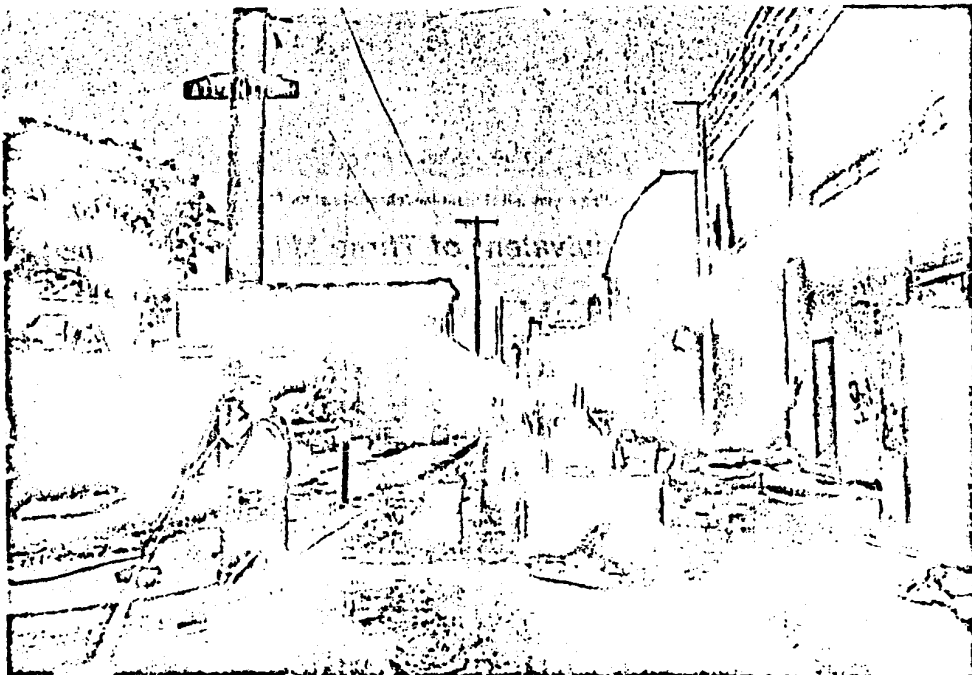


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PCB / polychlorinated biphenyl: They were making "mud pies" with it in Kensington last week. They're battling over it in Gloucester County. First produced in 1929, it has been used in everything from envelopes to electrical transformers, paints to carbon paper. But it has also become an insidious poison, perhaps the world's most persistent pollutant - a 'miracle' invention turning on its creator.



AP Wirephoto to AP Wirephoto

Workers hose the street and scoop up sand used to absorb polychlorinated biphenyl spilled in the Kensington section of Philadelphia.

Insidious chemical contaminates life

By WARREN FROELICH
Of The Bulletin Staff

It has been a quiet chemical invasion.

Unless, the insidious poison has crept across the borders of much of the world's developed nations over the past half century, contaminating food, animal life and ultimately their human residents.

Even today the chemical called polychlorinated biphenyl (PCB) — at one time considered a boon to industry and a triumph of scientific wizardry — remains perhaps the world's most persistent pollutant.

And just west the chemical left its acrid calling card again, when 600 gallons of oil containing the substance leaked from an abandoned factory in the Kensington section of Philadelphia.

Neighborhood children, not knowing the dangers, were seen playing with the oil which had accumulated in puddles in front of their homes. The small burned throats and caused tears in eyes. Those known to have come in contact with the substance were told to turn in their contaminated shoes and clothes to city health officials.

Blockades were posted along the affected area. Plans called for 600 feet of oil-covered roadway to be dug up and hauled to an open New York landfill. And federal and city health officials on the scene said they would have to make a door-to-door survey of residents who came in contact with the chemical.

This, however, was not the first brush that Philadelphia-South Jersey area residents have had with PCB.

In 1976, a federal study found small amounts of the chemical — used in the past for a wide variety of heat-resistant industrial products — in fish samples taken from the Delaware River.

Later that same year, a study of workers exposed to PCBs at the Shell Oil Refinery in Piquette, Mich., showed several had developed malignant melanoma, a skin cancer.

Tests have shown the chemical in mother's milk among Pennsylvania residents.

— And a battle is raging at present in Gloucester County, N.J., where residents are protesting plans to burn PCB at the Ralston Environmental Services Inc. in Bridgeton. The chemical is being collected from Public Service Electric and Gas Co. and other large companies inside and outside New Jersey.

But clearly the spread of PCB has not been confined to the borders of the metropolitan Philadelphia area.

According to one study by the U.S. Environmental Protection Agency, more than 90 percent of all Americans have detectable levels of PCB stored in their flesh. Other studies have found the chemical spread widely throughout the nation's waterways, making fish in many areas inedible.

True effects

"The true effects of PCBs and their contaminants on the human population, our rivers, lakes and streams and on their plant and animal life will not be known for a number of years," says Dr. Thomas H. Corbett, a clinical investigator at the U.S. Veterans Administration Hospital in Ann Arbor, Michigan, and author of "Cancer and Chemicals."

Indeed, the history of the oily, reddish brown substance has been almost a classic example of a "miracle" invention turning on its creator.

PCB was first produced in 1929 to help refine lubricating oils. The manufacture of PCB later became a major enterprise of the *Windsor Corporation*, which eventually became the world's leading supplier of the chemical.

The substance, produced under a controlled chemical reaction in which chlorine replaces the hydrogen atoms of an organic (carbon-containing) compound called biphenyl, was incredibly stable. Because it would not easily break down in nature, had a burning point of 1,200 degrees Fahrenheit and was a poor conductor of electricity, it became an invaluable industrial tool.

Soon it was being used for everything from adhesives for brake linings, envelopes and tapes to additives in electrical transformers and paints, epoxy resins and the manufacture of "carbonless" carbon paper.

By 1973 Monsanto had manufactured about 1.4 billion pounds of the substance, according to Federal Government reports. About 120 million pounds had been exported overseas and another 20 million pounds destroyed. The rest remained in the United States, with 750 million pounds still in service. Another 400 million pounds had been dumped in landfills or in the nation's waterways.

Evidence of hazards

As the chemical slowly built up in the environment, the evidence of its hazards also began to accumulate.

In 1953 scientific journals were reporting that workers exposed to high concentrations of PCB suffered from unusual symptoms — acne-like blemishes all over their bodies, loss of appetite, and impotence.

And a study by the New York State Department of Labor published in 1949 reported widespread skin disorders among workers handling electrical equipment containing PCB. Two of the workers died from liver disorders.

But despite these studies, the use of the chemical proliferated.

In 1968 the substance was first detected in the environment by Dr. Sven Jonsson, a Swedish chemist from the University of Stockholm, who found accumulations in fish and birds.

Soon other scientists around the world were doing their own studies. High levels were reported in fish from the Hudson River to Lake Michigan. People were advised not to eat the fish from the Merrimack River in Massachusetts to the Saint Johns River in Florida, from the Rio Grande to the Colorado River system in the west.

While traces of the chemical began turning up throughout the environment, other studies began to point to further warnings of the chemical's potential harm to man.

In 1968, about 1,000 Japanese were sickened after eating rice contaminated with PCBs. A following study, conducted on 180 victims of the so-called "Yusho" incident, found skin rashes, darkened pigmentation, swelling of limbs, numbness and a reduction in growth of the male children. Of 104 fourteen

pregnant women, two gave birth to stillborn children. Four other infants had birth defects.

Research on rats

In the lab, scientists found that rats fed massive doses of PCBs developed liver cancer. Monkeys, given large quantities of the chemical, lost their hair and developed acne-like lesions. Their offspring were undersized and showed learning disabilities.

Prompted by the accumulating evidence on PCB and other poisonous chemicals, Congress in 1976 passed the Toxic Substances Control Act which, among other things, prohibited the manufacture, processing and sale of PCBs in the United States.

And the U.S. Food and Drug Administration plans to lower the permissible level of the substance in food, particularly fish, to safer levels. The present standard of 5 parts per million, attacked by environmental groups as not being strict enough, is expected to be lowered to 1 part per million — the level now in force in Canada.

But not everyone is happy with the law or other regulations proposed to combat the problem.

According to Jacqueline Warren, staff attorney with the Washington-based Environmental Defense Fund, toxic substances regulations proposed by the U.S. Environmental Protection Agency don't go far enough. She said in an interview that her group plans to file suit this week against the EPA over the matter.

Mr. Warren explained the EPA regulations allow a program to maintain the burden of millions of pounds of PCBs already in the environment. As a result, she said, much of the PCB problem will remain.

"There are still 750 million pounds out there that are still being used," she said. "The regulations don't apply to those. This isn't the dramatic phase-out of PCBs that Congress had intended."

"The whole thing is a sham."

Added Robert H. Boyle, author of "Malignant Neglect" — an account of known or suspected cancer-causing agents in the environment: "PCBs will be here to poison the environment for years and years to come."

Deliberate PCB Spill Brings Arrests

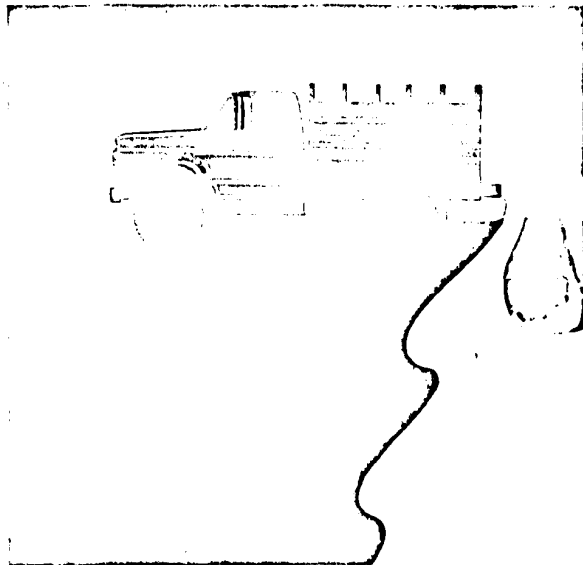
There was something in the hot, August air that got to people. They complained of nausea, weakness, dizziness, and irritation of the eyes, nose, and throat. The complaints poured in from the residents of rural areas in eastern North Carolina.

State and local health officials were perplexed. Then someone mentioned that the illness might be linked to a stain that had recently appeared alongside roadways in the area. Vegetation within the stained areas was dying, it was noticed. Someone else remembered helping a driver with his truck that was stuck one night. It had contained a protruding pipe for discharging liquid.

Officials of the North Carolina Natural Resources and Community Development Department tested the stained areas and found that the oily substance on the roadsides contained a highly toxic PCB (polychlorinated biphenyl). White, crystalline PCB's are not easily biodegradable. They have been used since 1929 but have been tightly controlled by the Federal Government since the late 1960's when laboratory tests linked them with liver cancer, acne, dizziness, and cramps.

PCB's have been mixed in oil, mainly by utility companies, for use as an insulator for electrical transformers and capacitors. And that's what was killing the plant life along the Carolina roads. Specifically, it was identified as Arochlor 1260, an insulator manufactured by Monsanto Co.

It was found that some 210 miles of roadways in 15 counties were contaminated by the substance. Spray that had escaped into the air was causing the human ailments. Once the problem was pinpointed, health officials set out to inform residents about PCB's



and the consequences of the spill, while police officials went to work to track down the polluters.

Authorities knew that the transformer fluid normally is disposed of at three federally approved dumping sites in the country, the closest one being a landfill operation at Livings-ton, Alabama. The cost of dumping a 55-gallon drum there is \$58, but doesn't include the expense of getting the drum to the site.

With that knowledge, authorities began to suspect that someone was trying to save money by spraying it around the countryside to dispose of it. Nine State Bureau of Investigation officers were assigned to the case. They began to check area transformer salvage firms—firms that buy up old transformers for scrap metal.

One is the Ward Transformer Co. of Raleigh. But Ward's records showed it had paid a New York State hauling firm to take the PCB fluid off its hands.

The trail ended when attention turned to the New York firm, Transformer Sales Co., owned by Robert J. Burns of Allegany, New York. Burns was unable to explain to the satisfaction of the investigators what his firm had done with the fluid. He and his two sons were charged with dumping the oil. They pleaded guilty in January in the Federal court at Raleigh. Sentencing is pending.

Also charged in the case is Robert Earl Ward III and his son, of the Ward Transformer Co. Authorities say the Wards conspired with the Burns firm to arrange for dumping some 15,000 gallons of the PCB fluid along the rural roads. According in the charges, the Burns hauling firm was paid \$1.70 a gallon to dispose of the oily substance, but 70 cents of this was kicked back to the Wards. The Wards have pleaded not guilty to the charges, brought in Federal grand jury indictments.

To calm fears about the spills and

to educate residents on the extent of the problem, officials from the State Department of Human Resources and Agriculture as well as county health personnel hand delivered notices to the affected areas. People were advised to avoid walking on the contaminated strips and to wash off their feet, shoes, and any clothing that came in contact with the oily substance.

The residents were also told that tests would be made by request on any individuals who believed they had been exposed to the PCB. Assurances were given that there was no immediate danger from the spill. It was pointed out that the chemical was trapped in the soil and that it would

probably be 2 to 3 years before it migrates to any extent. However, they were warned to keep livestock from grazing in the exposed areas. Some gardens were plowed under because of contamination.

The Food and Drug Protection Division of the State Department of Agriculture found contamination of up to 219,000 parts per million in grass at the stained sites. However, the exposure to vegetation dropped off dramatically just outside the contaminated areas. Wells tested within a few feet of some sprayed areas showed no PCB concentrations. State and FDA officials are watching closely to see if farm crops have been affected. Of lin-

gering concern was the possibility of dust migrating from the affected areas into other areas.

Also of continued concern is what to do with the contaminated soil. At one point, officials proposed removing the soil from the sprayed areas—some 10,000 truckloads—and disposing of it at excavation sites in the State, but residents near all the proposed sites voiced strong opposition. Subsequent consideration was given to finding a method of treating the soil to confine the PCB. If that isn't feasible, the 10,000 truckloads will probably have to be taken to the Alabama disposal site. The cost could run into millions of dollars.