Briefings

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OTA Gives One Thumb Up for Bio

These days, when it seems as if a major oil spill hits some coast every few months, it's little wonder that a simple, environmentally safe way to clean up such spills would attract a lot of attention. One such method is bioremediation, the practice of releasing or encouraging the growth of microorganisms that actually "eat" oil. In a recent report*, the congressional Office of Technology Assessment (OTA) cautiously endorses this approach but points out that it is, at best, an incomplete response to oil spills.

The basic premise of bioremediation is simple: Under the right circumstances, microbes can metabolize petroleum hydrocarbons into simpler end products such as carbon dioxide and nontoxic water-soluble compounds. Real spills, however, present a number of problems. For one thing, crude oil contains a number of complex, hard-to-degrade hydrocarbons. Some, such as C_5-C_9 alkanes, are toxic to many species of bacteria; others, such as asphaltenes (tar) and resins, degrade very slowly. Heavy oils—or even light oils that have been subject to evaporation and dispersion—may contain up to 45% of such compounds. Furthermore, biodegradation is limited by the availability of oxygen and nutrients, ocean temperature, and the pH and salinity of the water.

Despite these pitfalls, OTA reports that some bioremediation efforts are showing promise, particularly those in which cleanup teams add nutrients to encourage the growth of indigenous bacteria. The most striking successes seem to involve digestion by microbes of toxic low-molecular-weight aromatic compounds. OTA notes, however, that findings in the field are still tentative and suggests that more research be devoted to the subject.

**Bioremediation for Marine Oil Spills*, U.S. Congress, Office of Technology Assessment, OTA-BP-O-70, May 1991.

Queasy Riders

Between 50% and 70% of astronauts suffer from the misery of "space sickness," which can reduce work efficiency and make them feel miserable, says Laurence Young, an aeronautical engineer at MIT. He plans to learn more about the cause of this pervasive and sometimes debilitating ailment on the current space shuttle flight, using the crew of the shuttle Columbia as subjects. Young's project is part of a larger set of biology experiments on the current mission, known as Spacelab Life Sciences-1.

Space sickness, like seasickness, starts not in the stomach but the inner ear, says Young. People often get an upset stomach if actual or apparent motion upsets the inner ear's vestibular system—the apparatus that helps people sense motion and position.

That system doesn't work well in the zero gravity of orbit, and Young's experiments are designed to find out why. One experiment requires subjects to put their heads in a rotating, spotted dome. Another looks at the response to an actual rotation—the kind you feel if you spin fast in a swivel chair.

Young says such experiments may lead to simple techniques to avoid the sensory confusion that can lead to queasiness. For example, astronauts already know to limit certain types of head movements.

It will be easy to quantify the effectiveness of any space sickness remedy, thanks to Senator Jake Garn (R–UT), who suffered a bad case of space sickness on his shuttle flight. "We have an official unit of motion sickness," explains astronaut Jeffrey Hoffman. "We call it the Garn."

AP/Wide World Photos

Big heat. *Houses burn as hot ash pours from Unzen.*

Volcano Claims Scientists' Lives

In volcanology, a scientific misjudgment can cost you more than wasted time or misspent grant money. On 3 June, it cost volcanologists Harry Glicken and Maurice and Katia Krafft their lives. At about 4:00 in the afternoon a half-million cubic meters of Unzen volcano collapsed, sending hot ash racing down the Mizunashi River and into the town of Kamikoba, near Nagasaki, Japan. Thirty-seven people died, including journalists, rescue workers, local residents, and the three volcanologists who had come to study their killer.

Unzen had given plenty of warning that it was not to be completely trusted. In mid-1990, with a rumble of earthquakes, it had begun awaking from a 200-year slumber. In November the first ash erupted, and on 20 May lava began extruding near the summit. The resulting lava dome partially collapsed on 24 May, sending the first of several hot ash flows down the mountainside. The penultimate flow stopped 600 meters short of Kamikoba. As spring rains threatened to push ash into the town, as many as 3000 people were evacuated.

The volcanologists would have been the last to underestimate the continuing threat. Glicken, an American who was a visiting professor at Tokyo Metropolitan University, narrowly escaped death 10 years ago at Mount St. Helens. And the Kraffts, who worked out of the Vulcain Volcanology Center in Cernay, France, are known worldwide for not only their science but also their filmmaking about volcanoes. But even volcanologists can fatally misjudge their subject.

Worse could still happen. Three months after the beginning of the previous eruption of Unzen, in 1792, a lava dome collapsed into the sea, unleashing tidal waves that killed 15,000 people. About 200,000 people now live around Unzen—and the eruption continues.

Suit Against NAS Dismissed

Victor Herbert—gadfly, nutritionist, attorney, hunter of quacks, and angry author who took the National Academy of Sciences (NAS) to court on a charge of plagiarism last year—received a major setback in his legal battle on 22 May. Judge Stanley Sporkin of the U.S. District Court for the District of Columbia dismissed his case for lack of jurisdiction.

Herbert claims that the academy wrongfully published parts of a chapter he wrote for the NAS's *Recommended Daily Allowances* in 1984. The academy had a contract with the Department of Health and Human Services to produce the report on