RANDOM SAMPLES

edited by RICHARD STONE

NRC Brushes Off Fluoride Concerns

Don't switch to bottled water and baking soda just yet. Fluoride in tap water, toothpaste, and foodstuffs, long debated as a potential health risk, has been deemed safe—in the small concentrations mandated by the Environmental Protection Agency (EPA)—according to a report* released last week by the National Research Council (NRC).

Since the 1940s, public utilities have added sodium fluoride to U.S. water supplies to prevent tooth decay. And ever since then antifluoridation groups have charged that fluoride may cause health risks ranging from brittle bones to cancer. A 1990 study by the National Toxicology Program (NTP) only heightened their worries when it found that fluoride-fed male rats had an increased risk of bone cancer. A year later, EPA asked NRC to assess fluoride and advise the agency on whether to lower its "maximum containment level" (MCL) for fluoride in water (4 milligrams per liter).

The NRC panel, chaired by New York University toxicologist Bernard Wagner, found the EPA standard "appropriate." As for fluoride's health effects on people, "there's no evidence to say it's harmful," says panel member Brian Burt, a University of Michigan epidemiologist. That includes the NTP cancer study. "I know the zealots are going to be disappointed," says Burt. Antifluoridation groups failed to return calls from *Science*.

There was, however, a weak association between fluoridated water and hip fractures—not very significant, but perhaps enough for antifluoridation groups to continue worrying. So the NRC report may not put an end to the debate. "I'm sure there will be sequels," Burt says. The first reprise will be EPA's decision, expected within 4 months, on whether or not to change the MCL.

* "The Health Effects of Ingested Fluoride," NRC, August 1993.

THOMAS SMITH III

A new beginning. In August 1992, Hurricane Andrew's 160-mile-per-hour winds devastated large swathes of mangrove forest in south Florida's Everglades. Today the mangroves are starting to repopulate—no surprise, considering the Everglades is accustomed to coping with frequent severe storms. But what is surprising, at least to some ecologists, is that the recovery seems to be spurred by saplings exposed to Andrew's fury.

Using 3-year-old infrared aerial photos of the Everglades, ecologist Thomas Smith III of the Rookery Bay National Estuarine Research Reserve in Naples, Florida, and his colleagues identified gaps in the mangrove canopy caused by lightning strikes. After exploring these same areas earlier this summer, Smith found that saplings now reclaiming the gaps—and exposed to the hurricane's full force a year earlier—weathered the storm better than either older trees or saplings sheltered among older trees. Pioneering trees such as the mangroves shown above, Smith says, "may provide the seed source for larger scale forest recovery following catastrophes." Indeed, it appears that lightning strikes "set up mangrove forests for renewal," says Everglades ecologist Earl McCoy of the University of South Florida. Smith reported his find earlier this month at the Ecological Society of America's annual meeting (see story on p.1115).

FDA to Make Hard Decision on Folic Acid

Last September, after learning that folic acid supplements might halve the rate of certain birth defects, a Food and Drug Administration (FDA) advisory panel recommended that diets be fortified with the vitamin. By the end of this month, the FDA expects to decide how to implement the panel's suggestion. But some physicians are pushing FDA not to heed the advice at all: They're warning that folic acid supplements may do as much harm as good.

Most researchers agree that extra folic acid in the diets of pregnant women could save up to 1000 U.S. children a year from spina bifida, a spinal cord disorder, and ancephaly, a lethal condition in which most of the brain never develops. Folic acid seems to exert its beneficial effects in the first few weeks after conception, when most women haven't realized they're pregnant. Therefore, FDA would order flour or another common food fortified.

Yet some physicians argue that extra folic acid can complicate the diagnosis of the 1 million sufferers of pernicious anemia, a blood disorder that often strikes the elderly. Folic acid supplements alleviate anemia symptoms but fail to improve underlying neurological problems such as memory loss and trouble walking. Anemia, however, is the defining symptom of the disease: Without it the illness might escape detection, says panelist Irwin Rosenberg, a professor of medicine and nutrition at Tufts.

During the panel's deliberations, anemia took a back seat to birth defects, says Rosenberg, who argues that folic acid's advantages outweigh its drawbacks. But another panelist disagrees. Jane Zones, a University of California, San Francisco, medical sociologist, claims folic acid supplements "will conduct an experiment on the entire population without knowing what the risks are." If FDA calls for supplements, the panel will reconvene to develop strategies for monitoring possible adverse effects.

Physicists Collide Over SSC

Nobelist and small-science champ Philip Anderson says he sees more than a literary urge behind the recent spate of mass-market science books by particle physicists.

He sees bored scientists looking for work.

Testifying at a Senate hearing on the Superconducting Super Collider (SSC) on 4 August, Anderson, a condensed-matter physicist, took on not just the SSC, but the field of particle physics and even a fellow scientist on the stand—Steven Weinberg, the University of Texas, Austin, Nobelist who wrote *Dreams of A Final Theory*.

Anderson, best known for his superconductivity work, argued that Weinberg and other particle physicists like Nobelist Leon Lederman, author of *The God Particle* (*Science*, 29 January, p. 587), write for general audiences for two reasons: 1) Their field is scientifically moribund and 2) they're underemployed. "That so many physicists have time to write so many books and articles about how important the SSC is...suggests that they don't have enough to do," Anderson said.

Weinberg took the jibes in good humor. And he even agreed with Anderson on one point—theoretical physicists indeed are "stuck," unable to go beyond present theories without new data. But rather than indicting the field, Weinberg argued, this impasse highlights the need to build the SSC, which would provide an infusion of new information.

Star Wars Sensors to Sneak Peak at Asteroid

For about a minute on 31 August, 1994, a small satellite will come within 75 miles of the near-Earth asteroid Geographos, gather ultraviolet, visible, and infrared data, and careen into uncharted space. Despite the brevity of the encounter, scientists are excited about this third major asteroid flyby, says Jim K. Campbell, manager of the National Aeronautics and Space Administration's (NASA) Project Clementine.

But a science payoff isn't the main objective for Clementine, which NASA will launch in January for the Ballistic Missile Defense Organization (BMDO), a.k.a. the Strategic Defense Initiative Organization. Clementine will test newly developed sensors and a laser and perform experiments in navigation toward targets. In this case, the "target" is Geographos. BMDO "wants to put the sensors into space just to see how they function," says Donald Horan, chief scientist at the Naval Research Laboratory, the spacecraft's designer. "While you're doing that you might as well get some data."

That seems clear enough, certainly clearer than the project's name—or names: NASA calls it Clementine, while the BMDO people call it the Deep Space Program Science Experiment (DSPSE). Campbell won't call it BMDO's DSPSE, which he says sounds like "bimdo's dipsy." He prefers the more apropos Clementine: One of the lines in the song goes "you'll be lost and gone forever"—the spacecraft's fate after Geographos.

Engineer Gets Life For Deaths

People at Montreal's Concordia University won't soon forget 24 August 1992, the day Valery I. Fabrikant, an associate professor in the mechanical engineering department, shot four fellow faculty members to death. But perhaps now the university community can take solace in the punishment meted out for the crime: Earlier this month, Fabrikant was found guilty of first-degree murder and sentenced to life in jail.

Fabrikant had been embroiled in disputes with his department and the Concordia Faculty Association for several years. His tenure application was rejected, and just before the shootings Concordia sued him for libel. The suit was prompted when Fabrikant sent out a series of Internet messages claiming that several university officials had insisted on co-authoring scientific papers they had nothing to do with (*Science*, 4 September 1992, p.1342).

During the 5-month trial in Quebec Superior Court, Fabrikant, representing himself, was hit with six contempt-of-court charges for, among other things, calling Judge Fraser Martin "the presiding Muppet." Deemed fit to stand trial even though psychiatrists concluded that he suffered from a persecution complex, Fabrikant portrayed himself as the victim of a conspiracy perpetuated by Concordia faculty and administrators. The jury, apparently, did not subscribe to conspiracy theories.

Physicists Make Tiny Fingers for Tiny Jobs

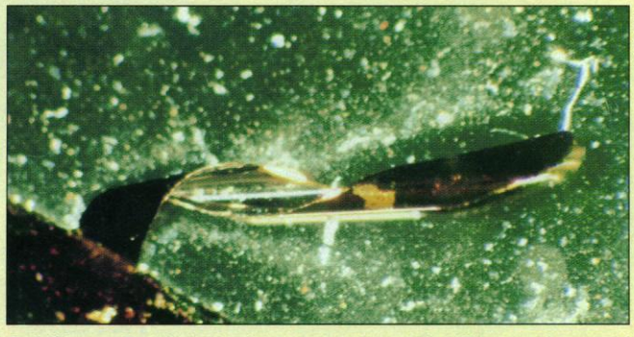
Having trouble with those little jobs, you know, the ones on a micrometer scale? Need smaller tools? Well, they may be on the way. Swedish researchers have created a "finger" a few millimeters long with a polymer "muscle" that allows the finger to bend. The goal is to create devices such as a microscopic pump to be implanted in the body to deliver timed doses of drugs.

The finger is a gold strip with a thin layer of polypyrrole—a polymer—bonded to its surface. Polypyrrole has alternate single and double bonds along its carbon chain—a structure that lets electrons fly up and down it, making the polymer a good conductor.

But physicist Olle Inganäs and colleagues at Linköping University also found the polymer contracts when electrons are added to the chain, making the gold strip bend. The researchers report in the September issue of *Advanced Materials* that they can swell or shrink the polymer at will by doping it with salts, which provide those added electrons.

To construct their finger, Inganäs' team made thin gold strips of various lengths on the surface of a silicon wafer; one end of each strip was attached to the wafer, the other free to move. On the strips they grew a film of polypyrrole doped with a salt, sodium dodecylbenzene sulfonate. After immersing the wafer in a salt solution, the researchers applied a voltage that expelled positively charged sodium ions from the polymer. The departing ions left excess electrons in the polymer, causing it to shrink. Short, stiff strips folded over while long, floppy ones curled into spirals.

Truly useful devices such as the drug pump are a way's off, says Inganäs, but in the meantime the researchers are flexing their micromuscles by making microscopic hands and corkscrews.



E. SMELA

Goldfinger. Swedish physicists are making this millimeters-long gold strip flex like a finger, the first step toward making miniature tools.

New Cholera Strain Arouses Concern

A new strain of cholera-causing bacteria is now sweeping through the Indian subcontinent and raising fears of an eighth worldwide cholera epidemic.

Nicknamed Bengal, the new strain (*Vibrio cholerae O139*) causes typical cholera symptoms, such as diarrhea, vomiting, and muscle cramps. However, it has a mutated surface protein that distinguishes it from the strains that triggered the past seven epidemics, including the most recent, which began in 1960.

This is bad news for survivors of that scourge, which recently reached epidemic proportions in South America. "This is different enough that people who had immunity to the old organism won't have immunity to the new form," warns epidemiologist David Swerdlow of the Centers for Disease Control and Prevention. Therefore, he says, the new strain tends to strike adults—who have gained immunity to the older strain—as frequently as children.

With more potential victims and increased global travel, the new strain sped from India and Bangladesh to Thailand in a year —2 years faster than the 1960 epidemic spread, a team of Thai and Japanese scientists reports in one of six articles on *0139* in the 14 August issue of *The Lancet*. To make matters worse, the new strain is gaining momentum just as many Asian and African countries have begun to curtail cholera programs because their cholera rates have been declining.

One bit of good news is that although the new strain is more virulent, it doesn't appear to be more deadly than previous ones, says World Health Organization epidemiologist Ronald Waldman. He says WHO will continue its policy of advising people to sterilize food and water.