large" for a single chromosome, as life-shortening mutations "surely" also occur elsewhere in the genome.

WILLIAM COTTON

Conceived to order. Young cattle.

Sex-Specific Sperm Goes Commercial

Animal breeders who use artificial insemination or other emerging reproductive technologies may soon be able to specify the sex of the offspring. XY Inc., in Fort Collins, Colorado, has licensed technology that separates semen into spermatozoa bearing X (female) and Y (male) chromosomes, and hopes to be producing sex-selected cattle semen within a year or two.

The method, developed by research physiologist Larry Johnson of the U.S. Department of Agriculture in Beltsville, Maryland, and patented by the USDA, involves sorting sperm by flow cytometry, in which cells are stained with a fluorescent dye and then passed through a laser beam. Cattle X sperm contain about 4% more DNA than Y sperm do, so the dye makes the X sperm glow more brightly, according to company head Mervyn Jacobson, a physician. Researchers headed by reproductive physiologist George Seidel of Colorado State University, who is also XY's science director, have tested the results on 17 cows; 14 bore offspring of the desired sex.

The method is of particular interest to beef cattle ranchers, who prefer meaty males, and dairy farmers, who want milkers.

Once the technology is refined, XY Inc., which just bought up the only other licensee of the technology, Mastercalf in Cambridge, England, hopes to set up facilities around the world. And it's not stopping with cattle. Breeders of Argentinian polo ponies and Middle Eastern racing

(continued on page 1505)

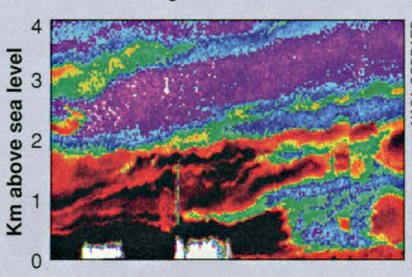
(continued from page 1503)

camels already are contacting the company, says Jacobson. Endangered species could benefit, too, adds Seidel. "You want largely females to make the species survive."

Could their method work with humans? "Our mission and license are specifically for nonhuman mammals," says Jacobson.

Cloudy Conundrum

Researchers have long thought that smoglike atmospheric pollution may be putting the brakes on global warming by reflecting sunlight back into space. But new measurements presented last week at the American Geophysical Union meeting in Baltimore indicate that the picture is more complicated.



NASA GODDARD

Greenhouse sunscreen? Aerosol density: Red colors mean more particles.

Most computer climate models suggest that increases in heat-trapping greenhouse gases should cause more warming on Earth than the half-degree rise observed over the past century. To account for this discrepancy, scientists have speculated that a haze of sulfates—from burning fossil fuels—in the upper atmosphere is providing a partial sunscreen, reflecting more light than it absorbs. But little is known about the chemical composition of these so-called aerosols.

So atmospheric scientists Peter Hobbs and Dean Hegg, of the University of Washington in Seattle, and T. Novakov, of the University of California, Berkeley, analyzed the chemical content and reflective properties of the aerosol haze off the Atlantic Coast with specially equipped airplanes. To their surprise, they found more carbon particles—from sources such as burning forests and burning fossil fuels—than sulfate particles. Carbon particles absorb more light than they reflect, and so would be expected to warm rather than cool the atmosphere.

So what's going on here? Hobbs thinks particles may indirectly promote cooling by serving as seeds for water droplets, spurring the formation of clouds, which typically reflect sunlight. But that's just speculation at the moment, he says. "That's what we're going to be concentrating on for the next few years."

Dutch Students Shun Science

The Netherlands is experiencing a trend already long familiar in other industrialized nations: declining interest in science among undergraduates. Documentation comes in a recent report by a committee of the Royal Dutch Academy of Sciences, which notes a marked decline in science courses taken by entering university students, beginning around 1990. The trend is compounded by a 22% decline in overall enrollment between 1991 and 1996, as study grants and loans have become more difficult to get.

The report finds a 40% drop in first-year chemistry students—from 5400 in 1989 to 3300 in 1996. Mathematics has been in a long decline, peaking in 1974 with 3000 first-year students. By 1996, the number was 1200. Biology increased in the early 1990s, to 6000 students in 1994, but in 1996 the number drooped to 5000. Technical disciplines such as electrical engineering and computer science show sharp declines since 1990.

The decline is paradoxical in view of the realities of the job market. "In the Netherlands, demand by industry and government are increasing," says soil-mechanics specialist Arnold Verruijt of Delft Technical University, who chaired the panel that produced the report. Verruijt pins part of the blame on environmental activists. "There is a negative attitude toward industry," he says, especially the chemical industry, which is blamed for acid rain. New restrictions on how long a student can count on financial support also reduce the flow into science, because those hoping to graduate early "will therefore avoid the difficult—the scientific and technical—curricula," says Verruijt.

The sciences also rank low in popularity with women. The report suggests that hiring more female high school science teachers might help.

Astrophysicists Win Crafoord Prize

Two prominent astrophysicists—Edwin Salpeter of Cornell University and Britain's Sir Fred Hoyle—will share this year's Crafoord Prize, which now amounts to a hefty $500,000. The prize is administered by the Royal Swedish Academy of Sciences to cover areas missed by the Nobel Prizes.

University of Chicago astrophysicist David Schramm says the two scientists did "very, very important work in cosmology"—the history and structure of the universe—in the 1950s, and that they independently predicted the energy level that had to exist in the nucleus of carbon atoms for carbon to be synthesized in stars. This, he says, was "one of the first examples where an astrophysical argument was used to predict a fundamental property of matter."

Hoyle is best known for coining the term "big bang," a label he derisively attached to the prevailing version of the formation of the universe, which clashes with his own "steady-state" theory.

They're off ... and sequencing. Last month, gene mappers gathering for their annual meeting at Cold Spring Harbor Laboratory in New York reported that they are moving beyond mapping—identifying molecular landmarks along DNA's linear array—into sequencing pieces of the human genome. Fifteen participants weighed in with new data; according to Eric Green, of the National Human Genome Research Institute in Bethesda, Maryland, those data represent most of the human gene sequencing under way in the world. All together, the work totals about 52.4 million bases of the 3-billion-base genome. The researchers predict that by next May, their output will have quadrupled. That will leave just 93% of the genome to be sequenced by 2005, the scheduled completion date of the Human Genome Project.

SEQUENCED HUMAN GENOME

Group	Total Bases Finished and in GenBank by 5/97*	New Sequence Expected by 5/98*
Sanger Centre (United Kingdom)	18.3	35.0
Washington University (St. Louis)	5.7	25.0
U.S. Department of Energy	4.0	16.0
University of Oklahoma	3.4	6.5
The Inst. for Genomic Research	3.3	11.0
Baylor College of Medicine (Houston)	3.0	15.0
University of Tokyo (Japan)	3.0	5.0
Whitehead Institute	3.0	20.0
Inst. of Molecular Biol. (Jena, Germany)	2.4	6.0
PE-Applied Biosystems Inc.	2.2	4.0
University of Texas SW Med. Ctr.	1.8	5.0
University of Washington	1.4	4.2
Genome Therapeutics Corp.	0.6	5.0
Albert Einstein College of Medicine (NYC)	0.3	?
Stanford University	0	6.0
Total	**52.4**	**163.7**

*millions of bases

SOURCE: ERIC GREEN