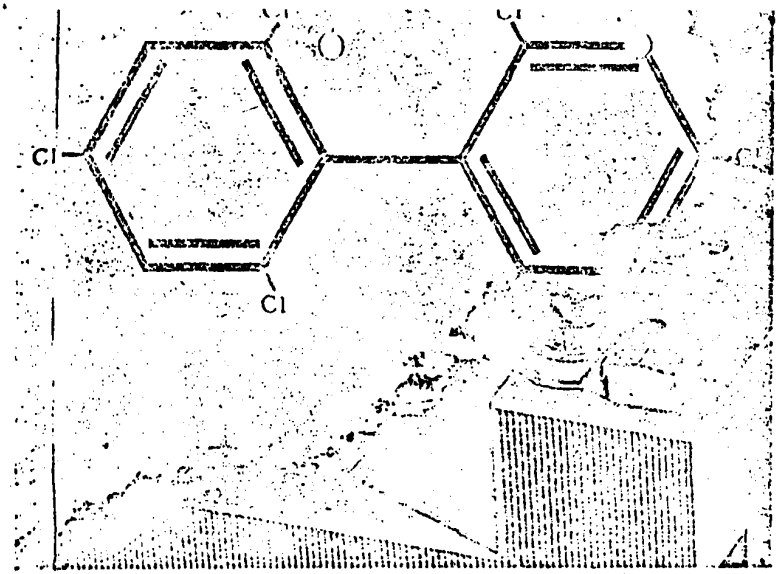

Insidiou... formula

The twin plumes of ... gomery County's sou... cinerator. White, virt... clean steam, they say... not to clean, really, wh... comes to what can't be ... lurking in the logg... ready and willing to l... ried on the wind to ri... lakes and land and ... people near and far. ... Polychlorinated bip... they call them. PCB... short. Insidious, sneaky ... slow about the way ... poison. But definitely ... like the chemical sym... just one species (2, 4, ... 4', 5' Hexachlorbip... they call it) imposing ... upon this picture ... ... over so much less obvi... upon the lives of men

PCBs: They won't go away

By Jim Babcock ...
Journal Herald Staff Writer

Jump Aboard the Wonderful World of PCBs.

But don't get unnecessarily panicky over it.

Dayton surrounded by, say, a maybe-more-potent relatives of the "lord" pesticides, which do all kinds of bad things to fish, fowl and man, doesn't necessarily spell doom ... at least not in the minds of the state and federal agencies we have to worry over such things.

The PCBs, more formally known as polychlorinated biphenyls, are just staying with us. They're put there by the making and destroying of countless industrial products which used their durability and inertness to make many manufacturing processes and processes land destroying — that's all.

OR PRACTICALLY ALL, except for the fact they've been turning up recently in some unexpected places, and they still seem to be accumulating in the places they are expected to be. And even a newspaper reporter can go out and find them fairly practically anywhere he looks — including fishing spots near the county morgue.

It is the kind of situation for which words like "ubiquitous" and "insidious" are apt.

Perhaps some remember how the PCBs nearly did in a Franklin County dairy farmer and his family a couple of years ago or how they were found early last year contaminating the Miami River; or how they shuttered the nation's chicken and egg industry just about a year ago.

THE SUBJECT keeps coming up because there seems to be an endless supply of the virtually invisible chemical compounds.

The latest revelations come from the U.S. Dept. of the Interior. PCBs have been found "in an unexpectedly large number of sampling points in streams, lakes and reservoirs throughout the nation," Interior reported.

The finding was made by U.S. Geological Survey scientists who had collected and analyzed more than 2,000 water and bottom sediment samples during the past two years, according to the Interior Dept.

THE SCIENTISTS were reported to be particularly concerned by PCBs in some newly developed real estate lakes and in "relatively remote areas essentially unaffected by man" — but Upper Twin Creek in southeastern Ohio's Scioto County.

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The PCB concentrations ranged from .1 to 4 parts per billion in river and lake water and from .006 to 2.2 parts per million in river and lake bottom sediments.

The concentrations in the river and lake water compared to a .01-parts-per-billion limit the Federal Environmental Protection Agency has recommended but never set for river and lake water.

The bottom sediment concentrations compared only to themselves, as none as limit has been recommended.

THERE ARE NO required limits because "a safe level for PCBs has not been generally accepted to date."

But rest assured that there is no evidence that such low concentrations are harmful to humans, and "state and federal officials have been alerted to the occurrences," Interior reported.

PCBs invade Miami Valley

And that was pretty much it except for some background information on PCBs ... And for the fact the The Journal Herald decided to see if there are PCBs invading the Miami Valley.

So, the PCB hunt was born, with the aid of Trace Element Trends, a division of Zipf Laboratories which specializes in detecting traces of exotic elements and chemicals in the environment.

The hunting grounds included the small lake behind Englewood Dam, Lake Laramie in eastern Shelby County, Tawawa Lake in Tawawa civic park in Sidney, Kiser Lake in northeastern Champaign County, the reservoir at Troy, Buck in Dayton's Eastwood Park and three real-estate lakes where go by the names of Lakengren, Shawnee and Marmalade.

WATER AND BOTTOM sediment samples were collected at each lake and taken in separate containers to the Trace Element Trends laboratory.

At the laboratory, technical director Dan Grove put each sample through the same gas chromatographic analysis procedures used by the U.S. Food and Drug Administration when it is looking for PCBs.

Grove found no detectable PCB concentrations in the water and sediment from Englewood, Laramie and Tawawa Lakes.

BUT IN THE remaining samples he found:

—The bottom sediment from Kiser Lake contained 11.7 parts per billion of Aroclor 1242, one of about 114 possible varieties of PCBs, even though the lake's water showed no detectable PCBs.

—The Eastwood Park lake water was also "clean." But sediment from the bottom of the lake contained 4.4 parts per billion of Aroclor 1242.

—Lakengren's water sample was stained with .1 parts per billion of Aroclor 1260 and .3 parts per billion of Aroclor 1254 — and its bottom sediment contained 4.7 parts per billion of Aroclor 1242.

—Shawnee Lake's water and sediment samples appeared free of PCB. But a small batch from that lake contained .32 parts per billion of Aroclor 1242, and a small creek contained 22 parts per billion.

—Marmalade Lake's water was unstained, but the sediment sample from that small impoundment read out at 30.5 parts per billion of Aroclor 1242.

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Distribution irregular

Grove said the apparent inconsistency of finding PCBs in bottom sediment samples (and the fish flesh) but not in accompanying water samples probably resulted from not obtaining large enough water samples, or from not taking the samples from the right areas in the lakes.

"These things (PCBs) are pretty irregular in the environment," he said. "We have found real discrimination differences in sampling. At one end of a lake you may have a lot, and at the other, you may have none at all."

Grove said the size of a water sample can make a difference simply because the more water there is, the more likely it is that somewhere as small as a part per billion, or even a part per trillion, will show up.

He also said these variables make it impossible to say the lakes where no PCBs were found are truly free of the chemical compounds.

"THAT'S WHY the best place to look for these things is in animals. The PCB is very lipid soluble (will dissolve in fat). So when, say, a carp eats up mud containing PCBs, you can bet most of the PCBs he gets from the mud end up in his fat . . . They just keep accumulating there, like the pesticides."

Pesticides, she said above, the "chlorinated hydrocarbons," have been virtually banned from use because minute and virtually undetectable traces of them in somebody's cornfield have a way of making their way into nature's food chains where they begin accumulating — first in the smaller living things, then in the larger living things that eat the smaller things . . . until they finally become a toxic-making dosage for some animal, or for man.

The damage they have done in that manner is believed to include the thin eggshell syndrome which has just about wiped out the California condor, the peregrine falcon and the bald eagle.

And what the pesticides do, the PCBs are suspected of doing — only maybe more so.

"PCB RESIDUES constitute an important human reproductive burden," says a May article in the American Journal of Public Health. "Long-term, low-level exposure effects seem more pervasive, but there is present concern regarding personal carcinogenic, teratogenic and mutagenic effects."

In other words, the PCBs may be responsible at each age — in addition to reproductive problems for birds and other wildlife — cancer, genetic damage and mutations among the rest of us.

"And that is pretty scary," Grove said. "The fact that it is everywhere in the whole world and a few decades without an even known chemical or chemistry in some efforts; and now people are surprised it is a pervasive . . . Well . . . it is here and it is going to be around for decades. And if it's toxic . . . if it really is a teratogen or a mutagen . . . it seems pretty hopeless."

More research is needed

But these kinds of things are "ah" right now.

First it's got to be clearly established if and how PCBs can reach the man — through the food chain or some other source. Then it has got to be established what concentrations in the human body the compounds might begin to do damage. And then it's got to be determined what kind of damage the things can do.

"It will take much more systematic research than is being done now," Grove said. "There is just too much we don't know."

The federal government has begun to sponsor some of the kinds of research Grove believes is needed. It also has taken the initiative to limit PCB concentrations in food products to a maximum of 5 parts per million, and to propose setting stricter banks for special items like baby food and milk.

BUT SCIENTISTS like Grove say the limits so far seem to have been "pulled out of the air" rather than based on any real scientific knowledge of where the PCBs begin to become toxic. And the general attitude of governmental agencies toward PCB pollution is probably best expressed by Andrew Turner, source pollution chief for the new Ohio Environmental Protection Agency's division of surveillance.

"To me, pollution this is not one of the more urgent problems," he said. "It's true that these things are very persistent and do not degrade in nature. So they will spread around in these low concentrations . . . but the PCB problem just has less urgency than some of the major air and water pollution problems."

Meanwhile, scientists do know PCBs are reaching at least some humans. The article in the American Journal of Public Health supported this knowledge in a report on the results of a 1970 study done on 725 human volunteers in Charleston County, S.C.

GRAM 1. AND The Journal Herald brought the proof much closer to home by obtaining new human fat samples from the county morgue and analyzing them for PCBs.

Two of the samples contained no detectable PCBs. But seven were contaminated with from 0.2 parts per million to 2 parts per million of Aroclor 1254, and one sample also contained 20 parts per million of Aroc. - 1254.

Grove said there is no way to say whether any of these concentrations were at dangerous levels because no one knows yet what that level is.

He also said it would be difficult to link the human PCB contamination to that found in the area lakes because they generally are not the same kind of PCBs.

And beyond that, it would be just shooting in the dark to try to say where any of the PCBs have come from because there are countless possible sources, he said.

PCBs have many uses

"There are just so many ways they are used," he shrugged. "I'll bet they're in the paper you're using here . . . And your typewriter ribbon . . . and the ink on your newspaper . . ."

PCBs are, or were, used in a large variety of ways mainly because of their properties, which include a high boiling point, low vapor solubility, high electrical resistance, an ability to mix with organic solvents and polymers, and a "remarkable thermal stability and resistance to chemical degradation."

Their practical uses are classified as "closed" and "consumptive."

The closed systems uses include electrical capacitors and transformer, heat transfer systems and hydraulic fluids.

The consumptive, or open system, uses include being ingredients in synthetic rubber, paints, plastics, wax insulation, caulking material, cutting oils, adhesives, sealants, paper, printing inks and protective coatings for wood, metal and concrete.

THEIR USE in closed systems dates back about 40 years and is not generally blamed for the current environmental contamination because there supposedly is no way the compounds can get out of a closed system into the environment.

There was in open systems is more recent and is generally blamed for almost all of the dirty work that reads out as a world-wide invasion by PCBs.

The presence of the PCBs in the environment was unknown until as recently as 1966, when a Swedish scientist named Jensen scanned there while examining fish and bird specimens for the presence of chlorinated hydrocarbon pesticides.

Their presence in this country was verified in 1967 by a pair of California scientists, likewise looking for chlorinated hydrocarbon residues. And since that time, they have been turning up in just about every place the pesticides are being found.

The major sore so far toward halting the escape of the compounds into the environment has been a voluntary decision by Monsanto, the only manufacturer of PCBs in this country, to stop producing and selling them for consumptive or open system uses.

BUT THE QUALITIES that have made the PCBs attractive to industry, particularly their durability, not only seem that practically every PCB that has ever escaped into the environment is still there, but also that more are still escaping as products in which they were used wear out and are disposed of.

Plagued dairy farmer

Evidence of this first came to light around here with the situation involving Preble County dairy farmer Loren A. Dillman.

Dillman's problem was that he had his silo interior painted with a PCB-containing protective coating which subsequently "broke down" and released the PCBs into silage that was then eaten by Dillman's dairy herd.

The contaminated silage affected nearly every cow in the herd and Dillman was forced to stop selling milk for nearly a year. Also, the Dillman family began to experience a series of mysterious illnesses (including liver problems) which Dillman still thinks were caused by the PCBs.

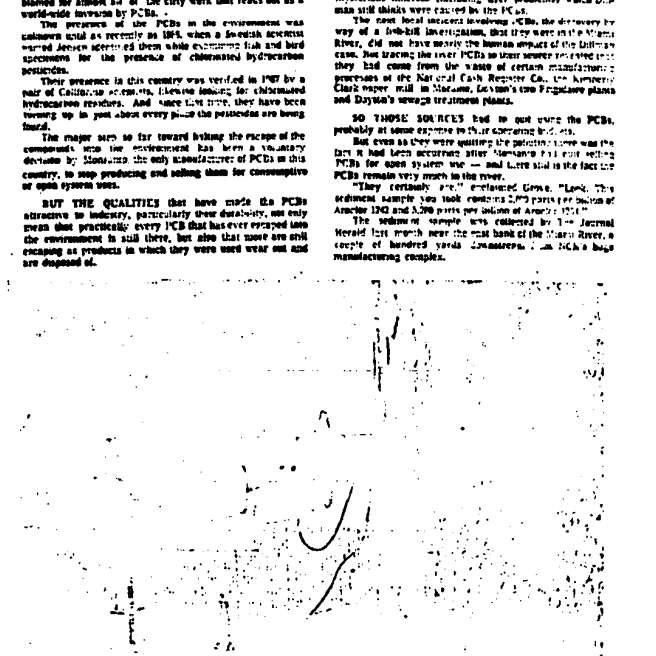
The case local interest involving PCBs, the discovery by way of a fish-kill investigation, that they were in the Miami River, did not have nearly the human overtones of the Dillman case. But tracing the river PCBs to their source received that they had come from the waste of certain manufacturing processes at the National Cash Register Co., the Kemberly Clark paper mill in Lebanon, Lawson's two Frigidaire plants and Dayton's sewage treatment plants.

SO THOSE SOURCES had to quit using the PCBs, probably at some expense to their operating budgets.

But even as they were using the polychlorinated biphenyls, the fact it had been occurring after Monsanto quit selling PCBs for open system use — and have said is the fact the PCBs remain very much in the river.

"They certainly are," exclaimed Grove. "Look. This sediment sample you took contains 2,000 parts per billion of Aroclor 1242 and 3,200 parts per billion of Aroclor 1254."

The sediment sample was collected by The Journal Herald last month near the east bank of the Miami River, a couple of hundred yards downstream from NCR's huge manufacturing complex.



Dan Grove tests for PCBs at county incinerator

THE JOURNAL HERALD Monday, November 20, 1972
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Incinerator a source

Grove said the sample at least confirms the PCBs have great staying power. It also suggests that there may still be PCBs getting into the river, he said.

He then speculated that the most likely source of continued PCB pollution is the county incinerators, where a good many PCB-containing products undoubtedly are being disposed of daily.

So the chemist took a smoke sample from the huge south incinerator in Moraine, and, sure enough, there they were: .020 parts per billion of Aroclor 1242 and .018 parts per billion of Aroclor 1254.

"The problem you see here is that incineration can greatly increase the presence of PCBs in the atmosphere," Grove said after all results were in. "We're looking at gross contamination all over the world from atmospheric fallout that is due to low-temperature incineration of solid waste.

"YOU CANNOT BURN these things except in a hydrogen-oxygen furnace Monsanto designed especially to dispose of them. You can use activated charcoal to clean them out of incinerator smoke. But then the problem is what do you do with the used activated charcoal . . .

"That's the thing, you see. That's why I think you could look almost anywhere for PCBs and find them. They have become an ubiquious contaminant."

Grove also said the PCBs represent only one of a Pandora's box full of "hidden pollutant problems" which our industrialized society is going to have to face up to being responsible for and to doing something about.

Other candidates for the trouble list include evocatively named chemical creations like chlorinated naphthalenes, chlorinated aliphatics and brominated biphenyls. All are sole creations of man and his technology. All are probably in some way disruptive to some ecology once they enter the natural environment.

But like the PCBs, there is not a whole lot that our "control by crisis" environmental policies are doing about them right now.

And with the PCBs, they may — just may — someday help make this the Wonderful World of Almost Nobody.

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