
RESOURCES & ENVIRONMENT

'Greenhouse' Gases

"The Biggest Chill" by Wallace S. Broecker, in *Natural History* (Oct. 1987), American Museum of Natural History, Central Park West at 79th St., New York, N.Y. 10024.

The "greenhouse effect"—the rise in the Earth's surface temperature caused by increasing amounts of carbon dioxide, methane, and freon gases in the environment—is well known. But what will the consequences be in the long term?

Broecker, a geologist at Columbia University, believes that increasing amounts of "greenhouse" gases may cause shifts in ocean currents. The results, he warns, may "pose great threats to humans and wildlife."

Broecker suggests that climatic shifts may occur in sudden leaps, not by gradual changes. His evidence: experiments conducted by Danish scientist Willi Dansgaard and Switzerland's Hans Oeschger. Dansgaard examined prehistoric ice in southern Greenland and determined that the air temperature there had warmed swiftly several times over the millennia. Oeschger discovered that the carbon dioxide (CO₂) content of the air trapped in bubbles in the ice increased by 20 percent during the same periods when the air grew warmer. Because these shifts in CO₂ levels were so radical, Broecker argues that shifts in ocean currents played a part in causing the ice ages. Only some extraordinary change in the Earth's chemical cycles, particularly those affecting ocean salinity, could have produced such sharp changes in CO₂ levels.

While the first ice age was due largely to a shift in the Earth's orbit that reduced summer sunlight, Broecker maintains that the second ice age, which began about 11,000 years ago but lasted only 700 years, was due to a stoppage of the network of currents (or the "ocean conveyor belt"), which circulates warm water to the North Atlantic and cold water to the northern Pacific. The increased flow of fresh water from melting glaciers in the Great Lakes area reduced the salinity of the ocean, disrupting the flow of warmer water from the Equator to the North Atlantic.

Yet, "we have no way to predict," Broecker concludes, "how the great ocean conveyor" will respond to the greenhouse effect, because the Earth has not warmed significantly during recorded history. The question of what damage "greenhouse" gases will cause, he warns, will "be resolved only by serious study over many decades."

Chemical Feast

"Cancer From Our Food: Natural and Man-Made" by Allen L. Hammond, in *Science Impact Letter* (Aug. 1987), 10400 Connecticut Ave., Ste. 304, Kensington, Md. 20895.

Many pesticides have been found by scientists to be carcinogenic. The National Research Council estimates that 30 percent of insecticides, 60 percent of herbicides, and 90 percent of fungicides may be cancer causing. But what about organic chemicals that occur naturally in foods? Are they

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as dangerous as their manmade counterparts?

Probably not, says Hammond, *Science Impact Letter* editor. While some "naturally occurring chemicals are toxic," he argues, their cancer-causing potential is probably lower than chemicals made by man.

Bruce Ames, a biochemist at the University of California, Berkeley, studied the effects of naturally occurring carcinogens. He concluded that an eight-ounce glass of wine is thousands of times more likely to cause cancer than either DDT or ethylene dibromide (EDB), because alcohol is known to cause about three percent of human cancers resulting from cirrhosis of the liver. According to Ames, peanut butter, basil leaves, and comfrey herb tea all contain compounds at least 100 times more carcinogenic than DDT.

Ames's research, however, is contradicted by a recent report from the National Academy of Sciences (NAS). An NAS study calculated that if residue from all 28 government-sanctioned pesticides accumulated in food to the maximum amount allowed under law, even the most dangerous food (tomatoes) would, at worst, only cause 8.75 cases of cancer for every 10,000 Americans exposed over a lifetime.

Hammond argues that both Ames's research and the NAS report have too many flaws to be absolutely reliable. Ames's data, for example, is derived from experiments with laboratory rodents, yet "no one knows how well such data predict a chemical's effect on humans." The Food and Drug Administration (FDA) only checks a small number of food samples for pesticides; in 1982, for example, the FDA checked 14 oranges from the two billion pounds sold in the United States that year.

"The real risks from pesticides," Hammond concludes, "are probably not very high." At worst, pesticides might cause 20,000 cancers a year, one-sixth the number caused by smoking. While the cancer-causing threat of pesticides is not great, he argues, it is still "probably more than negligible," and the Environmental Protection Agency should enact tougher standards, aimed at reducing the risk from pesticide residue to no more than one additional cancer case per million people per year.

ARTS & LETTERS

Decaying Art

"The Trouble With Modern Art" by Catherine Barnett, in *Art and Antiques* (Oct. 1987), 89 Fifth Ave., New York, N.Y. 10003.

Most 20th-century painters and sculptors have rebelled against the conventions of the past. This rebellion, says Barnett, *Art and Antiques* senior editor, has led artists to use such unconventional materials as cigarette ashes, yogurt, chocolate, and live crickets as part of their paintings or sculptures. One result: works of art that are difficult to preserve.

"Cheap materials, odd combinations, and untested techniques," Barnett says, "have caused many of the masterpieces of modern art to alter irrevocably."