RANDOM SAMPLES

edited by IVAN AMATO

Ig Nobels: Not the Real McCoys

A week before Sweden announced the 1993 Nobel laureates, the third annual Ig Nobels—a satiric version of the traditional awards—were given out in Cambridge, Massachusetts, by The MIT Museum and *Journal of Irreproducible Results*. Here are some of the unlucky winners.

Physics: Author Louis Kervran for his book, *Biological Transmutations*, in which he argues that a cold fusion process produces the calcium in eggshells.

Mathematics: Robert Faid of Greenville, South Carolina, for calculating the exact odds (8,606,091,751,882:1) that Mikhail Gorbachev is the Antichrist.

Pyschology: John Mack of Harvard Medical School and David Jacobs of Temple University for concluding that many of their patients, who claim to have been abducted by aliens, actually had been.

New at the ceremony this year were 30-second long Heisenberg Certainty lectures. Attendees included several Nobel laureates and other experts including Russell Johnson, professor emeritus of Gilligan's Island.

Closing the Case on Cluster Impact Fusion

A preprint making the rounds of the nuclear fusion community officially closes the book on cluster impact fusion, one of two fusion dramas that began in 1989. (The book virtually closed on the other story, cold fusion, not long after it opened.) Cluster impact fusion was announced that year by three Brookhaven chemists, Robert Beuhler, Lewis Friedman, and Gerhart Friedlander, who said they had bombarded a deuterium-loaded target with huge clusters of heavy-water molecules and induced fusion yields 10 billion times greater than allowed by classical theory.

The researchers treated these first results cautiously, fearful of getting the same treatment elicited by the highly publicized and incorrect cold fusion claim. The caution didn't help. The Brookhaven work was quickly criticized by physicists who argued that the effect was likely due to experimental artifacts and not some novel fusion mechanism.

Two years later, in March 1992, the Brookhaven trio partly acknowledged this when they published an erratum in *Physical Review Letters*, reporting that they had overestimated fusion rates and that stray ions in their cluster beam may have been responsible for their data. Still, they allowed that cluster fusion might exist, but at a much smaller rate.

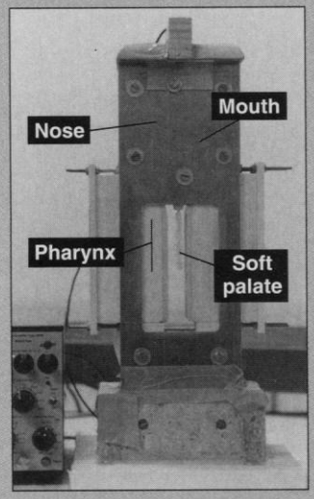
Now *Physical Review A* has accepted for publication the final word from Brookhaven. The original effect indeed could be explained by "small ion impurities," the Brookhaven chemists say in their abstract. Says Friedman: "The paper is the end of the story."

What's the morale of this fusion story? "When you get a result that appears to be spectacular and is supported by a large body of circumstantial evidence," Friedman says, "There is some tendency to want to believe that it's really there. You have an obligation to prove it one way or the other."

Snoring Machine Could Help Poor Sleepers

That snoring sound in a lab at the University of Maine at Le Mans, does not mean researchers there are napping on the job. *Au contraire*—they have only turned on their snoring machine.

Acoustics researchers Yves Aurégan and Claude Depollier built the machine to mimic the airflow through a human pharynx; the idea is to find better treatments for heavy snoring, which can be a sign of sleep apnea, a condition in which throat muscles involuntarily relax, blocking airflow. The problem robs sufferers of sleep and can lead to heart attacks.



Zzz. The mechanical snorer.

The machine has a lung reservoir, a tubular pharynx, a soft, rubbery palate, and mouth and nose outlets. By varying airflow, the diameter of the air passages, and the length and flexibility of the soft palate, Aurégan has managed to duplicate the human snore.

The machine begins snoring under conditions that make the airstream separate and form vortices, which cause the soft palate and the uvula, a fleshy extension, to beat irregularly against the walls of the pharynx. These conditions occur, the researchers concluded, when the soft palate is too long or too soft, or the pharynx is too narrow. From this data, Aurégan developed a formula which uses the pitch and loudness of the snore to predict airspeed, pharynx width, and the palate's length and elasticity.

The researchers hope their results will allow doctors to listen to snorers and use the sound to pinpoint anatomical problems. That, in turn, could indicate specific treatments, ranging from laser surgery to reshape a soft palate to a recommendation to sleep on the stomach in order to keep the pharynx as open as possible.

But the researchers need to show that their technique is reliable before doctors could use it, says Jean-Louis Racineux, director of the sleep laboratory at University Hospital in nearby Angers, who originally suggested the research. At present, he says, the machine's primary use will be to explore the phenomena underlying the nightime racket.

Smart Materials Get a Production Boost

If a damaged bridge over an Alabama bayou had been smarter, the recent Amtrak derailment might have been avoided. Engineers have been talking about making structures out of "smart" materials that sense their own status and alert humans of dangers. But smart materials aren't used much now, in part, because they can't be made efficiently.

That could soon change, says physicist Charles Askins at the Naval Research Laboratory. In a press release, he and coworkers reported a new fabrication technique suitable for large-scale production of sensors based on optical fibers. The idea is to embed the fibers into materials such as concrete or composites where changes in the intensity, wavelength, or phase of light traveling in the fibers would reveal the host material's health.

Existing methods of making the sensors entail stripping a protective polymer coating from the fiber, before a laser treatment can create stacks of closely-spaced panes, or Bragg gratings, within the fiber. The gratings reflect specific colors of light, and detectors at one end of the fiber monitor changes. After the gratings are made, the coating is reapplied, making the process time-consuming and expensive.

The new technique takes a shortcut, beaming an intense laser at a glass filament as it is being drawn into a fiber and then it is coated with the polymer. "Before you could make ten [Bragg gratings] a day," Askins says. "Now we can make many a second."

"This looks like a way to make kilometers of sensors," says physicist Gerald Meltz of United Technologies Research Center, where groundwork for making the sensors had been done.