edited by CONSTANCE HOLDEN

Benzene alert. Whistleblowing toxicologist Mehlman.

Fired Mobil Scientist Awarded $7 Million

Mobil Oil is having gas pains. A New Jersey jury last month awarded $7 million in lost salary and damages to the former chief toxicologist for Mobil Oil, who claims he was fired 5 years ago for saying there were dangerously high levels of benzene in the oil at Mobil's Japanese refinery.

Mobil fired Myron Mehlman in November 1989, charging that he had "misused company assets," such as postage and copying facilities, in connection with a scientific publishing company that he runs. But Mehlman—noting that a few months earlier Mobil had nominated him for membership in the National Academy of Sciences—says the real reason he was sacked was that his company didn't want to hear what he had to say about its gas. In October 1990 Mehlman sued the company for wrongful dismissal.

Mehlman recounts that in September 1989, he visited the subsidiary that runs Mobil's oil refinery in Chiba, Japan, where he was told that levels of benzene in Mobil's Japanese gas sometimes exceeded 5%. "I was completely shocked," says Mehlman. Benzene causes leukemia and other cancers, and levels that high would be viewed as poisonous in the United States—by next year, the legally allowable percentage of benzene in U.S. gas will be no more than 1%. Mehlman says he told Japanese Mobil officials that they should stop selling the gas. The company's response to this potentially costly message, he continues, was to frame the messenger: Less than a day later, Mobil mounted the investigation that led to his termination.

The company's version of the story bears little resemblance to Mehlman's. John Lord, spokesman at Mobil headquarters in Fairfax, Virginia, calls Mehlman's allegations about his dismissal a "fabrication," and says the real reason he was fired was because he used company personnel, time, and equipment for personal business. As for Mobil's Japanese gasoline, the company claims that benzene levels have never exceeded 5%, a limit agreed upon by Japanese petroleum producers. And Mobil officials in Japan told *Science* this month that benzene levels at the Chiba refinery are currently around 2.5%.

The jury obviously believed Mehlman. But the toxicologist, now a visiting scientist at the federal Agency for Toxic Substances and Disease Registry in Atlanta, Georgia, still has a way to go before he sees the $7 million. Mobil has moved to have the verdict thrown out on a legal technicality; if the verdict is upheld, the company plans to appeal.

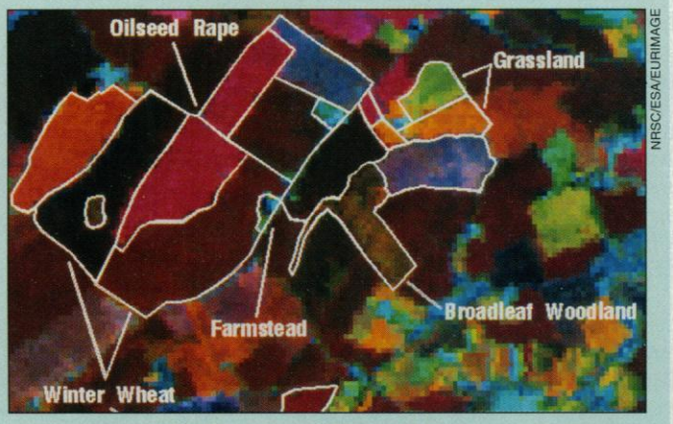
Eyeing European Crops

European farmers, like those in the United States, get subsidies for not growing crops. Farmers may claim they've set land aside, but agriculture departments want proof before handing over cash. So the European Union (EU) has turned to a spy in the sky: a program of crop-monitoring satellites. It began last year with the American Landsat 5 and European SPOT, and proved successful enough to warrant expansion this year with the European Space Agency's Earth Resources Satellite, ERS-1, the first of a new generation of radar satellites. Its cloud-penetrating images will back up the visible and infrared sightings of the other satellites.

The satellites can discern planted from fallow fields as well as different types of crops because the amount of light reflected from fields depends on plant type, stage of maturity, water content, and pigmentation. Maps of farmland, with individual field boundaries, can then be digitized and overlaid onto computer-processed satellite images, enabling officials to verify farmers' claims.

Stephen Briggs, acting head of Earth observation at the United Kingdom's Natural Environment Research Council, says that analyzing the data is "not a case of simply looking at the satellite images." The images are taken continuously during the growing season and must be corrected to account for land contours and changes in the sun's position, as well as augmented by data collected on the ground. In the U.K., the Ministry of Agriculture, Fisheries and Food has contracted with a private company, the National Remote Sensing Centre, to perform this analysis on random areas of farmland. Similar monitoring programs will be conducted over the summer in every EU member state.

Europe appears to be ahead of the United States in satellite crop-monitoring for subsidy programs. U.S. Department of Agriculture officials say they find satellite images to be too imprecise. Instead, they rely on airplanes.



Fertile or fallow. Satellite image of farm in Bedfordshire shows two shades of brown for winter wheat—lighter color indicates youth.

Prehistoric Bird Kill

Complete avian fossils are rare birds indeed; their hollow bones and delicate skulls don't usually stand up to the forces of time. Thus paleontologists have been dazzled by a cache on Florida's Gulf coast containing hundreds of complete skeletons of an extinct species of cormorant.

On page 684 of this issue of *Science*, Steven D. Emslie of the Florida Museum of Natural History and Gary S. Morgan of the New Mexico Museum of Natural History describe a fossil deposit in Sarasota County containing evidence of a mass dying-off of seabirds from about 2 million years ago. Included is what Morgan calls a "spectacular" array of hundreds of whole and partial cormorant skeletons "all laid out the way they died." The authors suggest that the cormorants died from poisoning, possibly from a "red tide," toxic algae that grow from an excess of nutrients.

Emslie says the fossil bed, which also contains remnants of other birds and marine life, is a "last representation of the diversity of that time period in Florida." This era, known as the Pliocene, stretched from roughly 5 million to 2 million years ago, and saw a massive increase in marine vertebrate biodiversity. The Florida trove, say the authors, adds to a "growing body" of evidence that this increase was

primarily caused by a sustained "upwelling" of cool, nutrient-rich water. Paleontologist Geerat Vermeij of the University of California, Davis, concurs that "most bird fossils don't come in huge quantities," so this cormorant concentration suggests there was a lot of food available, possibly because of such an upwelling.

NSF Audit Wins Plaudits

The $3-billion National Science Foundation (NSF) is one of the smallest outfits in the U.S. government. But its accounting procedures are second to none. Last week the Office of Management and Budget (OMB) gave NSF a pat on the back for being one of only three agencies in which auditors found no errors in its 1992 books and one of only two agencies with no "material weaknesses" in its internal accounting systems. NSF officials are basking in the praise. "It confirms what we've always thought, that the administrative side of NSF is as strong as the research side," says Joseph Kull, NSF's chief financial officer.

Of course, OMB's assessment of this small agency is based on a small inspection. The audit covered only 1% of NSF's overall budget, a $20-million account that handles international research collaborations. Auditors looked at a much larger slice of the budgets of several bigger agencies—over half the activities of the $550-billion Department of Health and Human Services and the $300-billion Department of Defense, for example. And bigger looks at bigger budgets, apparently, turn up a bigger array of problems.

Money Offered in Spinal Surgery Trial

Boston University Hospital agreed earlier this month to reimburse up to $50,000 in medical expenses to patients who complained they were misled about a controversial operation's chances of repairing their spinal-cord injuries.

A small trial of the surgery, known as omentum transposition, produced numerous complaints last year from paralyzed patients who alleged that a rehabilitation expert who recruited them for the trial oversold the benefits of the procedure. The charges prompted a state investigation and caused the hospital to suspend the trial after 26 of the 30 patients had already had the surgery (*Science*, 17 September 1993, p. 1525). The hospital has also agreed not to pursue any further studies of omentum transposition and has barred the surgeon, Harry Goldsmith, from performing the surgery at their facilities.

Omentum transposition, which Goldsmith pioneered, involves tunneling one end of the blood-rich tissue, which comes from the abdominal cavity, to the site of the injury. Goldsmith has claimed this brings healing blood and nerve growth factors to the site of injury (*Science*, 9 October 1992, p. 218). But spinal-cord experts argued that reports of beneficial results were based on poorly monitored overseas operations.

This first U.S. trial of the procedure was supposed to settle the debate, but it probably won't. A panel convened by the hospital to review the results has not yet made a report, but hospital officials already concede the trial may have been flawed. "The follow-up of some of the protocols was inadequate," says hospital board member Richard Egdahl. He says he still hopes another institution will one day pick up where his hospital has left off and provide a definitive answer to omentum's potential to heal.

Goldsmith, meanwhile, is out of the country and disapproves of the settlement, according to his attorney Richard Melick. "This is a shameful thing that has been done to him," says Melick.

Bugs Are Sweet on Crop Waste

If ethanol could be fermented from agricultural waste as cheaply as gasoline can be refined from crude oil, high-polluting, fossil-fuel–guzzling cars could become fossils themselves. And a British research team, which has discovered a hungry, fermenting microorganism with a tremendous appetite for plant waste, thinks that day may be a little bit closer.

The bug is a mutant strain of a bacterium, *Bacillus stearothermophilus*, and it was discovered accidently by biotechnologists Namdar Baghaei-Yazdi and Brian Hartley of London's Imperial College. "We think a spore floated in through the window from Hyde Park," says Baghaei-Yazdi. The spore ended up in a dish of bacteria the two scientists were screening for rapid anaerobic growth in high temperatures. It turns out the new mutant outperforms other organisms in rapidly chewing up wheat, maize, and sugar-beet wastes at 70° to 75°C, producing ethanol in the process.

The new bacterium has a big advantage over yeast, the most commonly used fermenting agent, because it is able to digest sugars called hemicelluloses that yeast ignores. "The real attraction of this organism is its ability to eat a wide range of sugars.... It's an agrodustbin," enthuses biochemist Giovanni Guidoboni of GRC Consultants of Alton in Hampshire, who has studied the Imperial team's results.

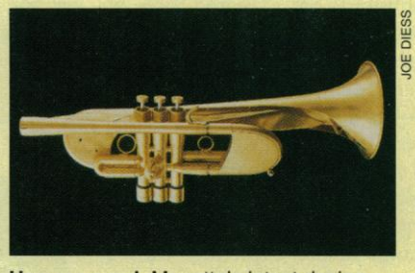
This trait should dramatically increase the proportion of plant waste that can be made into fuel. In Brazil, for instance, where more than two thirds of cars run on ethanol from sugar cane, only the juice of the plant is converted into fuel. If the leftover hemicelluloses from sugar cane were also fermented, the ethanol yield would be at least doubled, says Baghaei-Yazdi.

But the scientists still have one big hurdle to overcome: Over time the mutant reverts back to the wild-type *B. stearothermophilus*. This bug also digests hemicelluloses, but it contains an enzyme, lactate dehydrogenase, that breaks down sugars into lactic acid as well as ethanol, thereby producing less biofuel. Baghaei-Yazdi and Hartley are therefore now working to produce a genetically engineered strain lacking the gene for this enzyme.

Horn of Plenty

David Monette is trying desperately to lose some weight, and he's turned to materials scientists for advice. The Oregon-based trumpet designer's hand-built brass horns tip the scales at 7.5 pounds, nearly four times the weight of the average 2-pound trumpet, and he needs to lighten up.

Monette has been fashioning weighty trumpets since 1983. The extra weight comes from structural additions that help control pitch and enrich the instruments' sound. His latest model, favored by jazz great Wynton Marsalis, includes a double-walled bell, a mouthpiece built directly into the body of the instrument, and additional bracing. "The thing is a big tank," says Monette.



JOE DIESS

Heavy sound. Monette's latest design.

Hoping to hear about lighter, high-strength materials, Monette sought out experts at the Materials Research Society conference in San Francisco earlier this month, and he got an earful. Among the tips: Try replacing some of the brass with graphite, titanium, and niobium. "I assume we'll start with the bracing," where materials changes are less likely to affect the sound, says Monette. After all, trumpets are called brass for a reason.