
RESOURCES & ENVIRONMENT

is the pollution that it produces. The plants tend to spew toxins (e.g., lead, dioxin, hydrogen chloride gas) into the air, especially when burning plastics and metals. Yet equipping incinerator flues with scrubbers, "baghouses" (fabric filter systems), and "electrostatic precipitators" (which capture metal particles from the smoke), as the Japanese have done, can cut the pollution by as much as 95 percent.

Hershkowitz has little doubt that a carefully regulated waste-to-energy effort could be a boon to a majority of U.S. communities. What is lacking today in the United States, he says, is not the necessary technology, but a commitment to a changeover in disposal systems.

Calculating Risks

"Environmental Epidemiology: Separating Politics and Science" by Michael Gough, in *Issues In Science And Technology* (Summer 1987), The National Academy of Sciences, 2101 Constitution Ave. N.W., Washington, D.C. 20418.

Proving a "cause-and-effect" relationship between low-level exposure to a hazardous substance and adverse health effects is a difficult task.

Cancer and birth defects are common among human beings. Only 30 chemicals have been shown to cause cancer in humans. In fact, none of the agents classified as carcinogenic to humans by the World Health Organization have been shown to cause cancer at low levels of exposure.

This presents a problem for the courts, says Gough, project manager at Environ Corp., a Washington D.C.-based consulting firm. When individuals who have been exposed to a hazardous substance become ill or produce a child with birth defects, they often sue for damages. But in order to grant compensation, U.S. courts require "proof" that a given substance has directly harmed a person. When no proof exists, the courts turn to epidemiological studies to determine the likelihood that the person was injured by low-level exposure to the substance.

Yet such studies are often unreliable, Gough contends. One cannot always distinguish "exposed" and "nonexposed" individuals, or determine their degree of exposure. While many veterans of the Vietnam War have sought compensation from the Veterans Administration for "health effects" (e.g., cancer, nervous disorders) due to exposure to the herbicide Agent Orange, no study so far has linked such exposure to any one disease. Two of Agent Orange's ingredients—dioxin and 2, 4, 5-T—do cause tumors and birth defects in animals. Yet in humans, epidemiological studies have related dioxin only to chloracne, a skin rash, and 2, 4, 5-T to soft tissue sarcomas and lymphomas. A study of the 1,200 Air Force participants in Operation Ranch Hand, who sprayed 90 percent of the Agent Orange used in Vietnam, found no significant evidence of adverse health effects due to Agent Orange exposure.

Although studies by the National Research Council of 46,000 veterans exposed to radiation during two atomic bomb tests in the 1950s turned up evidence of an above-average rate of leukemia, the increase in cancer levels was so small that the Office of Technology Assessment concluded that even a large-scale survey of all 220,000 atomic test veterans would not produce reliable results.

RESOURCES & ENVIRONMENT

"If we are to avoid spending increasing time and resources on futile searches for health effects from environmental exposures," Gough concludes, "we must realize when science cannot reveal all of the answers—and when the answer instead lies in the political sphere."

ARTS & LETTERS

Benton's Politics

"Thomas Hart Benton: A Politician in Art" by Elizabeth Broun, in *Smithsonian Studies in American Art* (Spring 1987), 16-00 Pollitt Dr., Fair Lawn, N.J. 07410.

Missouri-born Thomas Hart Benton (1889-1975) had a political heritage, being son of a congressman and grandnephew of one of the leading Democratic politicians of the 1850s. Broun, chief curator of the Smithsonian's National Museum of American Art, argues that Benton's many murals and illustrations were "the painterly equivalent of the country stump speeches that were a Benton family tradition."

Benton's interest in politics began after World War I, when he reacted against his art school training, which held that the only acceptable subjects to paint were "napkins and vegetables." *The American Historical Epic*



Palisades, one of 10 works in Benton's first important series, *The American Historical Epic*. Begun in 1919, it celebrated "people," not "great men."