Environmental disaster area: A witches' brew of long-buried chemicals turns the Love Canal district into a ghost town

The Chemicals Around Us

Everyone calls it Love Canal, a small neighborhood of several hundred people living in modest Cape Cod-style homes just 8 miles from the roaring splendor of Niagara Falls. But last week it was fast becoming a ghost town—an environmental disaster area fallen victim to a witches' brew of toxic chemicals that had been buried there over 30 years ago. More than 40 families abandoned their homes on 97th and 99th streets, setting up temporary quarters in an Air Force barracks nearby. Mothers and children lined up at the local school to take blood tests. Gov. Hugh Carey, in an election-year tour, promised the residents that New York would relocate them and buy up their now worthless homes. And Jimmy Carter, promising $4 million to match the state's aid, declared Love Canal a Federal emergency area.

It was an emergency that built slowly. For as long as 23 years starting in the 1930s, the Hooker Chemicals and Plastics Corp. put tons of chemical wastes in metal drums and buried them in a muddy ditch. In 1953, Hooker deeded the dump to the Niagara Falls board of education, which filled it in, built a school and let developers put up scores of homes. Everything seemed fine until the mid-1970s, when heavy rains began flushing out the chemicals. Suddenly a stench was everywhere. Trees turned black. Children would throw rocks against the pavement and watch them ignite and flash bright colors. Dogs sniffing in the landfill developed nose lesions that never healed. And when children ran across the site, the oozing slime burned holes in their sneakers.

TRAGIC COINCIDENCE?

More tragically, several children were born with birth defects. On 99th Street between Frontier and Colvin, people wondered whether it was a coincidence that four mentally retarded children were born to families on one block. "My daughter has already had three operations [for a defective ear]," says Tim Schroeder, 37, who works for a concrete company. "She's scheduled to have three more." Pregnant women miscarried at a rate 50 per cent higher than normal, and people complained of liver ailments and nervous disorders. In all, scientists have identified 82 chemical compounds at the site—eleven of them known or suspected carcinogens. "What I want to know," says Robert Neubauer, a laborer who took two separate yearlong layoffs because of a nervous disorder, "is just what the chemicals have done to my kids."

There is no answer. The only certainty is that the people of Love Canal are simply the latest victims of a burgeoning menace to technologically sophisticated man—toxic chemicals. In a grim update of the Faustian legend, the products and by-products of industrial efforts to improve consumers' standards of living are threatening those same people with disease and death. Chemicals vital to packaging, paints, perfumes, plastics and preservatives are causing ailments that range from headaches and skin rashes to sterility and cancer. "There are ticking time bombs all over," cautions Steffen Plehn of the Environmental Protection Agency. "We just don't know how many potential Love Canals there are."

Scarcely a month goes by without some frightening reminder of the chemical plague. Last week, toxicologists at the Massachusetts Institute of Technology reported that nitrites, additives that protect consumers of bacon and other cured

Al Kamuda—Detroit Free Press

No place to hide: PBB-contaminated cattle interred in Michigan

meats from botulism poisoning, produced cancer in the lymph nodes of 13 per cent of the animals in an experiment. The study, according to an immediate government statement, "leads us to the concern that nitrites may increase the incidence of cancer." Two months ago, a researcher reported significant chromosome damage among Dow Chemical Co. workers exposed to amounts of benzene that were thought well within safety limits. In May, the EPA warned cities that a chemical component of a mortar regularly used to repair tunnels and sewers had apparently caused nerve damage among workers who produced it. And freight-train derailments threaten thousands of people with explosions and toxic fumes from such substances as chlorine and vinyl chloride.

Chemically caused illness itself is as old as the industrial revolution, and even the most fervent environmentalists concede that today's risks don't match those of a century ago. Then, hundreds of residents of factory towns died early from tuberculosis, pleurisy and other ailments aggravated by exposure to the smoke that belched out of tall chimneys and the effluents dumped untreated into waterways. Today, points out Dr. David P. Rall, director of the National Institute of Environmental Health Sciences, "most of us live to be 65, so we're obviously not going around in a poisonous cloud."

INVISIBLE TOXINS

Yet today's toxins act more insidiously. They are invisible and often scarcely detectable. In one case, exposure to less than one ten-thousandth of an ounce of *dioxin, an impurity caused in the manu*facturing process for certain pesticides, led to disfiguring skin lesions. The modern poisons are generally widespread and long-lasting. Polychlorinated biphenyls (PCB's), which can cause a variety of illnesses from nausea and dizziness to liver disease, have been detected in mothers' milk. A single sniff of carbon tetrachloride, a carcinogen once used widely in dry cleaning, can be traced on the breath for a full year.

Most disturbing of all, many chemical hazards do not produce recognizable symptoms for years. Bladder cancer touched off by *benzidine*, a *component* of hundreds of dyes, may not be diagnosed until 30 years after exposure. These long latency periods have led epidemiologists to forecast a surge sometime soon in illnesses stemming from the post-World War II industrial buildup, during which large numbers of new and now suspect chemicals were produced in bulk for the first time. Some ecologists fear that the enormous production of dangerous chemicals is overwhelming nature's ability to cleanse itself. "We are reducing the capacity of the planet to *support man*," warns *Thomas Lovejoy of* the World Wildlife Fund.

TIME BOMBS

Such gloom is not universal. "The alleged impact of chemicals on health has been exaggerated in a negative way," claims Elizabeth Whelan of the American Council on Science and Health, a nonprofit organization formed in March to "combat the chemical phobia rampant across the country." Certainly the scare can be attributed in part to improved methods of detecting toxins and linking them to specific ailments.

But there is no doubt that chemical time bombs are ticking away in the environment—and that locating all of them, let alone disarming them, will prove all but impossible. "There are an awful lot of chemicals out there that we know very little about," concedes EPA administrator Douglas Costle. "Not all are toxic, but certain of them have toxic properties. We don't know where they are. We don't know in what quantities."

At present it is almost impossible for experts to assess the risks even for industrial workers who come into contact daily with dangerous compounds, let alone the threat to the public. "Unless the effect is overwhelming, you won't notice it," explains epidemiologist Sherry Selevan of the National Institute for Occupational Safety and Health. The relatively small number of current human-exposure studies have not yet run long enough to produce any conclusive results, while extrapolation of animal tests to human beings remains an arcane and controversial art—thalidomide, after all, seemed safe enough in hamsters.

The danger is sufficiently clear, however, to spur a Federal effort to clean up the compounds. The 1977 Toxic Substances Control Act requires corporations to provide the government with experimental data indicating the likely effects on people of all new chemicals that they plan to market. Further, the EPA can ban or greatly restrict use of any chemical now in circulation that poses a high risk to the public. In effect, the government can now regard chemicals as guilty until proven innocent.

Derailed tank car in Ohio: 300 people evacuated

But implementing the act is extraordinarily difficult. So far, the EPA has tackled only two compounds—PCB's and the chlorofluorocarbons that power certain aerosols—and environmentalists are angry. "It's like pulling teeth to get them to move in any direction on anything," complains Jacqueline Warren of the Environmental Defense Fund. The EPA defends its deliberate approach as inevitable. "With jurisdiction over as many as 70,000 chemical substances manufactured or processed in up to 115,000 establishments nationwide, our mandate ... will not be achieved overnight," testified Steven Jellinek, EPA's assistant administrator for toxic substances.

MORE PRECAUTIONS

Even without direct government prodding, private industry is taking more precautions. In 1974, the B.F. Goodrich Co. announced that exposure to vinyl chloride monomer, a substance produced during the manufacture of polyvinyl chloride plastic, could induce a rare type of liver cancer known as angiosarcoma twenty years later. "Our thought process has been reordered since vinyl chloride," admits Monsanto Co. vice president Monte C. Throdahl. "We're studying everything as if it were a potential carcinogen."

That is a tall order. About 1,000 new compounds are introduced to the U.S. market each year, adding to the 70,000 already in circulation. So far, 26 chemicals have been indisputably linked with cancer in human beings, hundreds more have been pegged as carcinogenic to animals, and even greater numbers are thought to cause other types of harm to man and beast. To complicate matters further, poisonous chemicals can act in concert. Smokers exposed to asbestos dust, for example, are eight times as likely to incur lung cancer as asbestos workers who do not smoke. "We do not encounter toxins singly in real life," says Dr. Irving Selikoff of New York's Mount Sinai Hospital. "The fact is, the agents interact."

Toxic chemicals appear in a multitude of guises. A few examples:

- **ASBESTOS.** Probably the most ubiquitous of all hazardous substances, this mineral is suspected as a cause of lung cancer, gastrointestinal cancer and a rare type of lung tumor called *mesothelioma*. More than 800,000 tons of asbestos are used annually in the U.S. to manufacture at least 3,000 products, ranging from floor tiles to automobile brake linings. Beer, gin and medications passed through asbestos filters during their production. In one survey, Arthur Langer of Mount Sinai found traces of the compound in every one of 130 cadavers that he examined.
- **CADMIUM.** This metal can cause kidney disease, bone embrittlement and an intensely painful neuralgic affliction of the joints named by the Japanese *itai itai* (ouch ouch). Because of its wide use in plating processes and batteries, cadmium permeates the environment; when it is smelted, the vapors slip into the atmosphere. According to Swedish researchers, the amounts of cadmium in adults in industrial nations are already approaching danger levels.
- **TRIS (2,3-dibromopropyl) PHOSPHATE.** Known commonly as tris, this chemical flame retardant was banned from use in children's nightwear in early 1977 after tests showed it to be carcinogenic. Earlier this month, a House panel warned that not even repeated washings would make tris-treated garments safe.
- **MERCURY.** A basic component of batteries and paints, this liquid metal attacks the nervous system, causing mental retardation and often death. When released into waterways it finds its way into fish, and subsequently into people who consume the fish. Hundreds of Japanese died from mercury poisoning in the

Dead dog and child with skin disease in Seveso, Italy: The full effects of the disaster are not yet clear

notorious Minamata disaster during the 1950s, which was caused by industrial release of mercury wastes into the water, and thousands of others suffered paralysis and brain damage.

These dangers seem only dimly perceived by the public until a disaster occurs. In July 1976, an explosion at the Icmesa chemical plant in the Italian town of Seveso spread a blanket of dioxin around the region. Within a few days, pets and other animals were dying in the streets, and humans were complaining of skin rashes, itching, vomiting and diarrhea. No human deaths in Seveso have been blamed directly on dioxin poisoning, but scientists caution that the full effects are not apparent until three years after initial exposure. And deaths attributable to sclerosis of the liver, a condition probably exacerbated by dioxin, doubled in the area between 1976 and 1977.

Such frightening events are not restricted to factory towns. In 1973, a worker at the Michigan Farm Bureau Services, Inc., accidentally mixed the fire retardant polybrominated biphenyl (PBB) into a batch of animal feed. That set off a chain of contamination that has resulted in the destruction of 30,000 cattle and 150,000 chickens. At least traces of PBB may have infiltrated the bodies of most of Michigan's nearly 9 million residents.

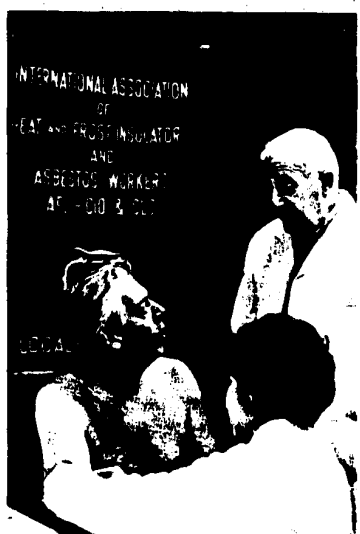
KEPONE POISONING

Extreme contamination does not necessarily result from a single incident. For sixteen months, Life Science Products Co., a Hopewell, Va., subcontractor for Allied Chemical Corp., manufactured a chemical pesticide named Kepone. Workers claim executives never warned them the chemical was highly toxic. A series of on-the-job illnesses raised suspicions, and in July 1975, the plant closed. More than 70 people have since been identified as victims of Kepone poisoning, and 29 were hospitalized. Their symptoms include tremors, liver damage, and in one case, sterility. Two children of a Life Science employee have also been contaminated by the chemical through contact with their father. And vast tracts of the James River and the seafood-rich mouth of the Chesapeake Bay have been declared off-limits to fishing because they are tainted.

As a result, Allied Chemical pleaded no contest to 940 misdemeanor charges of violating antipollution laws, and was fined $13.2 million. The fine was reduced to $5 million after Allied agreed to establish an $8 million environmental endowment fund for Virginia and to contribute $5.2 million to help clean up the Kepone. Life Science Products was convicted on 153 counts and fined $3.8 million, and its president and vice president were convicted, fined $25,000 apiece, and placed on probation for five years. Critics were not satisfied. "The economic incentive for using these compounds," charges Dr. Irma West of California's Department of Health, "is so much greater than the incentive to protect the worker and the public."

WARNING SIGNS

Companies that manufacture or use chemicals have frequently been accused of ignoring warning signs of chemical danger. In the '50s, for example, experts at the Dow Chemical Co. spotted potential health hazards in chloromethyl ether, a key ingredient of certain plastics. Dow limited its employees' exposure to the toxic compound. But other companies did not follow its lead and, as a result, say Federal health officials, dozens of plastics workers needlessly contracted lung cancer.



Tony Ratto—Newsweek

Test for asbestos poisoning: A long fuse

Even when they are interpreted correctly, warning signs do not necessarily remove risk. "All our statutory authority is cast in the language of risk-benefit analysis," explains EPA administrator Costle. "You go out and assess the risks, and you weigh them in making a judgment against the benefits of having a particular chemical . . . The use of the word 'judgment' implies that you will make a call on which reasonable men differ." There are plenty of opportunities to differ. Scientists from industry and government dispute with environmentalists such basic issues as the validity of animal tests for humans or the relationship between public benefits and public risks.

Tests on animals face two major objections: the effects of chemicals on lab animals' bodies may be quite different from those on humans, as in the tragic thalidomide case; and the doses of chemicals fed to laboratory animals are often much higher than humans would ever encounter. This latter issue arose spectacularly last year when the Food and Drug Administration announced that it would ban saccharin because the artificial sweetener caused bladder cancer in experiments with rats. Politicians, industrialists and frustrated dieters alike protested that the amount of saccharin given to the rats was equivalent to human consumption of hundreds of cans of diet soft drinks daily. Such an amount of any substance, the critics charged, would produce cancer. Researchers disagree: thousands of chemicals do not cause cancer or any other ailment, whatever the dose. Thus, they believe if a small number of animals fed gross quantities of a suspect chemical get sick, there is potential risk to at least some people who consume only small quantities of the same substance.

DIFFICULT CHOICE

In some cases, it might be more dangerous to do without toxic chemicals. If asbestos were banned from brake linings, for instance, less efficient substitutes might lead to more automobile deaths. Sometimes there seems to be no answer. In 1972, the Federal government ordered that all children's sleepwear be made flame retardant. Five years later, the Consumer Product Safety Commission announced a ban on tris, the most widely used retardant, because animal tests showed it to be carcinogenic. Another product, Fyrol FR-2, was substituted. Now the Environmental Defense Fund wants manufacturers to put warning labels on Fyrol FR-2, on the ground that it may also cause cancer.

Protecting people from' kille chemicals is an extraordinarily complex task. Most of the suspect compounds play some role, direct or indirect, in increasing human comfort. They can be neither ignored nor banned altogether. No one has offered a convincing compromise. "We look back on the Middle Ages, and we say, 'No wonder they had bubonic plague—they used to throw their garbage in the streets', muses EPA administrator Costle. "Now I just hope that in the year 2025 my grandchildren don't look back on this generation and say, 'No wonder they had problems—look at all the chemical just carelessly introduced into the environment, uncontrolled'."

—PETER GWYNNE with MARK WHITAKER in Niagara Falls, ELAINE SHANNON and MARY HAGER in Washington, SHARON BEGLEY in New York and Bureau reports