

COVER STORY

The Poisoning of America

Belatedly, the campaign begins to control hazardous chemical wastes

In the last 200 years, and with staggering acceleration in the last 25, the power, extent and depth of man's interventions in the natural order seem to presage a revolutionary new epoch in human history, perhaps the most revolutionary the mind can conceive. Men seem, on a planetary scale, to be substituting the controlled for the uncontrolled, the fabricated for the unworked, the planned for the random. And they are doing so with a speed and depth of intervention unknown in any previous age of human history.

—Barbara Ward and René Dubos,
Only One Earth

Of all of man's interventions in the natural order, none is accelerating quite so alarmingly as the creation of chemical compounds. Through their genius, modern alchemists brew as many as 1,000 new concoctions each year in the U.S. alone. At last count, nearly 50,000 chemicals were on the market. Many have been an undeniable boon to mankind, mitigating pain and disease, prolonging life for millions and expanding the economy in myriad ways by stimulating the creation of new products. There is, however, a price to pay for an industrial society that has come to rely so heavily on chemicals: almost 35,000 of those used in the U.S. are classified by the federal Environmental Protection Agency (EPA) as being either definitely or potentially hazardous to human health. Although cause-and-effect relationships between many chemicals and specific illnesses are still difficult to prove, the danger is clearly growing. Long concerned about the more familiar pollution problems of nuclear wastes, dirty air and befouled lakes and rivers, the nation has only belatedly begun to recognize the threat of chemical wastes poisoning America's earth and—more ominously—its underground reservoirs.

Last week, sounding the most authoritative warning yet, Julius Richmond, the Surgeon General of the U.S., declared that throughout the 1980s the nation will "confront a series of environmental emergencies" posed by toxic chemicals that "are adding to the disease burden in a significant, although as yet not precisely defined, way." Said the Surgeon General's report to the Senate: "The public health risk associated with toxic chemicals is increasing, and will continue to do so until we are successful in identifying chemicals which are highly toxic and controlling the

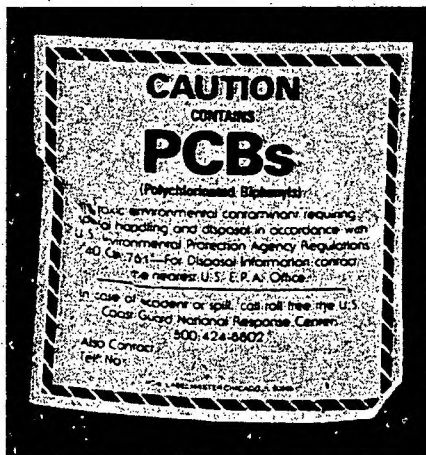
introduction of these chemicals into our environment." His report was supported by a study of 32 major chemical-contamination incidents that was conducted by the Library of Congress. The library's survey said these cases "represent the tip of an iceberg of truly unknown dimensions" and concluded that toxic chemicals "are

so long-lasting and pervasive in the environment that virtually the entire population of the nation, and indeed the world, carries some body burden of one or several of them."

Experts may debate just how bad the problem is. Robert A. Roland, president of the Chemical Manufacturers Association, attacked the Surgeon General's report for exaggerating the threat of toxic wastes. But one thing is certain: the rapid accumulation of chemical-waste products poses one of the most complex and expensive environmental control and cleanup tasks in history. Says Douglas M. Costle, administrator of the EPA: "We didn't understand that every barrel stuck into the ground was a ticking time bomb, primed to go off." Predicts Dr. Irving Selikoff, director of the Environmental Sciences Laboratory of New York City's Mount Sinai Medical School: "Toxic waste will be the major environmental and public health problem facing the U.S. in the '80s." The EPA estimates that the U.S. is generating more than 77 billion lbs. of hazardous chemical wastes a year and that only 10% are being handled in a safe manner. At least half of the wastes, says Gary N. Dietrich, an EPA official, "are just being dumped indiscriminately."

There may be no greater threat than the steady rise in the number of wells found to be contaminated by chemicals. Fully 50% of all Americans depend on ground rather than surface water for their drinking supply. Water that may have fallen to earth as long as a century ago has percolated slowly down through soil and porous rock to collect in vast underground aquifers that were virtually void of chemical and bacteriological impurities. Now substances, mostly petrochemicals thought to have been harmlessly disposed of years ago, are beginning to show up even in the deeper U.S. wells. This contamination will grow as those forgotten chemicals of the past steadily reach more of the underground reservoirs from which Americans will drink in the future.

After two years of investigation, the New York Public Interest Research Group, Inc., a respected private organization, charges that 66 companies dump nearly 10 million gal. of contaminated waste water each day into eleven municipal sewerage systems on Long Island. Since none of these systems can treat toxic wastes, claims the report, the drinking





A vivid illustration of the problems facing many communities throughout the U.S.: thousands of drums containing toxic wastes are scattered across

water for some 3 million residents is "in danger of deteriorating into a severely contaminated industrial sewer."

In a lovely wooded area of New Jersey known as the Pine Barrens, more than 100 wells have been poisoned by chemicals leaching from the 135-acre Jackson Township dump. James McCarthy, who had drunk well water for ten years, had one kidney removed in 1977, and now has trouble with the other. Tara, his daughter, died in 1975 of a kidney cancer when she was nine months old. A 16-year-old neighbor lost a kidney to cancer; another neighbor is on dialysis for kidney problems; a third also has a kidney ailment. No scientific link has been established between the chemicals and the illnesses, but, McCarthy says, "you can't tell me that all our kidney problems and the poisons in our water aren't connected."

Water supplies in 22 Massachusetts towns have been contaminated by chemicals. In Michigan, inspectors have found 300 sites where wastes have polluted ground water. Residents of some 90 homes near Muskegon now use bottled water supplied by the county. The polluted water there, says Tom Spencer, a county health official, "looks just like bock beer. It even has a head on it."

Coal-tar residues have drained into an aquifer under the metropolitan area of Minneapolis and St. Paul. While the Twin Cities draw water from the Mississippi River, many of their suburbs depend on the threatened underground supply. Near Charles City, Iowa, some deep wells 30 to 40 miles downstream from a chemical dump have shown traces

of contamination. At the waste heap, state analysts have found some 6 million lbs. of arsenic, as well as large quantities of other dangerous chemicals. Says Larry Crane, director of the Iowa department of environmental quality: "It's an organic chemists' cauldron."

Growing recognition of the menace of chemicals has produced a series of state laws that make the casual disposal of wastes a criminal offense. Under a 1979 New Jersey statute, for example, offenders can be fined up to \$50,000 a

day for every day they leave wastes unprotected and may get jail sentences of up to ten years. As a result of such new rules, careless dumping has been declining—until recently. The reason for the upsurge: a tough set of federal regulations that will go into effect on Nov. 19 requiring dangerous chemical wastes to be tracked "from cradle to grave"; each person or company receiving any chemical wastes on the list will have to account for what happens to them and will be held responsible if the substances are not properly handled. To beat the deadline, some companies have been taking chemical refuse they have stored on their property for months or even years and simply getting rid of the stuff as swiftly and as surreptitiously as they can, often dumping by night and running.

One day a field in Illinois was empty; a week or so later, it contained 20,000 bbl. of dumped wastes. Kentucky state police staked out a site just outside Daniel Boone National Forest, where some 200 containers loaded with dangerous solvents had been discarded. They arrested three Ohio truck drivers. Hundreds of toxic drums were found on three sites near historic Plymouth, Mass. State troopers and other authorities set up roadblocks to stop illegal dumping operations in New Hampshire, which, like the other New England states, has no legal disposal site. Declared New Hampshire acting Attorney General Gregory Smith: "We know toxic waste is being hauled through the state. We have to find out where and when."

The upcoming federal regulations and new state laws will surely help, but what



Storing chemicals in Idaho missile silo

"You don't want them near you—nor do I."

Environment

Three Mile Island because we don't really know what's down there." Six New Jersey men, including Russell Mahler, president of Hudson Oil Refining Corp., have been indicted in Pennsylvania on charges of illegally tossing chemicals into the shaft, thereby polluting the river.

No accurate count of all the toxic-waste dumps is possible. Many reveal themselves only when a flash flood or gradual erosion exposes rusting and cracking drums. Searching for clandestine sites, some 100 EPA agents are tracking down reports of midnight dumping, or seeking out acrid odors permeating wooded acres or strange colors staining rivers and streams. So far, the EPA estimates that there are some 50,000 sites where chemicals have been dumped. The EPA believes that 2,000 of these dumps may pose serious health hazards.

The public got an inkling of the seri-

ousness of the problem last year with the revelation of the horror that had occurred in New York's Love Canal. Contamination from a landfill laced with chemicals seeped into the area on the outskirts of Niagara Falls. A total of 1,200 houses and a school had been built near the site. Alarmed by studies of damage to the residents' health, the Federal Government finally paid for the temporary evacuation of families. At present, 710 families have been declared eligible to move, and about half have left the area. Researchers are continuing to probe the residents' high incidence of cancer, birth defects and respiratory and neurological problems.

The Love Canal story emerged gradually, but three events this year in the New York City region demonstrated suddenly and spectacularly just how heedlessly the chemical compounds have been stored. In April, residents of Elizabeth, N.J., and nearby Staten Island, N.Y.,

were jolted by explosions from a dump containing at least 50,000 chemical-filled barrels. The blasts rattled windows in Manhattan skyscrapers ten miles away. On July 4, an industrial-paint-manufacturing company that stored chemical wastes in its backyard flamed into a four-alarm blaze that spread toxic fumes over the city of Carlstadt, N.J. Three days later, storage drums at a chemical disposal plant in Perth Amboy, N.J., erupted in a barrage of explosions and a roaring fire that wiped out seven buildings and 16 businesses in an industrial park. Nearby residences were evacuated for several hours because no one knew how toxic the spreading smoke might be.

After the Love Canal and New Jersey headlines, an ABC News-Harris poll found that 76% of those surveyed consider the dumping of toxic chemicals "a very serious problem," and despite a growing antagonism toward Government

The Toxicity Connection

During the Viet Nam War, Air Force planes sprayed the dioxin-laced defoliant Agent Orange on dense jungles to strip the ground of cover. American soldiers got sprayed too, and now thousands of veterans are sure that the exposure has caused them skin rashes, neurological disorders, cancer and birth defects in their offspring. Residents of the Love Canal area of Niagara Falls, N.Y., are no less distressed. They are convinced that the toxic wastes buried there have led to nerve damage, miscarriages and other ailments, including mental retardation among their children. Says Housewife Cynthia Bassett: "It's as if we're all mutants."

If contemporary toxicologists were to conjure up a cause-and-effect grammar for lethal chemicals, asbestos would stand for lung cancer, benzene for leukemia, Kepone for sterility, vinyl chloride for cancer of the liver. The links between these chemicals and certain ailments are now clearly limned, in medical circles as well as in popular mythology. But the connections with diseases for other substances are merely suspicions and likely to remain so for a long time.

The dismaying fact is that while toxic chemicals unquestionably affect human health, there is usually no way of knowing who will become ill in any given population or what ailments will be caused by the exposure. Scientists might be able to find out by giving selected people precise amounts of chemicals for specific lengths of time and comparing these human guinea pigs with a control group that has not been exposed. But such experiments would raise proper howls of indignation. So the disease detectives must rely on less direct methods.

One alternative approach is to expose laboratory animals or even individual cells to chemicals. Often such experiments will produce unwelcome changes—say, mutations in bacteria or bladder cancer in rats (as was the case with the animals fed huge amounts of saccharin). But what causes problems in one species may not be dangerous to another. In Michigan, researchers found that cows that licked barn wood treated with the preservative pentachlorophenol were starving to death. It turned out, explains Jerry Hook of

Michigan State University's new Center for Environmental Toxicology, that "this substance is toxic to the bacteria in the cow rumen." Such toxicity did not show up in tests with rats.

Another strategy is to study groups of people who have been exposed to specific chemicals, either on the job or in accidents. By this means, scientists have established some cause-and-effect links—for example, between prolonged inhalation of asbestos particles and mesothelioma (cancer of the lining of the chest or abdomen). But often the results of such epidemiological studies are not entirely convincing. The problem: scientists must trace effect back to probable cause rather than identifying cause and looking for effects. Says Dr. Irving Selikoff, of Manhattan's Mount Sinai Medical Center, who established the asbestos-cancer connection: "You're always working backward in this field."

Researchers are also confronted with the task of isolating the factors that might have contributed to an illness. The chemical dioxin can produce the skin condition chloracne, but allergies and plants produce conditions with similar symptoms. Benzene can cause leukemia, but so does radiation. Many diseases take a long time to show up. Workers exposed to vinyl chloride at a B.F. Goodrich plant in Louisville did not develop angiosarcoma, a rare form of liver cancer, until 15 to 20 years later. Says Selikoff: "There is no classic set of symptoms for chemical diseases."

Still another difficulty is that chemicals may behave totally unpredictably. Some act synergistically—one enhancing the toxicity of another. By contrast, others interfere with one another. Michigan researchers have found that both polybrominated biphenyls (PCBs) and dioxin seem to prevent kidney damage from chloroform, but they are hardly beneficial. Another problem for the researcher: determining the level, or threshold, at which a chemical will begin to do its damage.

Faced with all these uncertainties, scientists are understandably cautious. Says Hook: "We know that ingesting these things is probably not good for you. At the same time we should not go shooting our mouths off and scare everyone." Still, few scientists would disagree with Selikoff when he urges an immediate cleanup of the chemical mess. Says Selikoff: "We're fouling our own nest, and we can't survive if we continue."



Selikoff: seeking the link

Environment

regulation, 93.6% wanted "federal standards prohibiting such dumping made much more strict than they are now." Is the public unduly alarmed? Federal officials charged with enforcing the long-inadequate laws against unsafe disposal practices do not think so. Declares Dale Bryson, an EPA deputy chief in the Midwest: "Every time we go into these cases, we find it's worse than we thought." Some Dantesque examples:

ELIZABETH, N.J.

On a small peninsula between New Jersey and Staten Island, the charred remains of what had been a collection of about 50,000 drums, some stacked four high, adjoin a brick-and-steel building once owned by the now bankrupt Chemical Control Corp. The containers had

nearby Edison, N.J., the man was incinerated so quickly that he died with his hand on his gearshift. State officials have identified a horrific arsenal of chemicals at the site, including two containers of nitroglycerine; two canisters of a chemical similar in effect to mustard gas; barrels full of biological agents; cylinders of phosgene and pyrophoric gases, which are so volatile they ignite when exposed to air; wastes contaminated by lead, mercury and arsenic; plus a variety of solvents, pesticides, plasticizers, including dangerous vinyl chloride and even picric acid, which has more explosive power than TNT.

Toxic wastes are trucked to New Jersey's single licensed toxic-waste incinerator in Logan Township, where the chemicals are burned at more than 5000° F. After months of work, an 80-man crew

"We don't have any choice about cleaning this place up," says Jerry English, a lawyer who heads New Jersey's department of environmental protection. "We simply cannot allow a situation like this to continue." Wearing a white vinyl coverall over her fashionable suit, yellow plastic booties over her high-heeled shoes, a respirator and protective gloves, English recently climbed on a rooftop and looked out over the sea of barrels. She broke into a wry laugh, grandly swept an arm toward the rubble and declared, "Some day, my son, this will all be yours."

SEYMOUR, IND.

A neat stone wall graces the entrance to Freeman Field Industrial Park in the otherwise rustic small town of Seymour (pop. 13,100), about 70 miles southeast of Indianapolis. But in the park, there is a dry, mud-caked ditch, and the trees along its banks are dead. Inside a wire fence, an acrid scent brings tears to visitors' eyes. Some of the tidily stacked barrels bear household names: General Electric, Dow Chemical, Shell Oil, Monsanto. Paint sludges collect in sticky red and green pools on the porous ground, and such chemicals as arsenic, benzene, toluene, trichloroethylene and naphthalene ooze from rusty barrels. Near by, two former dairy trucks, one still bearing the faded invitation DRINK REFRESHING MILK, contain dangerous chemical wastes.

Over a period of twelve years, some 60,000 drums of waste were heaped on this site by Seymour Recycling Corp., which, like Chemical Control Corp., contracted with its corporate clients to get rid of their wastes safely. After the company failed to comply with a state order to dispose of the chemicals, a court appointed a custodian: William Vance, an easygoing small-town lawyer and president of the Jackson County Bar Association. He inherited the mess in February. Says he: "Like most of the citizenry, I wasn't that concerned before—but I am now."

In March, hydrogen gas began rising from a shed on the property where 25 badly corroded drums of chlorosilane had been stored next to 100 bbl. of flammable solvents. Rain soaking the chlorosilane created a smoky chemical reaction. Fear of an explosion caused city officials to order the area vacated for several hours. Says Vance: "We had a 13-acre keg of dynamite." Firemen rushed to separate the drums. Now, Vance frets, "every time we have a thunderstorm I think, 'My God, don't let lightning hit out there!'"

Vance is even more concerned about the future. He fears that the ground water beneath the sandy soil has been polluted, and this will show up later in wells. "It's a perfect setup," he says. "We think what they did with some of the chemicals was just pour 'em out on the ground. Glub, glub, glub." When state and local officials failed to get results, the federal EPA declared a water emergency and took over the cleanup chore. So far, it has spent



New Hampshire state police stopping truckers to check for illegal loads of toxic wastes

"We didn't understand that every barrel stuck into the ground was a ticking time bomb."

been left to rot for nearly a decade. Many of the drums had never been properly labeled; others were so seared by the explosive fire in April that neither the manufacturer nor the nature of the chemicals they contain can be determined from outside markings. Some barrels are leaking unidentified chemicals into the ground. Unknown wastes seep into an adjacent stream called the Arthur Kill and eventually ooze into the Hudson River. A huge tank holds a fluid laced with 4,000 parts per million of PCB, a chemical that has been linked to birth defects and nervous disorders. Explains George Weiss, coordinator of the cleanup from New Jersey's department of environmental protection: "No one knows what to do with that. No one even knows if we can touch it."

Wearing a respirator and a suit like an astronaut's to seal out fumes, the operator of a front-loader cautiously picks up one drum at a time. He is well aware of the fate of a bulldozer driver who hit a container of flammable phosphorus at a landfill in

has removed all but 700 drums from the site. Once the barrels are all gone, metal detectors and aerial photography will be used to uncover evidence of any additional buried wastes. The contaminated topsoil must be hauled away. Probing for possible poisoning of the underlying water will come later.

How was the mess created? Chemical Control Corp. had signed contracts with some of the state's chemical companies and factories to dispose of their wastes. The company was supposed to solidify nontoxic materials for safe burial in landfills and detoxify the poisonous chemicals for similar disposal. Instead, the corporation just stacked the drums out back. Reacting to the fears of Elizabeth residents, state officials seized the site in March 1978 and began the slow cleanup. The companies, whose barrels were clearly labeled, included the 3M Co. and Union Carbide; the firms had no legal obligation to retrieve their drums but promptly did so when notified by the state.

nearly \$1 million and estimates that complete removal of all hazardous wastes at the site could cost more than \$12 million. "They couldn't have located that dump in a worse place," says Roland Kasting, a farmer who lives near by. "There's a vast underground reservoir right underneath us. There have to be laws on this chemical waste. It's going to get worse and worse—it's going to be everywhere."

MONTAGUE, MICH.

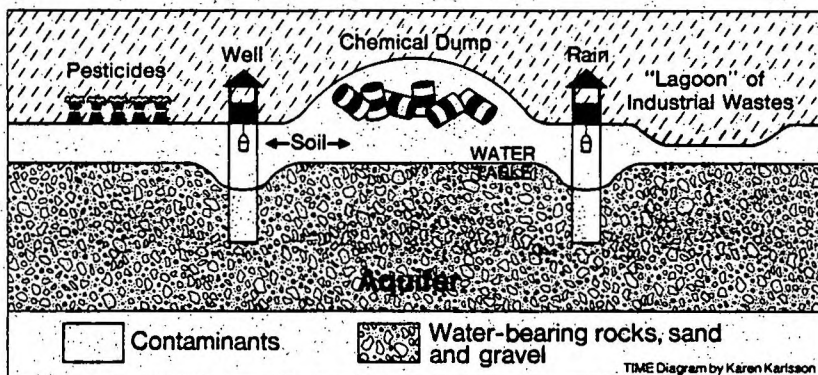
It took years of local agitation and a lawsuit filed by the State of Michigan, but something now is being done by Hooker Chemical Corp. (which also left contamination at Love Canal) to help dispose of some 1.2 million cu. yds. of chemical waste, drums and contaminated soil on its 880 acres of property on the edge of Montague. The cleanup may be too late to satisfy many residents in the community, a small town (pop. 2,396) of gracious, shaded houses along the shores of White Lake. State water officials estimate that some 20 billion gal. of ground water have been laced with deadly chemical wastes in an underground flow of contamination that is half a mile wide and more than a mile long. Moreover, each heavy rainfall propels some 800 lbs. of chemical residues daily into the lake, which, in turn, drains into Lake Michigan.

Children used to play in the dump behind the Hooker plant, where rusting drums sometimes leaked a tarry substance as sticky as soft asphalt. The site still contains at least 100 different compounds, many produced by spontaneous reactions among the discarded chemicals. They include hexachlorocyclopentadiene, more conveniently known as C-56. Toxicologists have found a C-56 derivative in the flesh of White Lake fish.

As a result of a lawsuit filed by the state, Hooker agreed to build a huge vault to contain its wastes. It has dug a hole 18 ft. deep and 300 yds. long. The bottom and sides of the excavation were formed of coarse beach sand, which would have allowed chemicals to filter down to the aquifer lying 80 ft. or less below the surface. Therefore, Hooker is lining the vault with 10-ft.-thick walls of compacted clay. The vault will rise five stories into the air. "A monument to stupidity," snorts Marion Dawson, a leader in the long fight to force Hooker to clean up its act.

Hooker officials do not deny their mistakes, though they rightly point out that they were made before the hazards were fully understood. The company is spending some \$15 million to correct the problems, including sinking a series of "purge" wells designed to draw water from the aquifer, decontaminate it and pipe it back into the ground. Hooker has also built a \$100,000 pipeline to carry uncontaminated city water to houses on Blueberry Ridge, where wells are threatened. In addition, the company is paying the monthly water bills of these residents.

Says Ken Hall, the Hooker official



Deep Concern: Ground Water

At the very top of the environmental scientists' list of concerns about pollution damage is something that most Americans probably believe to be safely beyond the reach of contamination: ground water. This is water that lies buried from a few feet to a half mile or more beneath the land's surface in stretches of permeable rock, sand and gravel known as aquifers. In the U.S. there is five times as much water in such subterranean reservoirs as flows through all its surface lakes, streams and rivers in a year. While most ground water is believed to remain pure, concern is rising because it is one of nature's greatest nonrenewable resources. Unlike surface water or the air, ground water is all but impossible to purify once it has become chemically polluted.

Ground water is not exposed to the natural purification systems that recycle and cleanse surface water; there is no sunlight, for example, to evaporate it and thereby remove salts and other minerals and chemicals. Nor can ground water be counted upon to clean itself as it moves through the earth, for it scarcely "flows" at all. Says Eckardt C. Beck, the EPA's assistant administrator for water and waste management: "Ground water can take a human lifetime just to traverse a mile. Once it becomes polluted, the contamination can last for decades."

In the past, ground water was kept pure because the soil at the earth's surface could be counted on to act as a filtration system, a kind of geological "kidney" that would scrub out bacteria and other insoluble contaminants placed on or in the ground before they could seep down to the water table, the ground water's upper limit. But this filtration system does not reliably screen out the waste chemicals that now leach into the soil from a variety of sources, including cropland that has been sprayed with pesticides, and industrial dumps like the pools into which liquid chemicals are placed so that the water they contain will evaporate.

The EPA has located 181,000 such "lagoons" at industrial and municipal waste disposal sites around the country. In a study of 8,200 of them, the agency found that 72% were just holes in the ground, not lined with concrete or other materials to prevent the chemicals from leaching into the soil; 700 of these unlined lagoons were within a mile of wells tapping ground water.

Bacterial wastes, such as the effluent from the nation's estimated 16.6 million residential septic tanks and cesspools, can be filtered fairly simply out of drinking water. But chemical contaminants are another matter. Says EPA Administrator Douglas Costle: "We are not even sure if, not to mention how, chemical contaminants can be removed. It takes sophisticated testing just to determine if there are chemicals present at all."



EPA Official Douglas Costle

The most serious cases of ground-water pollution confirmed so far have been in the Northeast states, where the problem is largely the result of surface dumping of industrial wastes, and in California from agricultural chemicals. But awareness of the vulnerability of ground water is still so new that EPA officials do not really know how far the fouling of the aquifers has spread. Says Costle: "We cannot even begin to say how much of our drinking water, actual or potential, may have been contaminated. We are going to be doing a lot of detective work."

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handling the cleanup: "You have to be careful about judging the 1950s by 1980s standards. I grew up thinking that if you put something in the ground it was safe. But that thinking was in error. If you don't do something about it now, you'll have an eternal problem." Indeed, much of the unsafe dumping occurred before the companies had a firm idea of how serious the waste problem was, and many disposed of material in ways they thought were safe at the time.

The chemical industry generally approves the new federal regulations that will require the tracking of all toxic chemicals to the point of final disposal. Violators can be fined up to \$25,000 a day and jailed for a year for a first offense. Says Robert A. Roland, president of the Chemical Manufacturers Association: "We don't want irresponsible disposal. This is a perfectly reasonable thing for the Federal Government to do."

The industry is more worried about the EPA's new rules requiring that only sites meeting federal standards be used. The companies are fearful that EPA standards will be so strict that an insufficient number of sites will be created. If that happens, predicts Roland, "companies will have two choices: they will either have nowhere to dump and they will close down, or they will go out and break the law." Conceding that "the EPA is between a rock and a hard place, with an enormous task to confront," Roland contends that the agency too often acts on the basis of insufficient information. The industry, for example, insists that the EPA has not carefully evaluated the hazards of various chemicals and that its regulations are needlessly complex and burdensome. Up to a point, the EPA's Costle agrees. "I know that things aren't perfect with us," he says. "But just imagine how they would be without us."

On its own, the chemical industry has set up a hazardous-waste response center in Washington, where state and local officials who are worried about an abandoned disposal site can get expert advice about how serious the threat may be and how the dump could be cleaned up. The industry has also written a model waste-disposal-siting law for the guidance of state legislatures.

Irving S. Shapiro, chairman of Du Pont, reports that his company is recycling waste material to reduce the disposal problem and keeps a watchful eye on the contractors it uses for disposal. The most critical problem, as he sees it, is to clean up widely scattered "orphan waste sites" that no one has supervised. Says he: "Let's start with today, not worry about who did what in the past. Government and industry should work together rather than get emotional. We've got to get going rather than sitting around trying to figure out who's wearing the black hat and who's wearing the white hat."

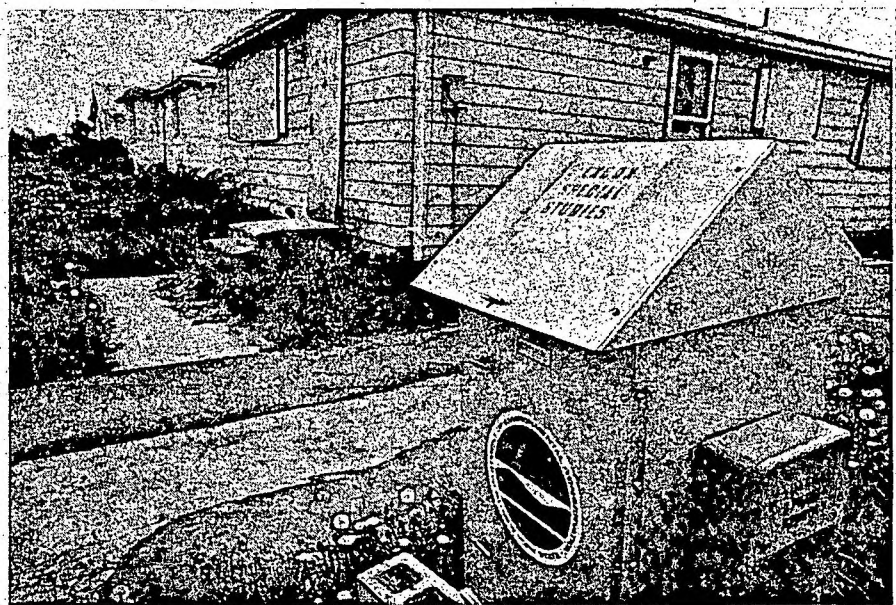
Right now there are enough safe dis-

posal facilities in the U.S., including incinerators and detoxification plants, to handle the toxic wastes, if the companies would go to the trouble and expense of using them. But as federal regulations governing the dumps become more stringent, and as the volume of wastes increases, the nation will need additional sites. Where to put them? "Everybody is in favor of safe disposal," says Costle. "They say, sure, let's have a safe landfill, but not in my town." Howard Tanner, chief of Michigan's Department of Natural Resources, goes even further. "We have technical solutions for these wastes," he says, "but we don't have social solutions. You don't want them anywhere near where you live—nor do I."

Looking for new waste sites, a private

company expects a compromise will be reached on the bill this year, possibly before Congress recesses for the November election. Even if passed, this act would be only a start. The EPA estimates the eventual cost of a national cleanup would be as much as \$22 billion.

Insists Costle: "We can't afford not to clean up. All we'd be doing would be pushing the cost over to the next generation." He notes that when the Life Science Products Co., a chemical plant in Hopewell, Va., was found to be contaminating the James River with Kepone in 1975, the source of pollution could have been cleaned up at a cost of \$250,000. The company delayed and since has paid out \$13 million in damage claims. Now, ex-



A pollution device at Love Canal monitoring the air for contaminants near boarded-up houses

A high incidence of cancer, birth defects and respiratory and neurological problems.

company has purchased obsolete Titan I missile silos in an Idaho desert. Near Grandview, three 160-ft.-deep holes, lined with 6-ft.-thick concrete walls and 13-ft.-thick concrete floors, are each being used to store some 1.5 million cu. ft. of wastes. Several European companies are using incinerator ships to burn chemical wastes at sea. Costle feels that U.S. private industry, rather than Government, should devise safe disposal techniques. Says he: "It's smarter and can do the job more efficiently than the Government."

If the future remains a problem, so does the past. The immense task of cleaning up the accumulated wastes still remains. A bill is slowly working its way through Congress to create a "superfund" to be used by the EPA to neutralize hazardous waste spills and dumps as they occur or are discovered. The legislation, now in various forms, could create a fund of up to \$4 billion in the next six years. But there are bitter fights under way over just how to split the costs between the general taxpayer and the various industries

perts estimate, it will cost at least \$2 billion to purify the river. Contends Costle: "In a misguided sense of thrift, we can save ourselves broke."

Some officials charged with protecting water supplies fear that much of the chemical damage already done to underground reservoirs is irreparable. Says New Jersey's English: "What's in the ground is there. It's too late to do anything about it." Perhaps so. Yet the growing public concern, the increasingly cooperative attitude of the chemical industry and the toughening resolve of federal and state governments reflect a new willingness of the nation to grapple with one of modern technology's least understood and potentially most insidious threats to health.

The circle must be made complete. The society that created the plethora of new chemicals that so enhanced human life must now use its scientific genius to make sure that those creations work safely for mankind.

—By Ed Magnuson.
Reported by Peter Stoler/New York and J. Madeleine Nash/Chicago