ATMOSPHERIC SCIENCE

Pollute the Planet for Climate's Sake?

The source of the proposal was almost as remarkable as the idea itself. In the August issue of *Climatic Change*, Paul Crutzen, who won the Nobel Prize for helping work out the chemistry of ozone destruction in the stratosphere, resurrected an oft-disparaged suggestion: Create a global haze by spewing megatons of sulfurous debris into the stratosphere to shade the planet and rein in greenhouse warming. "A few years ago, I would have said, 'I'm not touching that,' " says the Max Planck Institute for Chemistry researcher. Now, however, he finds the "grossly disappointing international political response" to global warming's threat so disturbing that the notion of deliberately contaminating the stratosphere looks less and less crazy.

Bad idea, respond some climate scientists. It would be applying a Band-Aid to the symptom while continuing to stoke the problem with ever-increasing greenhouse gas emissions. Best not even to talk about it. Worth looking at, say others. Given the surprises that may be lurking in the greenhouse, desperate countermeasures could come in handy. Thanks to Crutzen's stature, this scientific and ethical debate is blossoming as the climate community begins to take a hard look at geoengineering climate.

Supporters of at least studying the idea seem to have some momentum for now. "Crutzen's paper created some sort of phase change, making geoengineering a respectable topic of conversation," says climate modeler Kenneth Caldeira of the Carnegie Institution Department of Global Ecology at Stanford University.

Geoengineering as a fix for global warming has been a topic of usually sotto voce conversation since the 1970s, when the Soviet climatologist Mikhail Budyko suggested Earth could be cooled by adding tiny sunlight-reflecting particles to the stratosphere. Nature soon served up a couple of striking examples of how it might be done when the volcano El Chichón erupted in 1982 and Mount Pinatubo erupted in 1991. The long-lived stratospheric debris of Pinatubo—water droplets laced with sulfuric acid derived from the volcano's sulfur—reflected enough sunlight back into space to cool Earth on average 0.5°C for a year or two following the eruption. That's about the size of the warming of the past century.

A volcanic chill. Humans might loft sulfur into the stratosphere to counteract global warming; Mount Pinatubo did in 1991.

CREDIT: BULLIT MARQUEZ/AP PHOTO

Pulling off a "human volcano" to counteract global warming would take some wherewithal. Pinatubo put up 10 million tons of sulfur, most of which fell out of the stratosphere within 2 or 3 years. So humans looking to cool the greenhouse by stratospheric shading would have to send millions of tons of sulfur tens of kilometers into the air every year, perhaps century after century, in order to renew the continually depleted shield of haze. The resulting acid rain would be minor compared to current levels, say proponents. People have discussed delivery methods from balloons, big guns, and giant planes. To ease the burden of lifting megaton masses, the late Edward Teller—father of the hydrogen bomb and "Star Wars" missile defense advocate—proposed substituting more efficient reflectors for sulfur, something metallic and perhaps engineered like tiny retroreflectors. ▶

Pass the Hat for Alien-Hunting

With NASA scaling back funding for astrobiology, scientists are turning to California's Silicon Valley to keep hope alive. The SETI Institute in Mountain View, whose more than two dozen researchers rely on NASA astrobiology grants, plans to create a new privately funded center devoted to the study of life in space. Organizers are looking for up to $6 million over the next 3 years, says SETI's Scott Hubbard, with funds aimed at retaining staff and expanding research at the newly named Carl Sagan Center. The community took a similar approach after lawmakers refused to fund extraterrestrial intelligence research a decade ago.

–ANDREW LAWLER

Crawford Pleads Guilty

A former head of the U.S. Food and Drug Administration (FDA) pleaded guilty this week to owning shares of stock in companies the agency regulates and filing false financial disclosure forms saying he had sold them. Lester Crawford, a pharmacologist and veterinary medicine specialist who resigned his post suddenly last fall after just 2 months, was charged with two misdemeanors for withholding financial information. The Justice Department complaint states that Crawford, who spent 8 years at FDA in three separate stints, or his wife owned shares in soft-drink maker Pepsico while he chaired an FDA obesity working group.

"There's little that we can do if people do not provide honest disclosures of financial interest," says Jeremy Sugarman, a bioethicist at Johns Hopkins University in Baltimore, Maryland. Sentencing is set for January.

–JENNIFER COUZIN

Biosafety Lab Delayed

A U.S. nuclear-weapons lab must conduct another environmental review before opening a biosafety level 3 lab on its grounds, a federal appeals court ruled this week. The move is a win for activists led by the Livermore, California, based Tri-Valley Cares, which had sued the Department of Energy's Lawrence Livermore National Laboratory over the proposed facility in 2003. Such a review, which must consider the possibility of a terrorist attack on the lab, could take a year. Livermore says it is mulling its options; activists hope the decision will bolster efforts to thwart other planned biosafety labs at government facilities. Livermore had planned to open the lab as soon as next month (*Science*, 13 October, p. 235).

–ELI KINTISCH