



"The Housatonic River" (1872-74), a steel engraving by A.F. Bellows in "Picturesque America, or The Land We Live In," a book edited by William Cullen Bryant.

Keeping the water clean

PCBs, developed as a wonder substance here, turned out to be an environmental disaster. But several years, and several millions of dollars later, the problems they caused are being cured.

By JUDY KATZ

WILLIAM DEVOS OF LENOX, who watered his dairy cattle about four green miles downstream from Pittsfield's General Electric Co. compound, was flabbergasted by some bad news he received in July 1970.

He had been selling milk to Sealtest in Connecticut. Sealtest told him it didn't want his milk because a routine yearly test for pesticides had revealed that it was contaminated with chemicals similar to DDT — polychlorinated biphenyls (PCBs).

DeVos was able to sell the milk — to a cooperative in West Springfield — but for 32 cents less a hundredweight than Sealtest had been paying. Massachusetts, according to Peter Griffin, head of the dairy division of the state Department of Food and Agriculture, tests milk regularly only for bacteria and antibiotics.

A feast of frog's legs from the Housatonic was once a highlight of George Hamilton's classes in the ecology of the river. But not any more, says Hamilton, who heads Berkshire Community College's environmental science department.

Last October and November, Leo Daly of the state Division of Fisheries and Wildlife turned frog samples from the river over to the Department of Environmental Quality Engineering for testing. On average, Daly said, the frogs' legs contained more than twice the five-parts-per-million maximum concentration of PCBs the federal government has set for fish.

In 1974, consultants assured Pittsfield that under-

ground natural reservoirs could provide enough good drinking water to meet the city's needs for at least 40 years. City water-supply plans were guided by that comforting news until July 1977. That was when state tests marked the whole supply with the skull-and-crossbones by turning up traces of PCBs in the ground water.

After 75 years of manufacturing operations in Pittsfield, PCBs seem to be almost the only GE fingerprints still smudged on the environment. A little more than a decade ago, a variety of GE wastes flowed into the Housatonic, Unkamet Brook and Silver Lake and escaped into the air. But a comprehensive environmental protection program the company began in 1966 — before, according to Hamilton, the general public was aware it had an environment to protect — has eliminated most of them.

PCBs are hard to scrub away. Unlike more obviously offensive wastes, such as oil, dye or odorless phenol, they do not break up and disappear. Once they escape into the environment, the sturdy molecules linger for decades, accumulating in soil and river bottoms and gradually building up in the fatty tissues of fish, birds, and, at the top of the food chain, people.

For almost 40 years, PCBs were considered miracles of chemistry. A pinch of PCBs — stable, non-flammable, non-corrosive, insoluble in water and retaining their flexibility in heat and cold — improved products ranging from adhesives to specialty papers.

GE used PCBs here from 1929 until March 1977, 27 months ahead of a deadline for their discontinuance set by the federal Toxic Substances Control Act. PCBs were a component of an insulating fluid called Pyranol — a

fluid invented here — that was used in transformers that had to be fire resistant.

The metamorphosis of PCBs from miracle to monster began in 1966. That was when a Swedish biologist discovered that, like DDT, they might be contaminating the environment. Then, in 1968, 20 Japanese died and 1,200 more became ill after cooking with oil into which large dollops of PCBs had been spilled accidentally.

Scientists soon linked small amounts of the chemical to reproductive disorders in birds and fish. Although research continues in the attempt to pinpoint how high a concentration of PCBs is required to harm people, the present consensus in the scientific community, according to ecology Professor Eugene Likens of Cornell University, is that PCBs cause mutations in humans "and, possibly, cancer."

In 1966, when the first PCB warnings were being sounded in Sweden, Pittsfield GE put a civil engineer named James H. Thayer in charge of water pollution control.

"It became clear in Pittsfield before it did in other places that there would have to be concern for the environment," Thayer says. "People here expect it. They want green grass, deer, fish. Also, there's an obvious need. The Housatonic is a very small stream."

AT TIMES OF EXTREMELY LOW water, he said, the amount of water GE discharges, about 6½ million gallons a day, is almost equal to all the water flowing in the river. "From the start, it was plain that the answer here was not dilution, but treatment."

Thayer, whose title changed in 1968 to manager of environmental protection rather than the way the War Department became the Department of Defense, is a slightly built man with a face as creased as crumpled newspaper. He approached his mission with the thoroughness of a professional, the ingenuity of an inventor, the enthusiasm of a hobbyist and, judged by his accomplishments, a sizable dash of the quality called genius.

GE Jubilee

He started by trying to inventory the contents of GE waste water and determine which substances were, or might eventually be identified as, pollutants.

That had never been done before.

The first study identified eight categories of things that needed to be controlled. At the top of the list was oil; dye, used to detect leaks in transformers, came second, and "miscellaneous organic wastes" was third. Pyranol — and the PCBs in it — ranked last, after the thermal pollution caused by spewing warmed water into the river and Silver Lake.

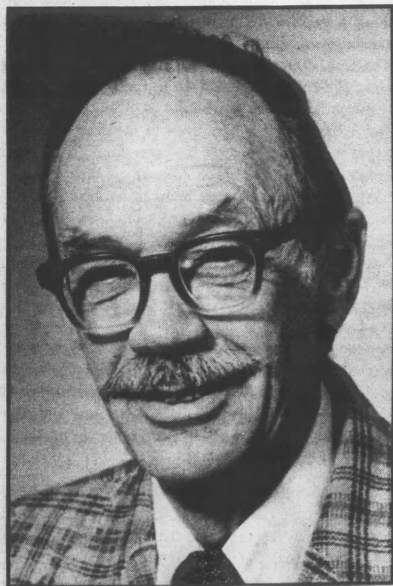
Because oil was perceived as the biggest problem, and because oil was found in waste water, Thayer set about designing a device that would separate the two.

THE FIRST SEPARATOR COST about \$50,000 to build (a fifth large separator of improved design now under construction is expected to cost \$500,000) and received the first permit given under the state's 1966 Clean Water Act. When PCB control was moved to top priority in 1970, Thayer's oil-water separators became a key tool. Given its choice of clinging to oil or water, the PCB molecules stick with oil. Removing the oil, consequently, also removes PCBs.

Thayer installed small separators and drilled wells in what GE insiders call "the PCB land mine," a field across East Street from the main GE complex saturated with contaminated oil that had soaked into the ground over the years and oozed into the river during wet weather. Pumps suck water mixed with oil out of the wells and into the separators. Purified water returns to the ground. The oil, and the PCBs it carries, fuels another of Thayer's specialized contraptions — a thermal oxidizer, the only oven capable of destroying PCBs.

The oxidizer, a multi-stage incinerator that achieves 2,000-degree temperatures and vaporizes a variety of GE wastes (and, on occasion, some DDT shipped over by the Environmental Protection Agency) has become something of a tourist attraction.

Visiting Connecticut state officials, politicians, scientists and an occasional carload of radio and newspaper reporters and editors pass through the scrubbed and dike-surrounded handling area, through a small control building, and up the metal staircase to peer through a porthole into each end of the roaring, cylindrical inferno.



James H. Thayer, manager of GE's environmental protection program here, won an Audubon Society award in 1969.

October 7, 1978

Above them, a narrow-necked stack releases pure-looking white steam. All that is left of the noxious materials fed into the oxidizer, Thayer explains, is water vapor and carbon dioxide.

It is one of only six in the country, GE boasts, capable of completely destroying chemicals that would simply spew unchanged from the stacks of less sophisticated incinerators.

Obtaining the early permits for the pollution-control gear was difficult, Thayer recalls, because the state was just forming the Division of Water Pollution Control. In that infant stage of state-level environmental awareness, there was confusion over who should sign the permit.

That early confusion worked both ways. Because each GE department is run as an independent business, each department head is responsible for controlling his department's costs and producing a profit. And William Doubleday, regional engineer with the division's office in Amherst, remembers spending four months trying to arrange a meeting at which all seven high-level executives then assigned to Pittsfield could be present. When he finally accomplished that feat, he said, "two were missing."

By mid-1968, however, Thayer was the only one Doubleday needed to see. Charles J. Meloun, then manager of the transformer division, and Richard L. Reinhart, the relations and utilities chief, took a step that Thayer says is unique in GE operations: They made Thayer environmental czar over all Pittsfield GE operations. That made the environmental protection effort at Pittsfield GE the only function that transcends normal corporate lines of responsibility. Every new process must be cleared by his office. It is that centralized authority, in Thayer's opinion, that has made the success of his program possible.

IT IS A HARD THING, he concedes, to tell a manager who is responsible for the figures on his own profit-and-loss statement that he must accept "a charge that he never had before, and a continuing one."

But assigning those charges, he said, which so far have totaled \$8 million in addition to \$4 million specifically for PCB eradication, shows that "the company has decided that environmental protection is an inseparable part of the cost of doing business."

After spending so much time and money trying to stuff the PCB genie back into the bottle — by next April, the EPA wants seepage of PCB residues into the river cut to 1.3 ounces a day — GE is taking steps to ensure that no others, as yet unsuspected, escape.

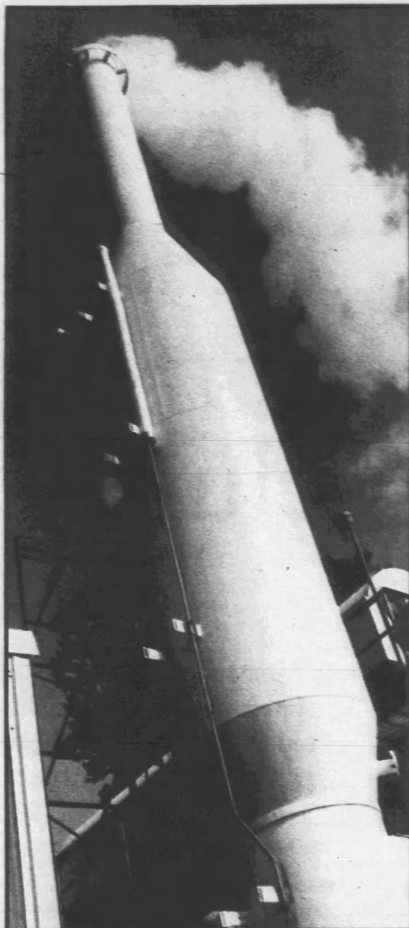
Visitors to GE's PCB-scouring operations are always impressed. Angelo Iantosca, the regional environmental engineer for the state's Department of Environmental Quality Engineering, says that "GE is doing a wonderful job with PCBs here."

GE gets more than awards and pats on the back from its complex of pollution-control devices. Under a state law, it has received \$261,000 in property tax credits from 1972 through 1978. And Thayer estimates that a phenol-recovery station saved the company more than \$1 million worth of that raw material from 1974 through 1976.

And when oil spills do occur — as they have on at least two occasions — the company has the means at hand to contain them or clean them up.

The effects of the GE pollution-control program, combined with efforts by other industries and Berkshire cities and towns, are dramatic. Doubleday recalls that he took water quality samples from the Housatonic River 25 years ago. "I think it would have dissolved your shoes," he says. Now, major stretches of the river have been judged fit for fishing or swimming.

That does not mean that GE has become whistle-clean. For one thing, Doubleday says, "We don't know everything that is going in (to the river and lake from GE), and probably Jim Thayer doesn't even know everything that is going in."



The thermal-oxidizer in Pittsfield, one of six in the country, vaporizes a variety of GE wastes.

And for another, GE violated the limits the EPA set on discharges of phenol and suspended solids in both April and May, as well as the permitted level of acidity.

The reason, according to Thayer, is that the EPA limits are unrealistically stringent.

Drainage from the city goes through the plant, Thayer said, accounting for much of the elevation in suspended solid readings. "I can't see installing two parallel drainage systems."

AS FOR THE ACIDITY LEVEL, Thayer said, city water coming into the plant is more acidic than the water GE is allowed to discharge out. "We spent considerable money trying to raise the Ph (the measure of acidity or alkalinity), but it's like turning the tides back." And in addition, he said, the river itself has its headwaters in limestone and acts upon the acid like Alka-Seltzer. "When the water (from the plant) contacts the river, it springs right back to seven (the Ph number for a neutral liquid)."

GE's efforts have not turned the environmental clock back 75 years, but Thayer has reached the point where meeting ever-higher governmental standards is like getting the last bit of ketchup out of the bottle — it takes a great deal of effort to produce a very limited result.

Thayer recalls, almost wistfully, the early days of GE's pollution control program when "there was a lot to do. It was nice," he explained, "in the beginning of the game, when everything you did made a great difference." □