Briefings

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Banning the Biological Bomb

Although the U.S. government pledged not to put biology to offensive military use when it signed the Biological Weapons Convention in 1972, U.S. citizens have never been technically prohibited from doing free-lance bioweapons work—either for themselves or for a foreign power. Now Congress is about to close that odd 17-year-old loophole.

In the waning hours before adjourning for Thanksgiving, Christmas, and the New Year, the Senate approved a bill, proposed by Senator Herb Kohl (D–WI), that would make it a criminal offense to "knowingly" develop, produce, stockpile, or possess a biological agent or delivery system for use as a weapon. Violators could be imprisoned for life. Helping a foreign power or organization along the road to bioweapons would also be considered a criminal act.

The bill, which is expected to make a swift passage through the House early next year, has prompted some nervousness among scientists. They have worried that innocent research on pathogenic organisms might be misidentified as work that has potential military uses.

The legislation was amended, however, to require law enforcement officials to demonstrate before seizing property or making arrests that materials that have aroused suspicion have "no apparent justification for prophylactic, protective, or other peaceful purposes."

Richard Godown, president of the Industrial Biotechnology Association, who expressed concern about the bill in testimony earlier this year, now says that the legislation is worded "to afford sufficient protection for those who are engaged in legitimate scientific investigations."

Scintillating Blues

Crystals of lead carbonate are clear and rather unimpressive until they are hit by ionizing radiation. Then they glow with a beautiful blue light.

That azure hue may help make major improvements in a number of medical and scientific instruments, including positron emission tomography (PET) systems and detectors for nuclear and high-energy physics, say scientists at Lawrence Berkeley Laboratory. The lead carbonate crystals could give researchers more accurate data at a faster rate.

The potential advance arises from the recent discovery by a Lawrence Berkeley Laboratory team of a new scintillation material. Defined as crystalline structures that emit light when struck by ionizing radiation, scintillation materials are relatively rare—in fact, there are only a score of scientifically useful ones known. After a 2-year search, the Lawrence Berkeley team settled on lead carbonate, which has a combination of high stopping power, fast response time, and short time between responses that makes it superior to other materials for a large range of scintillation applications. It also does not absorb moisture from the air, so it does not need to be sealed off as many other scintillators do.

The one obstacle to its use is that large, naturally occurring crystals of lead carbonate are practically unknown, and no one knows yet how to make them synthetically on a commercial scale.

LBL Photo

Lead carbonate crystal *under blue light.*

A Herpes Therapy Too Hot to Take?

The fiery ingredient in chili peppers—the one that makes all the difference between, say, your average Tex-Mex TV dinner and the real tamale—singes the taste buds and makes grown-ups cry at the table. Now it's a weapon in the scientific battle against the herpes simplex 1 virus.

Tests of the chemical substance capsaicin using mice show that outbreaks of herpes infections in the eye can be prevented for up to 2 months. Donald G. Payan, a neuroimmunologist at the University of California at San Francisco, says the chemical interrupts nerve fiber and neurotransmitter activity.

While not a therapy in its raw form, capsaicin may serve as a starting point in the development of new compounds that would block flare-ups in infected individuals and prevent the spread of the virus, according to Payan. He advises that people avoid using capsaicin in home remedies, though. The liquid will give you more than a hot time; it can destroy sensory nerves.

Running on Empty

For about 6.7 million Americans, the National Ambient Air Quality Standards may not be all they're stacked up to be. According to a study recently published in the *New England Journal of Medicine*, moderate exercise can dangerously increase carbon monoxide levels in the blood for people who suffer from atherosclerotic coronary artery disease—even on days when air quality is well within the NAAQS.

Once in circulation, carbon monoxide limits the amount of oxygen carried by the blood. Healthy bodies easily adjust to the loss by increasing blood supply to the heart. However, 6.7 million Americans with coronary artery disease can't make that compensation.

For them, an increase in carbon monoxide blood levels from the usual 0.6% to 2%—easily attainable within the NAAQS—greatly increases their chance of experiencing severe paroxysmal chest pains, known as angina, even after short periods of moderate exercise.

Engineering's Ten Greatest Advances

What would you nominate for a list of the ten greatest engineering achievements in the last 25 years? The National Academy of Engineering (NAE) sorted through 340 possibilities to make selections it hopes will draw attention to engineering prowess.

NAE's winners:

- The moon landing.
- Communications and information-gathering satellites.
- The microprocessor.
- Computer-aided design and manufacturing.
- The computerized axial tomography scan.
- Advanced composite materials.
- The jumbo jet.
- Lasers.
- Fiber optic communication.
- The application of genetic engineering to produce new pharmaceuticals and crops.

As part of the celebration of its 25th anniversary, NAE plans to distribute 20,000 booklets describing these technologies to school systems and the general public. *Engineering and The Advancement of Human Welfare: 10 Outstanding Achievements 1964–1989* is available from the National Academy Press. Tel: 1-800-624-6242.